graduate bulletin

2009-2010

UNIVERSITY
OF WYOMING

University Calendar 2009-10

2009

May

S	M	T	W	R	F	S
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31						

June

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October

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November

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December

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Fall 2009

August	20	Residence halls open—8:00 a.m.
	24	Classes begin; Late registration and drop/add begins
	27	Last day to drop first-half block courses
	28	Last day to add first-half block courses
	28	Tuition/Fees due, strictly enforced (see page 23)
September	2	Last day to drop or change sections in semester courses - strictly enforced
	4	Last day to add, late register or change grading options in semester courses; last day to make changes to health insurance selection
	7	Labor Day (offices closed, classes excused)
	29	Last day to withdraw from first-half block courses
October	16	Midsemester
	21	Midterm grades must be submitted online by noon
	22	Last day to drop second-half block courses
	23	Last day to add second-half block courses
	26-30	Advising week for spring 2010
	30	Last day to withdraw from individual semester courses
November	2	Registration for spring 2010 begins
	15	Last day to withdraw from second-half block courses
	24	Last day to withdraw from the university for fall 2009
	25-27	Thanksgiving holiday (classes excused)
December	4	Last day of classes
	7-11	Finals Week
	11	Residence halls close—8:00 p.m.
	17	Final grades must be submitted online by noon

Spring 2010

January	8	Residence halls open - 8:00 a.m.
	11	Classes begin; late registration and drop/add begin
	14	Last day to drop for first-half block courses
	15	Tuition/Fees due, strictly enforced (see page 23)
	15	Last day to add first-half block courses
	18	Martin Luther King Jr./Wyoming Equality Day (offices closed, classes excused)
	21	Last day to drop or change sections in semester courses (strictly enforced)
	25	Last day add, late register, or change grading options in semester courses; last day to make changes to health insurance selection
February	1	Registration for Summer 2010 main campus courses begins
	9	Last day to withdraw from first-half block courses
March	5	Midsemester
	10	Midterm grades must be submitted online by noon
	11	Last day to drop second-half block courses
	12	Last day to add second-half block courses
	15-19	Spring break
	22-26	Advising week for fall 2010
	26	Last day to withdraw from individual courses
	29	Registration for fall 2010 begins
April	2-4	Easter Break (classes excused)
	16	Last day to withdraw from second-half block courses
	23	Last day to withdraw from the university for spring 2010
	30	Last day of classes
May	3-7	Finals Week
	7	Residence halls close—6:00 p.m.
	8	Commencement
	13	Final grades must be submitted online by noon

Notes:

(1) Refer to the *Class Schedule* for information on registration.

(2) Subject to change on not less than 30 days' notice unless an actual emergency arises, in which event the administration may exercise its option to make any change without notice.

2010

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Table of Contents

College and Division Programs

University of Wyoming World-Wide Web address: www.uwyo.edu

The University of Wyoming is built upon a strong foundation of integrity, respect and trust. All members of the university community have a responsibility to be honest and the right to expect honesty from others. Any form of academic dishonesty is unacceptable to our community and will not be tolerated.

The University of Wyoming is an affirmative action/equal opportunity employer and institution and does not discriminate on the basis of race, sex, creed, color, age, national origin, individual handicap, or veteran status in any aspect of employment or services. The institution's educational programs, activities, and services offered to students and/or employees are administered on a nondiscriminatory basis subject to the provisions of all civil rights laws and statutes. Evidence of practices that are not consistent with this policy should be reported to the Employment Practices Officer, 766-3459.

Administration

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Chuck Brown . . . . . President
Jim D. Nieman . . . . . Vice President
Warren A. Lauer . . . . . Secretary
Dave Bostrom. . . . . Treasurer
*New Officers to be elected May 2009

Members

Term Appointed		*Year Expires*
1997	Thomas E. Spicer, M.D., Rock Springs	2009
1999	Taylor H. Haynes, M.D., Cheyenne	2011
2001	Jim D. Neiman, Hulett	2013
2002	James Trosper, Fort Washakie	2013
2003	Richard M. "Dick" Davis, Sheridan	2009
2003	Howard Willson, M.D., Thermopolis	2009
2005	C.H. "Chuck" Brown, Wheatland	2011
2005	Warren A. Lauer, Laramie	2011
2005	David F. "Dave" Palmerlee, Buffalo	2011
2007	David J. Bostrom, Worland	2013
2007	Betty Fear, Big Piney	2009
2007	Ann M. Rochelle, Casper	2013

Ex Officio

Dave Freudenthal, Governor of Wyoming . . . . . Ex Officio
Jim McBride, State Superintendent of Public Instruction . . . . . Ex Officio
Tom Buchanan, President of the University of Wyoming . . . . . Ex Officio
Kelsey Day, President of the Associated Students of the University of Wyoming . . . . . Ex Officio

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Myron Allen . . . . . Provost and Vice President for Academic Affairs
Rollin H. Abernethy . . . . . Associate Provost
Nicole S. Ballenger . . . . . Associate Provost
Maggi Murdock . . . . . Associate Provost and Dean of Outreach School
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Nell Russell . . . . . Associate Vice President for Diversity
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Dorothy Yates. . . . . Associate Vice President for Research and Economic Development
Sara Axelson. . . . . Vice President for Student Affairs
David Cozzens . . . . . Associate Vice President for Student Affairs and Dean of Students
Thomas K. Burman . . . . . Director, Intercollegiate Athletics

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Finance:

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Troy Lane . . . . . Chief, Campus Police
Roger J. Baalman . . . . . Director, Facilities Planning
Vacant . . . . . Director, Human Resources
Connie Brizuela . . . . . Director, Institutional Analysis
James Scott . . . . . Director, Physical Plant
Vacant . . . . . University Budget Officer

Student Affairs:

Noah Buckley . . . . . Director, Admissions
Robbie Darnall. . . . . Director, Alumni Relations
Patrick Moran . . . . . Director, Campus Recreation
Jo Chytka . . . . . Director, Center for Advising and Career Services
Eric Webb . . . . . Director, Dining Services
Tammy Aagard. . . . . Registrar, Office of the Registrar
Beth McCuskey . . . . . Executive Director of Residence Life and Dining Services and the Wyoming Union
David Cozzens . . . . . Associate Vice President for Student Affairs and Dean of Students
Pilar Flores . . . . . Director, Student Educational Opportunity
David Gruen . . . . . Director, Student Financial Aid
Joanne Steane, M.D. . . . . Director, Student Health Services
Daniel Socall . . . . . Director, University Counseling Center
Darcy DeTienne . . . . . Director, Wyoming Union

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James Wangberg . . . . . Associate Dean and Director, Academic and Student Programs
Glen D. Whipple. . . . . Associate Dean and Director, Cooperative Extension Service
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Doug Hixon . . . . . Head, Animal Science
Karen C. Williams . . . . . Head, Family and Consumer Sciences
Ken Mills. . . . . Director, Microbiology Program
Mark M. Stayton . . . . . Chair, Molecular Biology
Stephen Herbert . . . . . Head, Plant Sciences
Vacant . . . . . Head, Renewable Resources
Donald L. Montgomery. . . . . Head, Veterinary Sciences and Director, Wyoming State Veterinary Laboratory

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Ricki Klages . . . . . Head, Art
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Edward Clennan . . . . . Head, Chemistry
Ed Muñoz . . . . . Director, Chicano Studies Program
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K. Gary Sherman. . . . . Head, Criminal Justice
Peter Parolin . . . . . Head, English
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Jean Garrison . . . . . Director, International Studies Program
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Richard Anderson-Sprecher . . . . . Head, Statistics
Leigh Selting . . . . . Head, Theatre and Dance
Marianne R. Kamp . . . . . Director, Women's Studies Program
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Penne Ainsworth. . . . . Associate Dean and Chairman, Accounting
Robert W. Godby. . . . . Chairman, Economics and Finance
John Jackson . . . . . Chairman, Management and Marketing
Stuart Webster. . . . . Director, M.B.A. Program

Kay A. Persichitte . . . . . Dean, College of Education
Suzanne Young. . . . . Associate Dean and Director of Graduate Studies in Education
John Cochenour. . . . . Head, Department of Adult Learning and Technology
Mary Alice Bruce. . . . . Head, Department of Counselor Education
Alan R. Buss. . . . . Head, Department of Elementary/Early Childhood Education
Suzanne Young. . . . . Head, Department of Educational Leadership
Allen W. Trent . . . . . Head, Department of Educational Studies
Linda Hutchinson . . . . . Head, Department of Secondary Education
Martin Agran . . . . . Head, Department of Special Education
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Jerry Haman . . . . . Head, Computer Science
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Demitris A. Kouris . . . . . Head, Mechanical Engineering

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June Ren. . . . . Associate Dean for Research
D. Paul Thomas . . . . . Associate Dean for Planning and Development
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Mona Schatz. . . . . Director, Division of Social Work
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James F. Broomfield, M.D. . . . . Director, UW Family Practice Residency Program at Cheyenne
Keith Miller . . . . . Executive Director, Wyoming INstitute for Disabilities (WIND)
Matthew McEchron. . . . . Director, WWAMI Medical Education Program
Rex Gantenbein . . . . . Director, Center for Rural Health Research and Education

Vacant . . . . . Dean, College of Law
Mary D. Pridgen . . . . . Associate Dean
Denise Burke . . . . . Assistant Dean of Law Admissions

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Maggi Murdock . . . . . Associate Provost and Dean, Outreach School

Brent Pickett . . . . . Associate Dean and Director UW/CC Center
Robert Seville. . . . . Associate Dean

Academic Coordinators Outreach School

Jeanie Martinez. . . . . Cheyenne
Janet Bass. . . . . Torrington
Amy McClure . . . . . Riverton, Jackson
Vacant . . . . . .Powell, Cody
John A. Tollakson . . . . . Gillette, Sheridan
Troy Archuleta . . . . . Rock Springs, Rawlins

Maggie Farrell. . . . . Dean, University Libraries
Lori Phillips . . . . . .Associate Dean, University Libraries

Ingrid "Indy" C. Burke . . . . . Director, William D. Ruckelshaus Institute and the Helga Otto Haub School of Environment and Natural Resources
Mark A. Northam . . . . . Director, School of Energy Resources
Michael J. Nutter, Lt. Col.. . . . . Head, U.S. Air Force ROTC
Brenton E. Reinhardt, Lt. Col.. . . . . Head, U.S. Army ROTC
Duncan S. Harris. . . . . .Director, Honors Program
Jane Nelson . . . . . .Director, John P. Ellbogen Center for Teaching and Learning
Anne Alexander. . . . . .Director, International Programs
James Steidtmann. . . . . .Director, Institute for Energy Research and Director, Enhanced Oil Recovery Institute
Mark A. Greene . . . . . Director, American Heritage Center
Susan B. Moldenhauer . . . . . Director, Art Museum

For a complete list of all faculty and staff and their contact information, please see the *UW Campus Directory* or the UW Web site at *www.uwyo.edu*.

Mission Statement

The University of Wyoming aspires to be one of the nation's finest public land-grant research universities. We serve as a statewide resource for accessible and affordable higher education of the highest quality; rigorous scholarship; technology transfer; economic and community development; and responsible stewardship of our cultural, historical, and natural resources.

In the exercise of our primary mission to promote learning, we seek to provide academic and co-curricular opportunities that will:

- Expose students to the frontiers of scholarship and creative activity and the complexities of an interdependent world;
- Ensure individual interactions among students, faculty, and staff;
- Nurture an environment that values and manifests diversity, free expression, academic freedom, personal integrity, and mutual respect; and
- Promote opportunities for personal growth, physical health, athletic competition, and leadership development for all members of the university community.

As Wyoming's only university, we are committed to outreach and service that extend our human talent and technological capacity to serve the people in our communities, our state, the nation, and the world.

The primary vehicles for identifying the specific actions and resource allocations needed to accomplish this complex mission are the university's strategic plans, revised periodically.

Statement on Discrimination and Harassment

A Campus environment characterized by diversity, free inquiry, free expression and balanced by interpersonal civility has always been, and continues to be, a top priority of the University of Wyoming. Civil discourse is an essential aspect of the search for and transmission of knowledge. Words and actions that promote and encourage self-worth, respect, and dignity are consistent with the university's mission. Conversely, words or actions that reflect prejudice, stereotypes and discrimination are antithetical to the mission of the university and can not be countenanced. Specifically, racist and other discriminatory or harassing conduct based on gender, color, disability, sexual orientation, religious preference, national origin, ancestry, or age impair and disrupt legitimate university functions. Every effort, within the context and protection of First Amendment rights, will be expended to eliminate such conduct from the campus community. Teaching our students to live productively in a multicultural/multiethnic society is a process that must take place within a constructive and harmonious multicultural/ethnic environment here at the University of Wyoming. It is the obligation of the faculty, staff, students and the administration of the University of Wyoming to provide this environment.

University Communication Statement

The University of Wyoming assigned email account shall be one of the official means of communication with all students, faculty, and staff. All community members are responsible for all information sent to them via their University assigned email account. Members who choose to manually forward mail from their University email accounts are responsible for ensuring that all information, including attachments, is transmitted in its entirety to the preferred account.

All faculty, staff, and students are required to maintain an @uwyo.edu computer account. This account provides both an online identification key and a University official email address. The University sends much of its correspondence solely through email. This includes, but is not limited to, policy announcements, emergency notices, meeting and event notifications, course syllabi and requirements, and correspondence between faculty, staff, and students. Such correspondence is mailed only to the University official email address.

Faculty, staff, and students are expected to check their email on a frequent and consistent basis in order to stay current with University-related communications.

Faculty, staff, and students have the responsibility to recognize that certain communications may be time-critical.

University Accreditation/Membership

The University of Wyoming, and all UW academic programs are accredited by The Higher Learning Commission, a commission of theNorth Central Association of Colleges and Schools Commission on Institutions of Higher Education, 30 North LaSalle Street, Suite 2400, Chicago, IL 60602-2504, (312) 263-0456 or (800) 621-7440.

In addition, many individual academic programs are either approved, accredited or hold membership as indicated below.

Recognized or accredited by:

- Accreditation Board for Engineering and Technology
- Accreditation Council for Graduate Medical Education
- Accreditation for Pharmacy Education
- American Association of Museums
- American Association of Vet Lab Diagnosticians
- American Bar Association
- American Chemical Society
- American Dental Association
- American Psychological Association
- American Speech-Language-Hearing Association
- Association of American Law Schools
- Association to Advance Collegiate Schools of Business - International
- Commission on Accreditation for Dietetics Education
- Commission on Accreditation of Athletic Training
- Commission on Collegiate Nursing Education
- Computer Science Accreditation Commission (a participating body of ABET)
- Council for Accreditation of Counseling and Related Educational Programs
- Council on Social Work Education
- National Association of Schools of Music
- National Council for Accreditation of Teacher Education
- Newberry Consortium for American Indian Studies
- Society for Range Management
- Wyoming Professional Teaching Standards Board

Holds membership in:

- American Association of Colleges of Teacher Education
- American Association of University Women
- American Council on Education
- American Society for Engineering Education
- Association for the Advancement of International Education
- Association of Academic Survey Research Organizations
- Association of American Colleges and Universities
- Council for the Advancement and Support of Education
- Council of Academic Deans from Research Education Institutions
- Council of Colleges of Arts and Sciences
- Council of Graduate Schools
- Justice Research and Statistics Association
- National Association of State Universities and Land Grant Colleges
- National Network for Educational Renewal
- University Continuing Education Association
- Western Cooperative for Educational Technology
- Western Interstate Commission for Higher Education

Institution Articulation Agreements:

- NOLS - National Outdoor Leadership School
- Pikes Peak Community College, Colorado Community College Commission
- Teton Science School
- Wyoming Community Colleges

Memberships are also held in various discipline-related organizations. For more information, contact the appropriate department.

For information regarding accreditation/membership, contact the Office of Academic Affairs.

The University of Wyoming is a member of, and active participant in, the National Commission on Accrediting, an organization which endeavors to coordinate all accrediting activities.

Assessment of Student Learning at the University of Wyoming

The University of Wyoming is committed to providing students with high quality academic programs and services. As a result, UW is actively engaged in several processes to assess student learning with the ultimate goal of continuous improvement. A university wide assessment plan and individual department plans have been developed and are in various stages of implementation. The purpose of these plans is to identify and articulate student learning outcomes – the skills, abilities, and knowledge that students are expected to acquire by the completion of their programs – and the means by which these outcomes would be measured. Learning is assessed at the university, college and departmental levels. Current assessment activities include, but are not limited to, surveys, interviews, portfolios, exams and senior capstone projects. In order for UW's assessment efforts to be successful, students must become engaged in the process. As such, students will be asked and/or required to complete various assessments as determined by the university or department prior to the awarding of degrees.

For more information regarding the student learning outcomes for a particular program of study, see the section on College and Division Programs. For further information about the University of Wyoming's assessment of student learning efforts, see the Assessment of Student Learning Web page at www.uwyo.edu/AcadAffairs/assessment.

FERPA

Family Educational Rights and Privacy Act (PL-380)

General Statement

The University of Wyoming has the responsibility for effectively supervising any access to and/or release of official data/information related to the educational records of its students. Certain items of information about individual students are fundamental to the educational process and must be recorded. This recorded information concerning students must be used only for clearly-defined purposes, must be safeguarded and controlled to avoid violations of personal privacy, and must be appropriately disposed of when the justification for its collection and retention no longer exists.

In this regard, the university is committed to protecting, to the maximum extent possible, the right of privacy of all individuals about whom it holds information, records, and files. Access to, and release of, such records is restricted to the student concerned, to parents of dependent students, to others with the student's written consent, to officials within the university, to a court of competent jurisdiction, and otherwise pursuant to law.

Access

All official information collected and maintained in the university identifiable with an individual student will be made available for inspection and review at the written request of that student subject to certain exceptions.

For purposes of access to records at the University of Wyoming, students enrolled (or formerly enrolled) for academic credit or audit at the university shall have access to official records concerning themselves.

A request for general access to all official records, files, and data maintained by the university must be made in writing to the registrar or to other person(s) as designated by the university officer in charge of the unit maintaining records. A request for access to official data maintained in a particular office may be made to the administrative head of the office.

When students (or former students) appear at a given office and request access to the university record about themselves:

1. The student must provide proper identification verifying that he or she is the person whose record is being accessed.
2. The designated staff person(s) must supervise the review of the contents of the record with the student.
3. Inspection and review shall be permitted within a period not to exceed 45 days from the date of the student's request.
4. Students will be free to make notes concerning the contents, but no material will be removed from the record at the time.

Recordkeeping personnel and members of the faculty and staff with administrative assignment may have access to records and files for internal educational purposes as well as for routine necessary clerical, administrative, and statistical purposes as required by the duties of their jobs. The name and position of the official responsible for the maintenance of each type of educational record may be obtained from the registrar of the university.

Any other access allowed by law must be recorded showing the legitimate educational or other purpose and the signature of the person gaining access. The student concerned shall be entitled to review this information.

Release of Information

No personally identifiable information shall be disclosed to any individual (including parents, spouse, or other students) or organization except as follows:

1. Disclosure is authorized in writing by the student.
2. Disclosure is to university officers or employees who need to know so as to accomplish legitimate university purposes related to their functions.
3. Disclosure is to a governmental agency, educational organization, parent of a dependent student, or other entity as described by federal regulations or otherwise required by state or federal law. Custodians of records should obtain interpretations whenever third parties request personally identifiable information.
4. When disclosure of any personally identifiable data/information from university records about a student is demanded pursuant to court order or lawfully issued subpoena, the staff member receiving such order shall, if possible, immediately notify the student concerned in writing prior to compliance with such order or subpoena. (NOTE: In fulfillment of its responsibilities to monitor certain state benefit and entitlement programs, the Wyoming state auditor may issue to the university from time to time an administrative subpoena for a listing of currently enrolled full-time students, the students' social security numbers, and information relating to the nature and amount of any educational financial aid being received by such students. Upon being served with such a subpoena, the university will provide the information requested without further notice.)
5. Data/information from university records about students will be released for approved research purposes only if the identity of the student involved is fully protected, or if the research is related to official university business and not publicly disseminated.
6. Information from university records may be released to appropriate persons in connection with an emergency if the knowledge of such information is necessary to protect the health or safety of a student or other persons.

The university officer responsible for the records from which information is released shall maintain with the student's record a listing of disclosures of personally identifiable information, except disclosures in accordance with items 1 and 2 above for which no record need be kept. The listing shall identify the parties who requested or obtained information and the legitimate interests these parties had in making the request.

Public or Directory Information

The following items are considered public data/information and may be disclosed by the university in response to inquiries concerning individual students, whether the inquiries are in person, in writing, or over the telephone:

1. Name;
2. Affirmation of whether currently enrolled;
3. Campus location.

Unless students have officially filed a written request with the university registrar within ten working days after the first day of classes for a semester that disclosure not be made without their written permission, the following items, in addition to those above, are considered public/directory information; may be included in appropriate university/campus directories and publications; and may be disclosed by designated staff members in response to inquiries concerning individual students, whether the inquiries are in person, in writing, or over the telephone:

1. School, college, department, major, or division;
2. Dates of enrollment;
3. Degrees received;
4. Honors received;
5. Local address and phone number;
6. Home address (permanent);

7. Email address;
8. Participation in officially recognized activities and sports;
9. Weight and height of members of athletic teams;
10. Full-time or part-time enrollment.

Letters of Appraisal/Recommendation

Candid appraisals and evaluations of performance and potential are an essential part of the educational process. Clearly, the providing of such information to prospective employers, to other educational institutions, or to other legitimately concerned outside individuals and agencies is necessary and in the interest of the particular student.

Data/information which was part of university records prior to January 1, 1975 and which was collected and maintained as confidential information will not be disclosed to students. Should a student desire access to a confidential letter of appraisal received prior to January 1, 1975, the student shall be advised to have the writer of that appraisal notify, in writing, the concerned records custodian of the decision as to whether or not the writer is willing to have the appraisal made available for the student's review. Unless a written response is received approving a change of status in the letter, the treatment of the letter as a confidential document shall continue.

Documents of appraisal relating to students and collected by the university or any department or office of the university on or after January 1, 1975, will be maintained confidentially only if a waiver of the right of access has been executed by the student. In the absence of such a waiver, all such documents will be available for the student's inspection and review.

If a student files a written waiver with the department or office concerned, letters of appraisal received pursuant to that waiver will be maintained confidentially. Forms will be available for this purpose.

Challenges to the Record

All students shall have the opportunity to challenge any item in their file which they consider to be inaccurate, misleading, or otherwise inappropriate. A student shall initiate a challenge by submitting a request in writing for the deletion or correction of the particular item. The request shall be made to the custodian of the particular record in question.

If the custodian and the student involved are unable to resolve the matter to the satisfaction of both parties, the written request for deletion or correction shall be submitted by the student to such person as designated by the president of the university who shall serve as the hearing officer. The student shall be given the opportunity for a hearing at which the student may present oral or written justification for the request for deletion or correction. The hearing officer may obtain such other information as he or she deems appropriate for use in the hearing and shall give the student a written decision on the matter within 30 days from the conclusion of the hearing. If the decision of the hearing officer is to deny the deletion or correction of an item in the student's file, the student shall be entitled to submit a written statement presenting the student's position with regard to the item to the hearing officer. Both the written decision of the hearing officer and the statement submitted by the student shall be inserted in the student's file. The decision of the hearing officer shall be final.

Grades may be challenged under this procedure only on the basis of the accuracy of their transcription or posting.

Exception to the Policy

It is the position of the university that certain data/information maintained in various offices of the university is not subject to the provisions of this policy with regard to inspection, review, challenge, correction, or deletion. Exceptions to "educational records" include: alumni records, employment records, law enforcement records, medical records, sole possession records, and university disciplinary records.

1. Statements submitted by parent(s)/guardian or spouse in support of financial aid or residency determinations are considered to be confidential between those persons and the university and are not subject to the provisions of this policy except with the written consent of the persons involved. Such documents are not regarded as part of the student's official record.
2. University employment records of students are not included in this policy, except as provided under the Wyoming Public Records Act.
3. With regard to general health data, only that data/information which is used by the university in making a decision regarding the student's status is subject to review by the student under this policy. Written psychiatric or psychological case notes which form the basis for diagnoses, recommendations, or treatment plans remain privileged information not accessible to the student. Such case notes are not considered to be part of official university records. To ensure the availability of correct and helpful interpretations of any psychological test scores, notes, or other evaluative or medical materials, the contents of these files for an individual student may be reviewed by that student only in consultation with a professional staff member of the specific department involved. Records that are subject to FERPA are not subject to the HIPAA Privacy Rule.
4. Records relating to a continuing or active criminal investigation by the University of Wyoming Police Department, or records of said office not relating to the student's status with the university, are not subject to this policy.
5. No student is entitled to see information or records that pertain to another student, to parents, or to other third parties. A student is entitled to review only that portion of an official record or file that pertains to him or her.
6. The personal files, or sole possession records, of members of the faculty and staff which concern students, including private correspondence, and notes which refer to students, are not regarded as official records of the university. This includes notes intended for the personal use of the faculty and never intended to be official records of the university. In order to be sole possession records, they cannot be shared with anyone else.

Rights of Students

Students are hereby notified that controlling provisions of federal law are contained in Sec. 438, Pub. L.90-247, Title IV, as amended, 88 Stat. 571-574 (U.S.C. 1232g) and regulations set forth in the code of Federal Regulations, 34 C.F.R. sections 99.1 to 99.67 (1981). Complaints of institutional noncompliance may be made to the Department of Education as provided in the regulations.

Academic Majors

The university confers bachelor's degrees for completion of academic disciplines established by the faculties of the colleges of Agriculture, Arts and Sciences, Business, Education, Engineering, and Health Sciences. Within each college, faculty expertise is concentrated in schools, departments, divisions, and programs to provide relevant advice, instruction, service, and research. College and department faculty administer the various major disciplines of study in subject areas selected by the students (including, when authorized, multi-college majors). Majors approved by the Trustees are listed below.

Minimum requirements for earning credits or a degree in any established major are fixed in advance and kept current by the faculty of the responsible units. Most established majors allow the students considerable latitude to attain individual goals. Selection of a major enables the student to study a body of knowledge in depth and concentrate on subjects of particular interest. A student may simultaneously earn credits in two majors, if approved by the respective departments.

If a student is not ready to declare a major concentration, an "undeclared" classification is available in each of the colleges. If the student is not ready to declare a college, a classification of "undeclared college and undeclared major" is available. The "undeclared" status is intended to be temporary for purposes of career exploration. Students are advised to declare and concentrate upon a major discipline as soon as possible.

A student who wishes to concurrently pursue a degree in more than one major must have advance approval of the involved college advisers and deans. Requirements for each of the majors must be fulfilled and credits in each must be applied to the same level of degree (i.e. bachelor's, master's, or doctoral). Students should consult with responsible faculty advisers in each major being attempted. Please refer to the section on concurrent majors and dual degrees in this bulletin.

Colleges:

AG: College of Agriculture
AS: College of Arts and Sciences
CB: College of Business
ED: College of Education
EN: College of Engineering
GRAD: Graduate School
HS: College of Health Sciences
LAW: College of Law

Degrees:

B = Bachelor's
M = Master's
D = Doctorate
O = Other

Major Title	*B*	*M*	*D*	*O*
Accounting (CB)	*	*		
Agricultural business (AG)	*			
Agricultural communications (AG)	*			
Agricultural economics (AG)		*		
Agricultural economics/water resources (AG)		*		
Agricultural Education (ED)	*			
Agroecology (AG)	*			
Agronomy (AG)		*	*	
American studies (AS)	*	*		
Animal and vertinary science (AG)	*	*	*	
Anthropology (AS)	*	*	*	
Architectural engineering (EN)	*			
Art (AS)	*			
Astronomy/astrophysics (AS)	*			
Atmospheric Science (EN)		*	*	
Audiology (HS)		*		
Biology (AS)	*			
Botany (AS)	*	*	*	
Botany/water resources (AS)		*		
Business administration (CB)	*	*		
Business economics (CB)	*			
Chemical engineering (EN)	*	*	*	
Chemical engineering (petroleum) (EN)	*			
Chemistry (AS)	*	*	*	
Chemistry (professional) (AS)	*			
Civil engineering (EN)	*	*	*	
Civil engineering/water resources (EN)		*		
Communication (AS)	*	*		

Major Title	*B*	*M*	*D*	*O*
Computer engineering (EN)	*			
Computer science (EN)	*	*	*	
Computer science (professional) (EN)		*		
Counseling (ED)		*		
Counselor education and supervision (ED)			*	
Creative writing (AS)		*		
Criminal justice (AS)	*			
Dental hygiene (HS)	*			
Earth System Science (affiliated major, interdisciplinary)	*			
Ecology (GRAD)			*	
Economics (CB)	*	*	*	
Economics/water resources (CB)		*		
Education (ED)		*	*	*
Education/curriculum and instruction/early childhood development (ED)		*		
Electrical engineering (EN)	*	*	*	
Electrical engineering (bioengineering) (EN)	*			
Electrical engineering (computer engineering) (EN)	*	*		
Elementary education (ED)	*			
Elementary and special education (ED)	*			
Energy Resource Science	*			
Energy Systems Engineering (EN)	*			
English (AS)	*	*		
Entomology (AG)		*	*	
Environment and natural resources (affiliated major) (GRAD)	*	*		
Environmental engineering (EN)		*		
Environmental geology/geohydrology (AS)	*			

Colleges:		**Degrees:**
AG: College of Agriculture	EN: College of Engineering	B = Bachelor's
AS: College of Arts and Sciences	GRAD: Graduate School	M = Master's
CB: College of Business	HS: College of Health Sciences	D = Doctorate
ED: College of Education	LAW: College of Law	O = Other

Major Title	***B***	***M***	***D***	***O***
Family and consumer sciences (AG)	*	*		
Family and consumer sciences/early childhood development (AG)		*		
Finance (CB)	*	*		
Food science and human nutrition (AG)		*		
French (AS)	*	*		
Geography (AS)	*	*		
Geography/water resources (AS)		*		
Geology (AS)	*	*	*	
Geology and earth sciences (AS)	*			
Geology/water resources (AS)		*		
Geophysics (AS)		*	*	
German (AS)	*	*		
History (AS)	*	*		
Humanities/fine arts (AS)	*			
Interdisciplinary studies (GRAD)		*		
International studies (AS)	*	*		
Journalism	*			
Juris Doctor (LAW)				*
Kinesiology and health (HS)		*		
Kinesiology and health/early childhood development (HS)		*		
Kinesiology and health promotion (HS)	*			
Management (CB)	*			
Marketing (CB)	*			
Mathematics (AS)	*	*	*	
Mathematics/science (AS)	*			
Mechanical engineering (EN)	*	*	*	
Microbiology (AG, AS, and HS)	*			
Molecular biology (AG)	*	*	*	
Music (AS)	*	*		
Music education (AS)	*	*		
Music performance (AS)	*			
Music theory and composition (AS)	*			
Natural science (AS)		*		
Neuroscience (GRAD)		*	*	
Nursing (HS)	*	*		
Nursing/early childhood development (HS)		*		
Organizational leadership (Bachelor of Applied Sciences) (AG)				*
Petroleum engineering (EN)	*	*	*	

Major Title	***B***	***M***	***D***	***O***
Pharmacy (professional) (HS)				*
Philosophy (AS)	*	*		
Physical education teaching (HS)	*			
Physics (AS)	*	*	*	
Physics plus (AS)	*			
Physiology (AS)	*			
Planning (community and regional) (AS)		*		
Political science (AS)	*	*		
Psychology (AS)	*	*	*	
Psychology/early childhood development (AS)		*		
Public administration (AS)		*		
Rangeland ecology and watershed management (AG)	*	*	*	
Rangeland ecology and watershed management/ water resources (AG)		*		
Reproductive biology (AG and AS)		*	*	
Russian (AS)	*			
Secondary education (ED)	*			
Self-designed major (AS)	*			
Social science (AS)	*			
Social work (HS)	*	*		
Sociology (AS)	*	*		
Soil science (AG)		*	*	
Soil science/water resources (AG)		*		
Spanish (AS)	*	*		
Special education (ED)	*			
Speech, language and hearing sciences (HS)	*			
Speech-language pathology (HS)		*		
Speech-language pathology/early childhood development (HS)		*		
Statistics (AS)	*	*	*	
Technical education (ED) - available only at the UW/CC Center	*			
Theatre and dance (AS)	*			
Theatre and dance (professional) (AS)	*			
Trades and industrial education (ED)	*			
Wildlife and fisheries biology and management (professional) (AS)	*			
Women's studies (AS)	*			
Zoology (AS)	*			
Zoology and physiology (AS)	*	*	*	
Zoology and physiology/water resources (AS)		*		

Graduate Admission

Applicants must submit the UW graduate application and the nonrefundable application processing fee. Applications may be submitted online at www.uwyo.edu/admissions. Once submitted, the application and fee payment remain valid for three years. One set of official transcripts must be sent directly to the UW Admissions office from each previous collegiate institution.

Domestic applicants must have completed at least a bachelor's degree from a regionally accredited institution. International transcripts will be evaluated for accreditation and U.S. degree equivalency. International applicants must have completed at least a degree equivalent to a U.S. bachelor's. All applicants should have at least a 3.0 cumulative GPA (scale of 4.0).

Applicants whose department requires the Graduate Record Examination (GRE) must request official scores be sent to the UW Admissions office directly from the Educational Testing Service (ETS). Our institution code with ETS is 4855. A score of at least 900 on the combined verbal and quantitative sections is required, (1000 for doctoral programs and 1100 for interdisciplinary). Students can occasionally be admitted provisionally with lower test scores.

Some departments may require scores from the Graduate Management Admission Test (GMAT), rather than the GRE, with a minimum score of 500.

International student applicants for whom English is not the native language must furnish scores from the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), the English Language School (ELS) or other approved test of English communication skills. The minimum paper TOEFL score acceptable for full admission is 540. This corresponds to the Internet-based TOEFL of 76. The minimum IELTS score for full admission is 6.0. Other approved tests will be acceptable at the level of the TOEFL score. Students may occasionally be admitted provisionally with lower test scores. Official scores must be sent directly from the testing agency (i.e. TOEFL scores must be sent from ETS).

Please note that some departments require higher GRE/GMAT/TOEFL scores than what is required by the University of Wyoming.

Three letters of recommendation must be submitted to the department. These forms are available on the Graduate Student Resources Web site.

To obtain graduate, non-degree status, an application, $50 fee, and transcripts must be submitted to the UW Admissions office. Only 12 credit hours taken with non-degree status may apply toward a graduate degree pending approval by the student's graduate committee. This 12-credit-hour rule may be decreased if prior courses were reserved for graduate credit or transfer hours are going to be used on the program of study.

Please note that non-degree students are not eligible for student financial aid. Non-degree graduate students deciding to pursue a degree must apply to and be accepted by the university. If the degree-seeking application is filed within three years after filing the non-degree application, the $50 application fee is transferable.

Graduate applicants should write or call the respective academic departments for questions concerning application status, degree program requirements, deadlines, and supplemental application materials they may require.

Students admitted with graduate standing may elect to take any undergraduate or graduate courses for which they are prepared, subject to restrictions as outlined in the graduate regulations and policies section of this *Bulletin*. However, tuition will be assessed at the graduate level for all courses taken with graduate status. Admission to graduate study does not automatically make a student a candidate for an advanced degree.

Note: Students working toward a second bachelor's degree are not considered graduate students and are subject to all undergraduate regulations.

Residency Student Classification

UW Regulation 8-1 governs the classification of students at the University of Wyoming as resident or non-resident for tuition purposes, and shall be administered by the Associate Vice President for Enrollment Management and Director of Admission.

Student Classification for Tuition Assessment

The University of Wyoming assesses tuition for Wyoming residents at the in-state rate; non-residents are charged out-of-state tuition. The following guidelines shall be administered by the Director of Admissions to govern University of Wyoming students for purposes of in-state or out-of-state tuition assessment for courses of study offered at the university. University-sponsored courses of study arranged with institutions outside Wyoming may have different residency requirements.

1. The following students are Wyoming residents:

   a. Individuals who are financial dependents or under the age of 24 with a parent, guardian or spouse who lives in the state of Wyoming.

   b. Individuals who are recipients of Wyoming high school credentials.

   c. Active Wyoming National Guard members and U.S. Armed Forces members stationed in Wyoming, and their dependents.

   d. Individuals with a permanent home in Wyoming and who have resided in the state for at least one full year. To determine if a permanent Wyoming home has been established, the following factors are considered:
   - Evidence that any former home has been abandoned
   - Full-time employment performed or contracted for in Wyoming for one continuous year
   - Ownership of home or property in Wyoming
   - One year of continual presence in Wyoming
   - Former Wyoming residency and maintaining state ties
   - Reliance on Wyoming resources for significant financial support
   - Wyoming vehicle registration
   - Wyoming address on most recent federal income tax return
   - A valid Wyoming driver's license
   - Wyoming voter registration

   Residing in Wyoming primarily as a student will not support a claim for resident status.

   e. Graduate students with university-funded fellowships.

   f. Wyoming residents temporarily absent from the state due to military service, attendance at an educational institution, or other type of documented temporary sojourn.

   g. Individuals who have been awarded resident tuition status at a Wyoming Community College and who attend the university within one year of leaving the Wyoming Community College.

   h. The spouse or financial dependent of an individual who is determined to be a Wyoming resident pursuant to this Regulation, except under (1b) and (e) above.

2. The following students are non-residents:

   a. Individuals who do not qualify for Section 1 above;

   b. Individuals who are not U.S. citizens or permanent residents except as provided by Section 1b. above

3. Reduced tuition rates calculated at one hundred fifty percent (150%) of resident tuition are available to the following non-residents.

   a. Graduates of the University of Wyoming and their spouses;

   b. Children, and their spouses of University of Wyoming graduates.

4. Change of residence classification shall be governed by the following process:

   a. An initially assigned non-resident classification may be reviewed by the Director of Admissions when a request and accompanying documentation is provided on or before the first day of classes. A decision on reclassification by the Director of Admissions may be appealed to the Residence Classification Committee within twenty (20) calendar days of the date of the Director of Admissions' decision. No reclassification will be retroactive to previous terms;

   b. Individuals may be reclassified for the following term when facts indicate that a change in residency has occurred since the time of original residence classification;

   c. The Director of Admissions is responsible for the administration of this procedure.

5. There shall be a Residence Classification Committee consisting of three members appointed by the President, chaired by the Director of Admissions who shall not vote. The duties of this committee shall be as follows:

   a. To render interpretations and rulings at the request of the Director of Admissions;

   b. To serve as an appeals committee for students who wish to appeal the decision of the Director of Admissions;

   c. To consider university policies in the area of residence classification and make recommendations to the Trustees of the University of Wyoming.

Applicants with Three-year International Degrees

India

The Graduate Council has adopted the policy as written by World Education Services (WES) as of January 2007. The policy states, "The new equivalency applies only to institutions accredited by the National Assessment and Accreditation Council (NAAC). It takes into consideration the relative standing of a university as reflected by the NAAC grade, and the individual degree holder's performance as indicated by the degree classification of the degree. Accordingly, three-year bachelor's degrees earned in Division I and II at institutions accredited by the NAAC with a grade of A are viewed as equivalent to the U.S. bachelor's degree. All other three-year degrees will continue to be regarded as equivalent to three years of undergraduate study."

Bologna Participants

Applicants earning a three-year bachelor's from a school participating in the Bologna process will be reviewed for possible eligibility of graduate admission to the University of Wyoming. Some applicants may be requested to undergo a credentials evaluation from WES. The fee for this service will be the applicant's responsibility.

Application Deadlines

Potential students should contact the departments directly about the department-specific application deadlines. A general rule, however, is that application materials should be received by the department and the university no less than six months prior to the desired date of admission to receive optimum time for evaluation, consideration, and funding allocation. However, the reality is that admission is a continuous process, and may occur at any time, but this is subject to departmental policies.

Measles, Mumps, Rubella (MMR) Immunization Requirement

The University of Wyoming has implemented a policy to protect the University community against measles (rubeola), mumps, and rubella. All new on-campus students must provide proof of immunity to measles, mumps, and rubella prior to registration. The *Student Immunization and Health History Form* (available on the web at www.uwyo.edu/ShSer/Forms/HealthHistory.pdf) must be completed, verifying compliance with this requirement, and sent to the Student Health Service prior to registration. Effective 9/3/02, two doses of MMR vaccine are required. Other acceptable methods to comply with the requirement are detailed on the Form. Please note that the first page of the form must be verified and signed by a health care provider. Alternatively, a verified copy of an immunization record can be appended to the Form.

The only contraindication to the MMR immunization is a previous severe allergic reaction to the vaccine or vaccine component (neomycin, gelatin). Relative (temporary) contraindications include: pregnancy; persons with immunosuppressive illnesses or treatment; moderate or severe acute illness; and recent receipt of blood products. If you are uncertain as to whether you should receive the immunization, please talk with your health care provider.

Exemptions may be granted to the requirement in two instances: a medical exemption for a contraindication noted above, and a religious exemption. A medical exemption requires a notation of the reason for the exemption and a medical provider signature. *To claim a religious exemption, a notarized form must be completed and attached to the Student Immunization and Health History Form.* If an outbreak of one of these illnesses occurs on campus, students granted an exemption may be excluded from campus for the duration of the outbreak.

For students unable to verify MMR vaccinations, the vaccine is available at the Student Health Service for a nominal charge. It will be administered prior to registration for any eligible student, without an appointment, during office hours. Do not delay verification or immunization until registration, as it is impossible to service all incoming students on one day.

In addition to the MMR requirement, students who are not US citizens are required to have tuberculosis testing prior to registration. This involves a Tuberculosis (Mantoux) skin test, and, if positive, a chest x-ray and consultation with a Student Health Service physician. The student is responsible for the costs incurred for these tests.

Campus Safety

This report includes statistics for the previous three years concerning reported crimes that occurred on campus; in certain off-campus buildings or property owned or controlled by the University of Wyoming; and on public property within, or immediately adjacent to and accessible from, the campus. The report also includes institutional policies concerning campus security, such as policies concerning sexual assault, and other matters. You can obtain a copy of this report by contacting the University of Wyoming Police Department or by accessing the following Web site: http://www.uwyo.edu/campussafety/.

Financial Support

Federal Student Aid

The Office of Student Financial Aid coordinates all student financial assistance available at UW. Available aid for graduate students includes scholarships, fellowships, loans (Federal Perkins, Federal Stafford, and private) and employment (Federal Work-Study).

The Student Financial Aid office will help all qualified applicants to secure aid, but resources are limited. Aid is offered first to those applicants whose materials are completed and received by March 1 prior to the academic year for which aid is sought. Federal Stafford Loans are available to qualified applicants throughout the year.

Prospective students seeking scholarships should send an application for admission, the nonrefundable application fee and a copy of their current college transcript(s) to the UW Admissions office by March 1. Students seeking federal aid or assistance based on their financial need must submit a Free Application for Federal Student Aid (FAFSA) to the Federal Processor. The FAFSA may be completed online. UW recommends filing the FAFSA as early as possible to meet the March 1 priority date. Final responsibility for ensuring that all required documents are received in a timely manner rests with the applicant.

Important: Students are assumed to be full-time when their initial financial aid is determined. If you plan to attend less than full-time in any semester, your aid will be adjusted to reflect your true tuition costs. It is always best to let the Office of Student Financial Aid be aware of your intended enrollment prior to the start of a semester so that accurate amounts of financial aid may be applied to your account. For graduate students, nine hours is considered full-time with 4 ½ hours considered half-time. For Law and Pharmacy students, twelve hours is considered full time with six hours considered half-time. Students must be enrolled at least half-time to be eligible for federal student financial aid.

Most scholarships require the recipient to be enrolled full time in a degree program. Veteran's benefits may be prorated for part-time enrollment and Federal Stafford Loans may only be used by students enrolled for at least half time (a minimum of 4.5 hours for graduate students). Classes for audit are not acceptable for any kind of financial aid. Generally, federal aid is not available for UW Flexible Enrollment (correspondence) courses, for continuous registration hours, for non-degree hours, or for audit hours. For details, ask a financial aid adviser.

To receive federal financial aid (such as Federal Work Study, Federal Perkins Loans, and Federal Stafford [subsidized or unsubsidized] loans) you must meet the following conditions and provide supporting documentation when requested to do so:

- have a high school diploma or its equivalent,
- be enrolled or accepted for admission as a degree-seeking student at UW,
- not be concurrently enrolled in an elementary or a secondary school,
- be a U.S. citizen or eligible non-citizen,
- have a demonstrated financial need (if required),
- maintain satisfactory academic progress,
- not be in default on a federal student loan or owe an overpayment of a federal grant at any institution (or, if so, have made satisfactory arrangements to repay or otherwise resolve the overpayment or default),
- not have borrowed in excess of the annual or aggregate loan limits of a federal loan program (loan borrowers only),
- agree to use funds received only for educational costs,
- register with the Selective Service if required, and
- not have had federal financial aid benefits suspended as result of a felony drug conviction.

Aid recipients must make satisfactory academic progress (SAP) toward their degree to receive federal aid. Academic progress is checked once a year following the end of the spring semester. Reasonable academic progress at UW as a graduate student is defined as:

- maintaining a 3.00 cumulative UW grade point average at a minimum;
- completion of 67 percent of credit hours attempted at UW at a minimum

Students may appeal for restoration of their aid eligibility by filing an appeal form to the director of financial aid, explaining and documenting extenuating circumstances. Please go to the Student Financial Aid website at www.uwyo.edu/sfa for a more extensive discussion of the SAP policy.

Each student who registers has his or her own student account with the university. Once a qualified student has registered, completed all required documents and accepted their awards on their WyoWeb account, the Office of Student Financial Aid will authorize the transfer of funds from UW financial aid accounts to the student's individual account at the university.

Scholarships, grants and federal student loans are credited to the recipient's UW account for each term. Normally, scholarships and other types of aid are awarded for one year at a time and are split evenly between fall and spring semesters, with one half to be paid at the beginning of each semester unless the donor or selection committee specifically directs that it be paid differently.

Payment for hours worked in the Federal Work-Study program are made twice monthly.

Federal Stafford loans are made by commercial lenders. Lenders electronically transfer loan proceeds to the university for direct deposit to student accounts. Federal Stafford Loan amounts may be reduced by amounts up to 4 percent to be retained by lenders as origination and guarantee fees. First-time borrowers of federal student loans must participate in entrance loan counseling (view a video presentation or interactive Web site). All student loan borrowers must participate in an exit loan interview prior to leaving UW.

The university will automatically charge a student's account for tuition and fees based on the student's enrollment. This will be a subtraction entry. Likewise, if the student is living in a university residence hall, room and board charges will be placed on the student's account. Any financial aid credited to a student's account will automatically pay tuition and fees first and then charges for room and board in UW residential facilities. With student permission, any remainder will be applied to other university charges. If a negative balance results, a "credit balance check" will be prepared by the university made payable to the student. This check will be mailed to the student's local address. Each recipient is expected to allocate these funds for use over the balance of the semester.

Students enrolled in a domestic or international exchange program or a study abroad program approved by UW for academic credit are eligible to apply for federal student financial assistance. Likewise, students concurrently enrolled in classes at two or more eligible institutions of post-secondary education may apply for federal aid. A special consortium agreement between institutions must be completed prior to each semester a concurrently enrolled student seeks aid. Those granted Federal Work-Study allocations have opportunities to perform community services to earn their allocation.

Information describing available aid, award criteria, rights and responsibilities of aid recipients, costs of attendance or refund and repayment policies, and schedules is available on the Office of Student Financial Aid Web site at http://www.uwyo.edu/sfa or students may see a financial aid counselor at 174 Knight Hall. Financial aid policies are subject to change without notice to reflect modifications in federal, state and institutional laws and regulations.

Graduate Student Scholarships, Fellowships, Assistance

The Office of Student Financial Aid Web site lists scholarship information regarding eligibility, amount, and application instructions.

Minorty Assistance

UW assists qualified ethnic minority students in pursuing graduate degrees. A small number of graduate tuition and fee scholarships are available on a competitive basis to U.S. citizens or permanent residents of ethnic minority backgrounds (Asian-American, African-American, Hispanic, and American Indian). Graduate assistantships, also available on a competitive basis, provide varying stipends for the academic year. For further information contact:

Office of Multicultural Affairs
Phone: (307) 766-6228

Federal Fellowships/Scholarships

The University of Wyoming participates in programs sponsored by various federal agencies, organizations, and commercial enterprises to fund and assist graduate students. Interested students should contact the head of the department to which they are applying for admission for information concerning fellowships or scholarships.

Graduate Scholarships

A limited number of scholarships are available each year to graduate students. These scholarships are based on merit and are available to students who have not previously received the award, are enrolled in a graduate program, and do not have an assistantship. The scholarship will pay half of the required tuition and fees (excluding the computing fee and other special fees and charges) for the selected students for one academic year. For further information contact the Student Financial Aid office.

Continuation of President's High School Honor Scholarship

Past undergraduate recipients of the President's High School Honor Scholarship may apply for two consecutive semesters of the Continuation Scholarship. A limited number of these continuations are available and will be selected in competition from eligible applicants. The scholarship will pay full tuition and mandatory fees (excluding the computing fee and other special fees and charges) for the selected students for two consecutive semesters. Please see the Graduate Student Resources Web site at www.uwyo.edu/uwgrad for more information and for an application.

See www.uwyo.edu/sfa/schol_book/pdf/Graduatebook2008.pdf for a comprehensive list of available scholarships.

Graduate Assistantships

Graduate assistants have responsibilities in teaching and/or research. The master's level graduate assistantship (100%) base stipend is $11,072 paid over a nine month period. The doctoral level base stipend (100%) is $15,408 paid over a nine month period. Stipends may be supplemental during the summer months. Further, departments may supplement the nine month academic year stipend.

Students interested in assistantships should contact their individual departments. Applications for assistantships should be sent to the head of the department to which application for admission is being made. Until final acceptance for admission is established, an assistantship may not be granted (see Admissions description).

Graduate assistantships (GAs) are awarded only to students enrolled in graduate programs (undergraduates and students classified in the non-degree category are not eligible). Students on provisional admission or on scholastic probation are eligible for GAs only with proper justification from the department or program.

Graduate students who have successfully petitioned for reinstatement following academic suspension are eligible for an assistantship the semester following reinstatement, but only in exceptional circumstances. Awarding such assistantships must be properly justified by the department or program.

Graduate students, including graduate assistants, are required to maintain a 3.0 graduate grade point average to avoid academic probation. If this level of academic competence is not maintained, or if a graduate assistant's performance is unsatisfactory in other ways, the assistantship may be revoked.

The standard assistantship stipend is payable in installments over the academic year (September through May). Graduate students who receive a full stipend are expected to work an average of 18 to 20 hours per week for the stipend. Units may supplement the academic year stipends to higher levels using various resources. Summer augmentation is also available for Ph.D. students who have completed the requirements. Students who receive a full stipend (at least 1.0 x base) must enroll for at least 9 credit hours and is considered a full-time, full-fee-paying graduate student. The full tuition and fee waiver pays for up to 12 credit hours. Students who receive one-half stipend (0.5 x base) also may enroll for nine to 12 credit hours. However, the associated 0.5 tuition and fee waiver will pay for 6 credit hours and half of the manditory fees. Graduate assistants for Summer Sessions must not enroll for more than six credit hours.

The tuition and fee reduction covers only the tuition and mandatory fees for courses in which the graduate assistant actually enrolls. Graduate assistants are not entitled to the difference between the amount stated in an award letter and the actual charges for enrollment. If less than a full stipend is awarded, the tuition and fee reduction is adjusted down to the percentage rate of the stipend.

Health insurance will be paid for graduate assistants for the calendar year. Students may refuse the university insurance. The insurance payment, in such cases, reverts to the university.

Requirements for New Graduate Assistants

Excellence in Teaching

The University of Wyoming prepares graduate students to be scholars and strong communicators. If the members of their discipline are to appreciate their work, students must learn to articulate their discoveries to a wide variety of audiences - from the undergraduates they teach (who, with their guidance, may become scholars like themselves), to the established leaders in their field, to the world at large.

Teaching & Learning Symposium

Graduate assistants who will have teaching responsibilities at UW for the first time are required to attend the Graduate Student Teaching & Learning Symposium. This is offered once a year in August. The Symposium has been designed in cooperation with the Ellbogen Center for Teaching and Learning (ECTL). Sessions are available free of charge to all graduate students.

Many departments also provide specific training. Check with your academic unit about location and times of unit specific training. The ECTL offers excellent semester long workshops and courses to enhance teaching and learning effectiveness.

English Proficiency Assesment Program

International students who will have a teaching assignment will be required to demonstrate English competency through the English Proficiency Assessment Program.

Excellence in Research

All graduate students, as part of their degree program, engage in activities or projects that result in a final, usually creative, discovery-based product. For the majority of graduate students, this scholarship may take the form of a written thesis or dissertation, a performance - sometimes on a certification examination, a portfolio, or a business plan.

Many graduate assistants are expected, as all or part of their assistantship, to conduct research. The nature, intensity, and general expectation of the research is established by the specific academic program and often by a specific professor. Students should communicate with their specific academic unit and research adviser to determine the nature and expectations of research activity.

Research is a vital component of the graduate experience. It teaches self-directed life-long learning and problem-solving skills and promotes creativity, critical analysis and scholarly independence. In many disciplines, publications of research results in the "gold-standard" for achievement. All graduate students should clearly understand measure of professional achievement within their discipline and strive to attain them.

Optional Student Fee Package

Full-time students must enroll for at least 9 credit hours. If you enroll for 4.5 to 8.5 hours of credit, you will be automatically charged for the Optional Student Fee Package. You are entitled to the privileges of a full-time student for the purposes of admission to cultural affairs, university theatre productions, and intercollegiate athletic games; eligibility for services of the Student Health Service, access to athletic facilities, and purchase of student health insurance; and other programs. If a student does not want the full-time student benefits, they must waive them when registering each semester.

Purchase of the Optional Student Fee Package does not classify you as a full-time student for purposes of full-time equivalent status in the Registrar's Office (i.e., loan certification, government statistics, etc.) unless you fit into one of the following two categories:

(a) master's candidates who have a program of study on file in the Office of the Registrar, who have completed at least 90% of the coursework for the master's degree, are working full time on his/her thesis or Plan B paper (certified by major professor and department head), and are enrolled for at least 1 hour; or

(b) doctoral candidates who have a program of study on file, who have successfully completed the preliminary examination, are working full time on his/her dissertation or research project (certified by major professor and department head), and are enrolled for at least 1 hour.

Students who fit within the two special categories described above must fill out the Petition for the Optional Student Fee Package regardless of whether they have an assistantship or not in order to receive the full-time student benefits. If these students also wish to purchase student medical insurance, they must visit the Student Medical Insurance office to complete the necessary paperwork after the petition has been approved.

Tuition and Fees

Semester Tuition and Fee Schedule 2009-10 (subject to change)

The University of Wyoming semester fee schedules are shown below. Different fees are applicable for summer school as published in the Summer Bulletin. The University Trustees and the university administration reserve the right to change the amounts for tuition and fees at any time.

Undergraduate students enrolled for 12 or more hours are considered to be attending full-time. At the graduate level, 9 hours is considered full-time and less than 9 hours is classified as part-time. Fees do not include special fees. Undergraduate and graduate student fees were not available at the time of publication. Please refer to the Accounts Receivable web site for fee information.

Tuition (per credit hour)	Resident	Nonresident
Undergraduate	$ 94.00	$ 358.00
Graduate	$ 183.00	$ 523.00
Pharmacy (Pharm. D)	$ 275.00	$ 615.00
Law	$ 302.00	$ 675.00

Mandatory Fees	Resident	Nonresident
Enrolled fewer than 4 credit hours	$ 30.00	$ 30.00
Enrolled 4 or more credit hours	$ 210.23	$ 210.23
Full-time students **add**	$223.00	$ 223.00
All students **add**	$ 20.00	$ 20.00

Computing Fee

The computer fee is specified for the support of the computer education environment in the college in which the student is majoring.

College of Agriculture, Arts and Sciences, Business, Health Sciences, Law, and Undeclared students:

Undergraduate students (per credit hour)		
up to a maximum of	$ 34.00	$ 2.95
Graduate students (per credit hour)		
up to a maximum of	$ 34.00	$ 3.95

College of Education (per semester)	$ 34.00
College of Engineering (per semester)	$ 59.00

College Fees (per semester)

College of Law - Potter Law Club	$ 20.00
College of Engineering - Engineering Fund for Enrichment	$ 20.00

Note: Some courses have fees and/or delivery fees in addition to those stated above.

Tuition and Fee Payment 2009-2010

All university charges are due prior to 4 p.m. the first Friday of each Fall and Spring Term.

An institutional Payment Plan is available for students who:

1. have made an enrollment confirmation payment of 1/3 total current term charges due plus 100% of prior term charges, required prior to 4 p.m. the first Friday of the term or
2. has "OFFERED and ACCEPTED" financial aid equal to or greater than the 1/3 total current term charges plus 100% of prior term charges.

A $15.00 payment plan enrollment fee is charged per semester. The payment plan allows for two additional payments approximately 30 days and 45 days into the term. Please see the semester class schedule for the exact due dates. Interest of 1.5% per month will be charged on all past due amounts.

Students who have not paid their charges in full or made the enrollment confirmation payment by 4 p.m. on the first Friday of the term will be dropped from classes. A $50 reinstatement fee will be charged to reinstate.

To be reinstated, a student must pay one-third of the anticipated charges plus a $50.00 reinstatement fee. Students owing $75.00 or less will not be placed in the payment plan or dropped. Please check your Student Account on WyoWeb to determine the amount due or contact Accounts Receivable at (307) 766-6232.

Charges for a course delivered by Outreach Credit Programs are due approximately one month before the first day of the class or upon enrollment, whichever occurs later. **Please contact Outreach Credit Programs for details and for exact deadline dates.**

Special Course Registration Fees

Additional charges (special course and college fees) must be paid by students enrolling in those courses and colleges with approved special fees. Fees for these courses and colleges will be indicated in the semester Class Schedule.

Tuition Waivers

If an employee, spouse of an employee or cooperating agency waiver is used for payment of tuition and/or fees, the properly completed and signed waiver must be received by the Accounts Receivable office by the first day of the term. Late waivers will not be accepted.

Financial Holds

A student failing to pay fees, charges, fines, penalties, deposits or short term loans as prescribed by the Trustees of the University of Wyoming shall be denied registration at the university and copies of academic transcripts and/or diplomas until such fees, charges, fines, penalties, deposits or short term loans are paid in full. A ten-day wait is required before a student loan hold can be removed if the debt is paid with a personal check. Contact Accounts Receivable or the Student Financial Operations Office in Knight Hall for information regarding financial holds.

Summer Session 2010

Please refer to the *2010 Summer Bulletin* for rates and applicable deadlines.

Refunds/Cancellations

Tuition and course fees will be canceled or refunded to a student who officially drops a class or classes, withdraws from the university through the Dean of Students office, or changes enrollment status (i.e. non-resident to resident; full-time to part-time) in accordance with the institutional refund policy outlined below.

No tuition penalty will be assessed for dropping and adding during the drop period identified in the term's class schedule unless all classes are dropped or an all-school withdrawal is processed. Students who withdraw from individual courses after the end of the drop/add period will have their charges canceled in accordance with the institutional refund policy outlined below.

Mandatory fees, late registration fees, or service fees are not refundable.

The portion of tuition refund/cancellation is computed from the first day of the term, not class meeting pattern. If a student's initial registration includes blocked classes or short courses that begin at a later date, the refund/cancellation will still be computed from the first day of the term. If a student's initial registration occurs during an approved late registration period, the date for computing a refund/cancellation will be the first day of the term.

Institutional Refund Schedule

Before first day of semester	100%
Semester Class Day 1-8	100%
Semester Class Day 9-15	80%
Semester Class Day 16-20	70%
Semester Class Day 21-25	60%
Semester Class Day 26-30	50%
Semester Class Day 31-35	40%
Semester Class Day 36 on	0%

Examples of these calculations are available in Accounts Receivable.

The refund schedule for Outreach School courses may vary; see the Outreach School course schedule for current dates.

Financial Aid Federal Return of Funds Policy

A student who receives federal financial aid (other than Federal Work Study pay checks) and chooses to complete less than 60% of an academic term is considered not to have earned all the federal aid he or she has been awarded.

- If aid already disbursed is equal to earned aid, no further action is required.
- If aid already disbursed is less than earned aid, additional aid may be offered to the student after he or she withdraws.
- If aid already disbursed is greater than earned aid, UW and/or the student must return some federal funds.

To determine whether federal funds have been earned or must be returned, UW follows this procedure:

1. Determine the percentage of the term the student completed. This is calculated by dividing the number of calendar days (including weekends) in a term into the number of calendar days that the student was in attendance for that term.
2. Apply the percentage of time attended to the total amount of federal aid the student was eligible to receive for the term. This is the student's "earned aid."
3. Subtract the amount of earned aid from the amount of aid actually disbursed to the student. A positive remainder is the student's "unearned aid." A negative remainder is the student's "earned aid" that may still be offered to the student.
4. Determine the amount of unearned aid remaining that must be repaid by the student. Subtract the amount of unearned aid repaid by the institution from the total amount of unearned aid.

All unearned aid will be returned to the federal student loan lender or federal aid accounts in the following order: (1) Unsubsidized Stafford Loan; (2) Subsidized Student Loan; (3) Federal Perkins Loan; (4) Federal PLUS (Parent) Loan; (5) Federal Pell Grant; (6) ACG-Smart; (7) Federal SEOG Grant. Any amount owed by the student on a grant will be reduced by 50%.

The date of a student's withdrawal from UW will be the date of the student's notification to the Office of Student Life of an intent to withdraw. When a student fails to officially withdraw from UW, it will be assumed that the withdrawal date is the midpoint of the semester or the last date of documented academic activity.

UW will repay the lesser of (1) the total amount of unearned aid or (2) an amount equal to the student's institutional charges multiplied by the percentage of unearned aid. "Institutional charges" is defined as charges for tuition and fees, plus room and board charges for students living in UW residence halls and apartments. It does not include such charges as bookstore charges, student health insurance premiums, parking citations, or library fines.

The amount of unearned aid owed by the student on a loan may be repaid under the normal repayment terms of the loan. The amount of unearned aid owed by the student on a grant must be repaid immediately.

Any amount of earned aid not yet disbursed to the student will be offered to the student. Such offers will cover any undisbursed grants first, followed by the undisbursed loans.

Examples of how the amount of unearned federal aid a student must return is calculated are available from a professional adviser in the office of Student Financial Aid. A chart detailing the percentage of earned and unearned aid, by calendar day of the semester, is provided in the term's class schedule. In brief, to determine the percentage of earned federal aid, the calculation will use the total number of calendar days in the term divided by the total number of calendar days the student attended.

Interaction of Federal Return of Funds Policy and Institutional Refund Policy

When a student who receives federal financial aid withdraws from the university, he or she may owe a repayment of federal funds and/or be due a refund from UW or owe an additional amount to UW. The Federal Return of Funds policy will be applied before any refund due under the UW policy is disbursed. For details on the application of these policies to a specific situation, please consult with the Accounts Receivable Office, 250 Knight Hall, (307) 766-6232.

Student WyoOne ID Cards

28 Knight Hall, (307) 766-5268

ID cards are issued to all students during their first semester of enrollment. These cards are used throughout the student's entire career at the university.

The ID card, also referred to as the WyoOne card, is needed to pick up transcripts, financial aid, cash checks, access student health services, attend athletic events, enter recreation facilities, check out library books and materials, food service access, enter residence halls, and other necessities. Visit the online card office at uwadmnweb.uwyo.edu/idoffice/ to make deposits, view transaction history, and access other card management features.

The WyoOne card may also be used as a debit card to make purchases on campus after the deposit account is established. Spouses, domestic partners and dependents of students are eligible for an ID card.

The Grading System

Students are evaluated according to the following grading system:

Grade	*Pts.*	*Definition*
A	4	Exceptional
B	3	Very good
C	2	Fair
D	1	Poor
F	0	Failure (may be assigned as a grade for failure to attend or to indicate failure to formally withdraw)
I		Incomplete (temporary mark pending coursework completion as agreed in a signed document). See section on incompletes below for details.
W		Withdrawal (from the individual course or all courses), only if the student follows the official withdrawal procedure. If a student enrolls in a course and then abandons it (stops attending) without following the official withdrawal procedure, a grade of F will be assigned.
S		Satisfactory (equivalent to a C or better [B or better in courses numbered 5000 or above]; see general information on S/U grading below)
U		Unsatisfactory (see general information on S/U grading below)
P		Passing (equivalent to a C or better, for midterm grades only)
UK		Unable to compute grades (for midterm grades only)

Grade Points

Each letter-graded course carries grade point value computed as: the total credit hours earned in the course multiplied by the point value of the letter grade earned. For example: a student earning an A (point value of 4) in a 3 credit-hour course would earn 12 grade points for the course.

Semester (or Term) Grade Point Average

The semester grade point average (GPA) is the sum of all grade points earned in a semester or term divided by all credit hours attempted for letter grade. Credit hours in courses in which marks of I, W, S, or U were assigned, as well as developmental courses, are excluded.

Cumulative Grade Point Average

The average of all grades earned by a student as outlined below is termed the cumulative grade point average. It is used for determining activity eligibility, honors, probation, suspension, graduation, and for all comparisons or purposes requiring measurement of academic standing.

The cumulative grade point average is defined as the sum of all grade points earned in University of Wyoming residence, correspondence, or the Outreach School, divided by all credit hours attempted for letter grade, with the following exceptions:

1. The credit hours shall not be counted in courses in which marks of W, S, or U were assigned, or in which marks of I (for incomplete) are still in effect.
2. For repeated courses:
   a. First repeat: only the second credit and grade is used to calculate the cumulative grade point average.
   b. If repeated more than once, only the last credit and grade earned is used to calculate the cumulative grade point average.
   c. A student is limited to a maximum of three (3) attempts in any course at the University of Wyoming.
   d. If a mark of W, S, or U is assigned in a repeated course, the previous grade assigned will stand except when an S or U is earned repeating a previous S or U.
   e. Courses applied towards one completed degree may be repeated as part of a second degree; however, the grade and grade point average in the original degree will not be changed.
3. Transfer grades are not counted in the UW grade point average. If a course taken at UW is repeated for the first time at another institution, the credits and grade earned at UW will be deleted from computation of the UW cumulative grade point average if credit for the repeated course is transferred to UW.
4. For graduate students, courses numbered below 4000 are not added in to the semester and cumulative totals, nor computed into the GPA.

Incompletes (I)

A grade of "I" (incomplete) is a temporary grade assigned in those rare instances when no other mark will insure justice to the student. It may be awarded only if the class instructor has approved a petition to be filed prior to grade submission by the instructor to the Registrar at the end of the term in which the student was enrolled in the class. (UW Regulation 6-720)

Time allowed for completing course requirements will normally not exceed 120 calendar days beyond the end of the semester in which the I was given. The dean of a college may designate certain research courses where the 120-day limit may be extended by the instructor; however, the completion date even in these courses should not be later than the time of graduation for the student unless the student is reserving the particular course for graduate credit.

If the final grade for the course is not received in the Office of the Registrar by the date indicated on the authorization, the I will revert to an F. Should graduation occur in the interim, the I can stand permanently or it can still be completed within the specified deadline, but the student's GPA at graduation with all associated honors will stand as computed.

General Information on S/U Grading

The grade of S (satisfactory) is interpreted to include grades A-C and the grade of U (unsatisfactory) to include grades D-F on the conventional grade scale for courses numbered less than 5000 (for courses 5000 or above, the grade of S is interpreted to included grades A and B). Credit hours of S/U courses are counted as hours attempted toward graduation. However, neither the S nor U grade carries grade points and neither will be included in the calculation of the cumulative grade point average.

Students may not take a course for S/U credit to satisfy University Studies Program requirements, unless the course is offered for S/U only; (e.g., POLS 1000, or the equivalent history or economics courses, may not be taken for S/U).

If a mark of S or U is assigned in a repeated course, the previous grade assigned will stand except when an S or U is earned repeating a previous S or U.

Students must signify at the time of registration or schedule modification whether they are taking any course for S/U grades. Faculty will be notified of the student's decision.

The faculties of the various colleges shall determine the number of credit hours of S that may be used to satisfy degree requirements in their programs. They may also place restrictions upon the use of S credits to satisfy college or major requirements. In addition, they may designate particular courses in their colleges as courses to be offered for S/U only.

A student who changes majors within a college or who transfers to a different college may petition for the acceptance of S credits previously earned if such credits are in conflict with faculty-established regulations for the new major or college.

Mid-Term Grades

Mid-term grades for all courses numbered below 5000 are to be submitted by instructors on WyoWeb the week following midsemester. Grades which can be assigned by faculty are:

Grade	*Definition*
P	Passing - for students performing at the A, B, or C level
D	Poor
F	Failure (may also be assigned as a grade for failure to attend or to indicate failure to formally withdraw)
S	Satisfactory (equivalent to a C or better) in cases where the class is offered for S/U or the student has elected the S/U option
U	Unsatisfactory (equivalent to a D or F) in cases where the class is offered for S/U or the student had elected the S/U option
UK	Unknown; unable to compute grade

The UK grade may be assigned if, due to lack of performance assessments such as exams, papers, homework, etc., a faculty member is unable to make a determination of a midterm grade.

Please note that the midsemester grade received in any particular class reflects the assessment of student performance during the first portion of the semester only.

Mid-term grades are available on WyoWeb.

End of Semester Grade Reports

Final grades are available on WyoWeb as soon as possible (usually within five working days) after the close of the semester or term.

Definitions

1. Cumulative semester hours attempted shall be the total of all credit hours attempted through the University of Wyoming, except for credit hours attempted in repeating a course, those in which marks of W were assigned, and those accepted in transfer from other institutions.
2. The cumulative grade point average is defined as the sum of all grade points earned through the University of Wyoming divided by the sum of all credit hours attempted through the university, except for credit hours in which marks of W, S, U, or I are assigned or those of an initial course which has been repeated. When a course has been repeated, only the last grade points and credit hours assigned for repeats of the course shall be entered in the computation of the cumulative grade point average.

Academic Transcripts

Official transcripts of individual academic records at UW are sent from the Office of the Registrar upon written authorization signed by the individual. Individuals may also authorize the release of their academic transcripts through WyoWeb. All financial obligations to the university must be cleared before a transcript may be released or viewed on WyoWeb.

Transcripts are produced on a first-come, first-served basis and one to two business days must be allowed. Individuals are asked to anticipate transcript needs and submit requests to the Office of the Registrar as far in advance as possible. Usually, 10-15 days are needed at the close of a semester to record semester grades and issue transcripts. For fax service, there is a charge of $10.00 per transcript; please allow 3-5 business days. Same-day transcript service is available for a $10 fee (limit of 2 transcripts).

Partial transcripts are not issued. Each transcript includes the complete academic record at the University of Wyoming and the number of credits from other institutions accepted by UW.

Official transcripts of credit earned at other institutions which have been presented for admission or evaluation of credit become the property of the University of Wyoming and are not reissued or copied for distribution. This includes high school records and any other type of supporting documents. Transcripts of work completed at other institutions should be obtained directly from the issuing institution.

Applicability of transfer credit toward any degree is dependent on the curriculum pursued by the student.

In preparing transcripts for graduate students or second bachelor's degree candidates whose undergraduate work was taken elsewhere, the University of Wyoming includes on its transcripts no detailed reference to that undergraduate work, mention being limited to designation of the degree and date received and the name of the institution granting the degree.

Academic Probation and Suspension

Exceptions

Upon the request of a person placed on academic suspension or denied reinstatement, the vice president for academic affairs may review the circumstances and reverse the decision of the dean if the vice president for academic affairs deems it necessary to prevent a gross injustice.

Graduate Students

A graduate student enrolled at the university shall be placed on academic probation at the end of a semester or summer session when his or her graduate cumulative UW grade point average in 4000-level or higher courses is below 3.0. Students who fail to bring their graduate GPA to 3.0 and remove themselves from probation after one semester or summer session will be suspended from the university. A suspended student may petition the dean of the college for reinstatement to the same degree program or to another degree program. The dean will consult with the appropriate department head prior to all petition decisions. A reinstated student will be on probation and may be subject to other performance criteria as specified by the dean in consultation with the department head.

The above GPA requirement is considered to be a minimum requirement. Departments may recommend suspension of students from their degree program based on other performance criteria.

Regulations governing academic probation, suspension, and reinstatement do not apply to students enrolled in the College of Law.

Regulations and Policies

All regulations are subject to change without notice by action of the Graduate Faculty, various administrative officers, the University of Wyoming Board of Trustees, and the appropriate departments and divisions. Published regulations are the minimum requirements for any advanced degree.

Academic Dishonesty

Academic dishonesty and scholarly misconduct will not be tolerated. Academic dishonesty is an act attempted or performed that misrepresents one's involvement in an academic task in any way, or permits another student to misrepresent the latter's involvement in an academic task by assisting in the misrepresentation (UW Regulation 6-802).

If academic dishonesty has been established, the offending student shall receive a failing grade for the course in question. If two such acts have been recorded at different times or in different courses, the student shall be suspended from the university in accordance with UW Regulation 6-802. These actions shall not preclude the imposition of other sanctions by university officers including the loss of benefits from programs, scholarships, and other opportunities normally afforded students.

Admission to Candidacy

Time spent in graduate study or accumulation of credit hours will not necessarily allow a student to become a candidate for an advanced degree. Admission to candidacy is an expression of the judgment of those who have observed the work and reviewed the credentials of the student, and deem the student worthy of the opportunity to complete the work for an advanced degree. Admission to candidacy for an advanced degree requires a specified procedure for specific degrees.

Admission Status Categories

Advanced-degree applicants may be admitted to the University of Wyoming in one of the following categories:

Admitted Graduate Student signifies the applicant has been accepted by the university and by a major department to work toward an advanced degree.

Provisionally Admitted Graduate Student signifies the applicant did not meet the formal admission requirements but has sufficient potential that the university and the major department are convinced that the student will be successful as an advanced-degree candidate. Provisions are usually placed on such students in the form of performance criteria for the first one or two semesters. If the provisions of admission are not met within the specified time period, the student may be denied admission to the university graduate program and the degree program.

The student and an adviser in the major department should monitor progress toward meeting the established provisions. The department is responsible for notifying the university when all provisions have been met.

Students should be certain they understand their admission status.

Armed Services

Time spent in the armed services is not computed in the total time allowed to complete the requirements for an advanced degree; however, students who are eligible and wish to use this time exclusion must file the leave of absence petition (http://uwadmnweb.uwyo.edu/UWGrad/forms&petitions.asp).

CAPP (Student Degree Evaluation)

Graduate students enrolled in certain graduate degree and certificate programs are no longer required to complete a program of study. These students' degree audits are completed internally using the CAPP program. Changes to the students' degree program must still be reported by using the Request for Change in Graduate Program to include listing any transfer coursework. The following degree programs participate: MA – Education, Option: Adult & Post-Secondary Education; MS – Education, Option: Instructional Technology; MS – Nursing; MBA – Business Administration; MPA – Public Administration. The following graduate certificate programs participate: Principal Endorsement – Educational Leadership; Reclamation & Restoration Ecology – Renewable Resources; Family Nurse Practitioner, Nurse Educator, and Psychiatric Mental Health Nurse Practitioner – Nursing; Teachers of American Indian Children and Literacy – Education (Curriculum & Instruction); and Behavioral/Mental Health Social Work and Health and Medical Social Work – Social Work.

Students in other disciplines will have their Programs of Study (POS) transcripted to a CAPP report once their approved POS is on file with the Office of the Registrar.

Accessing Your CAPP Report

Once you have logged on to **WyoWeb**, you can complete the following steps to view your transfer evaluation:
Click on the **Student Resources** (tab at the top of the screen),
Click on the **Registration Tools Channel** (channel on the left side of the screen),
Click on the **Degree Evaluation** link,
Select the **Term** and then hit **Submit,**
Click on the **Generate New Evaluation** and click **Submit,**
Select **Detail Requirements** and then **Submit.**

Students in graduate certificate programs will be required to submit an Anticipated Graduation Date form when the student is ready to complete the certificate program. The certificate will be noted on the student's transcript and a certificate will be awarded by the Office of the Registrar.

The major professor will sign the program of study, Graduation/Title form and Completion of Requirements form in lieu of the committee.

Classified or Proprietary Research

The process of research in graduate education is one of free and open inquiry involving the student and faculty. Final examinations for graduate degrees are open to all Graduate Faculty, and theses and dissertations are accessible to the public upon acceptance by the university unless embargoed as approved in advance.

For the purposes of this policy, classified research is defined as research that has a security classification established by a federal agency. Classified research projects also require approval of the trustees before being initiated. Proprietary research is defined as research for which the sponsor requires a delay in publication.

With the foregoing principle and definitions as guidance, the following policies will be used regarding use of classified and proprietary research for theses and dissertations:

Classified research cannot be used for a thesis or dissertation.

Proprietary research may be used for theses and dissertations. However, any delay caused by the proprietary nature of the research must be alleviated before the thesis or dissertation is submitted to the Office of the Registrar. Such delays cannot exceed six months without the approval of the college dean. Delays greater than 12 months in length will be approved only in unusual circumstances unless embargoed as approved in advance by the college dean. Sponsors of proprietary research should be aware that theses and dissertations are accessible to the public upon acceptance.

Continuous Enrollment

Once admitted, all degree seeking graduate students must maintain continuous enrollment. Unless a formal leave of absence is approved, all students should maintain at least one hour of continuous enrollment in the semester or session they expect to receive the degree. Students should maintain enrollment for two of the three academic semesters. Reactivation will be required if the student has not enrolled in classes within the previous 12 months. Contact your department to investigate your status. The department will contact the Office of the Registrar to initiate reactivation. Students who have been inactive for a long span of time should also investigate the status of their committees, programs of study, and time to degree status. If a summer-to-summer only enrolling student intends to finish his/her degree and graduate during a fall or spring semester, he or she must be enrolled for the appropriate number of hours, as required of all students, during the semester of intended graduation. International students' enrollment status is monitored by the office of International Students and Scholars and the office should be contacted for more information.

Correspondence Courses and Credit by Examination

Correspondence courses and credit by examination courses are not acceptable on graduate programs of study.

Course Numbering for Graduate Credit

Courses offered for graduate credit are distinguished by number as follows:

4000-4999 are primarily for junior and senior students, but also may be used as part of some graduate programs of study

5000-5999 are primarily for graduate students

Courses numbered 5000 or above may be taken by undergraduate students having the necessary prerequisites. If a course is filled, graduate students will have preference and undergraduates may be asked to relinquish their place in the course. Graduate students may enroll in courses numbered 1000-3999 to remove undergraduate deficiencies, but only those numbered 4000 and above will be computed into the graduate GPA and be allowed for graduate credit.

Courses Not Applicable Toward Advanced Degrees

Only courses at the 4000 or 5000 level may be counted for graduate credit. However, some 4000- and 5000-level courses may not be applicable toward undergraduate or graduate degrees. These courses are listed below:

**** 5959. Enrichment Studies in ____. (Any course numbered 5959 is not applicable toward UW degrees.)

EDUC 4740. Field Studies in ____. (Any course in the College of Education numbered 4740 is not applicable toward UW degrees.)

CNSL 5740. Continuing Education in _____.

KIN/HLED 4074. Field Studies in _____.

HLED 4970. Field Experience in Health Education.

Degree Completion

An Anticipated Graduation Date form must be filed for the semester in which graduation is planned. This form puts the student on the list for graduation. If graduation does not occur during the projected semester, the student must submit a new form no later than the deadline date for the new final semester. By the designated deadline, students who are entering their semester of graduation should:

Pay their associated graduation fees (diploma and/or certificate fee plus the digitizing fee if thesis/dissertation is involved) and retain receipt.

Download the Anticipated Graduation Form from the Office of the Registrar Web site.

Submit to the Office of the Registrar

If discrepancies are found during the degree check, the Degree Analyst will contact the student/chair with instructions for resolution.

Following the student's defense, the student will submit a signed Report on Final Examination form to the Office of the Registrar. All students whose programs require a Thesis/Dissertation must submit the document to ProQuest before the last day of classes. Once the final examination period is over, Degree Analysts will review the CAPP audit to verify that any discrepancies have have been corrected, final grades on any remaining coursework have been posted, and all required forms/documents have been submitted. Once all requirements have been met, the degree will be awarded.

Degree Revocation

UW Regulation 8-254

The University of Wyoming is a state higher education institution whose Trustees are legislatively empowered to confer degrees on students who have earned them, upon the recommendation of the faculty. The Board of Trustees recognizes that there may be instances where a degree is awarded to an individual who, upon review, has not properly completed all requirements for the degree. In such instances, the Board of Trustees may revoke the degree. This regulation establishes the process for such revocation.

Grounds for revoking a degree include convincing evidence that the degree recipient failed to complete the requirements for the degree that were in effect at the time of the degree conferral. Included in this category is evidence that the candidate engaged in academic misconduct serious enough to negate bona fide completion of one or more substantive degree requirements. Additional information can be found at www.uwyo.edu/generalcounsel/info.asp?p=3079.

Digitizing Requirement

All graduate students accept as a condition of enrollment that completed theses and dissertations will be published through ProQuest Information and Learning. This involves a special fee. The appropriate form for submitting the thesis/dissertation is available when submitting the project electronically through ProQuest Information and Learning.

Doctor of Education Candidates

The degree of doctor of education (Ed.D.) is offered to competent students who wish to pursue a program of studies and to participate in appropriate activities in preparation for professional service in teaching, administrative, and supervisory positions in education. The program is designed to meet the needs of those for whom intensive research is not a practical prerequisite to vocational goals. Doctoral students are expected to participate not only in organized coursework but also in informal types of activities that will insure breadth of outlook and technical competence.

Each doctoral student must furnish satisfactory evidence of having had three years of successful professional experience. This experience may be in teaching or administration or both. The student's graduate committee will determine what experience shall be required and when this requirement has been satisfied.

At least 36 semester hours must be earned in the major field. The degree requires a minimum of 72 graduate hours (beyond the bachelor's degree) to complete all requirements. In addition to the program of studies in organized coursework, the doctoral student will be required to complete an approved applied project report or dissertation within the major field of professional specialization.

A student who has taken a major part of his/her undergraduate and graduate training at UW may be required by his/her graduate committee to do a specified portion of graduate work at some other institution. The program must be on file in the Office of the Registrar before the preliminary examination can be scheduled.

Doctor of Philosophy Candidates

The doctor of philosophy degree does not represent a specified amount of work over a definite period of time but rather the attainment of independent and comprehensive scholarship in a particular field. Such scholarship will be manifest in a thorough acquaintance with present knowledge and a demonstrated capacity for research. The fulfilling of the following requirements suggests, therefore, only the minimum task one must undertake to earn the doctor of philosophy degree. No amount of time spent in graduate study or accumulation of credit hours entitles the student to become a candidate for this degree.

The program of study must include a minimum of 72 semester hours of credit at the 4000 level or above from UW or equivalent levels from another approved university. This 72-hour requirement may include graduate credits earned while working toward the master's degree in the same area, but at least 42 hours (of the 72) must be earned in formal coursework. Additional credits toward the 72-hour requirement may include additional formal course credits, 5980 Dissertation Research, or 5990 Internship. The program must be on file in the Office of the Registrar before the preliminary examination can be scheduled.

Dual listed Courses

If a course is dual listed at the 4000/5000 level, the course must be taken at the 5000 level to receive graduate credit regardless of whether the course is in the student's primary program area.

The syllabus for a dual listed course must specifically define differential expectations, outcomes and assessment for the 4000 and 5000-level components. These may include but are not limited to intellectual skills, discipline-specific competencies and challenging learning outcomes. For example, students enrolled in the 5000-level course may be required to lead discussion sessions, submit a portfolio, write a paper or may be involved in a service learning component, internship or collaborative assignment designed to provide experience in applying course information in different contexts.

Students enrolled in the 5000-level course will be expected to demonstrate greater sophistication in content expertise, inquiry, creativity, communication, problem solving, analytic reasoning and/or collaborative learning compared with those enrolled in the 4000 course.

Educational Specialist Candidates

(These programs are currently under review)

Coursework leading to the educational specialist degree has been designed for persons who desire additional preparation beyond the master's level but are not interested in pursuing a doctorate.

The program of study must include a minimum of 30 semester hours, 15 of which must be in the student's area of specialization. Six of the required hours must be in the form of specifically designated professional activity in education (such as supervision, administration, research, classroom experimentation, or technical assistance) and must be directed and supervised by the student's major professor or a designee. Approval of the program of study for an Ed.S. student is the admission to candidacy. In accordance with the academic unit's policy or the decision of the candidate's graduate committee, the hours earned toward the Ed.S. degree may, under specified conditions, be used to meet the requirements for a doctorate.

A written report must be submitted concerning the specifically designated professional activity. The graduate committee will evaluate the report for competency in English expression, organization, and significance of the contribution to the student's field of specialization. This report will also serve as a basis for the final oral examination and must be filed with the student's major professor.

Each doctoral student must furnish satisfactory evidence of having had three years of successful professional experience. This experience may be in teaching or administration or both. The student's graduate committee will determine what experience shall be required and when this requirement has been satisfied.

Examinations

Examinations may be required of any graduate student or advanced-degree candidate at such time or of such nature as the department or the student's graduate committee may require. It is standard procedure for doctoral students (Ph.D. and Ed.D. students) to be given a preliminary examination, and for final examinations to be conducted for both master's and doctoral students. It is common for the nature of these exams to differ from one academic unit to another.

Preliminary Examination

The preliminary examination will be held at least 15 weeks prior to the final examination. The preliminary examination may not be given before: (a) the research tool requirements, if any, have been met and certification approved;

(b) at least 30 hours of coursework have been completed; and (c) the doctoral program of study has been approved. The format and conduct of this examination shall be the responsibility of the student's committee, in line with any departmental policies (see specific department).

Following the completion of the departmental preliminary examination, the Report on Preliminary Examination must be submitted to the Office of the Registrar regardless if the student passed or failed. The favorable vote of the majority of the student's graduate committee members will be accepted as passing. In case of failure, the student may attempt the examination once more after not less than one nor more than four semesters have elapsed. When the preliminary examination has been successfully completed, and the report of the committee is on file in the Office of the Registrar, the student is considered a doctoral student admitted to candidacy for the degree. At this time, the doctoral candidate has four years to complete the degree process.

Final Examination

The final examination may not be held until after the beginning of the semester or session in which coursework is completed. Two weeks before the final examination, please make public the proposed date, time and place of the examination. The committee may require the candidate to take a written examination as well as an oral examination. The oral and/or written examination should be held by the student's graduate committee **at least 10 days before the end of the term of graduation.**

The written vote of each member of a candidate's committee must be on record in the Office of the Registrar on the Record of Final Examination form, indicating the majority of the committee members' approval, before any candidate will be recommended for an advanced degree. A student failing his/her final examination may retake the examination once after a reasonable period of time has elapsed.

Extension Courses

Extension courses, to carry graduate credit, must satisfy achievement criteria acceptable to the Office of the Registrar and must be taken under the auspices of UW, or involve study completed at an off-campus center.

Grade Point Average

A minimum 3.0 grade point average (GPA) or better is required for all coursework required for an advanced degree. Hours for which a C was earned may be balanced by a corresponding number of hours for which an A was earned. Departments and divisions have the option of indicating subject areas in which they will not accept grades of C for credit regardless of accumulated grade point average. No credit will be allowed toward an advanced degree for coursework in which a grade lower than C is earned. A student who fails to do satisfactory work may, upon the recommendation of the head of the department and with the approval of the college dean, be placed on suspension for one semester or Summer Session. Students who fail to bring their graduate GPA to 3.0 or greater and remove themselves from probation after one semester or one Summer Session will be suspended from the university. A suspended student can petition to be reinstated. The college dean will consult with the department head prior to all petition decisions. A reinstated student is on probation and may be subject to other performance criteria as determined by the dean in consultation with the department head.

Grades earned in coursework that are not included in the approved program of study for each candidate for an advanced degree will not be included in the accumulated grade point average to determine eligibility for an advanced degree. These courses are, however, included in the GPA as listed on the academic record if the courses are numbered 4000 or above, and are used in determining probation/suspension.

Grades for Thesis and Dissertation Research

The grade of S in thesis and dissertation research is a judgment that the student is adequately engaged in the required research objective. It in no way implies that the final thesis or the thesis defense will be judged of sufficient quality for the award of the appropriate degree.

Graduate Committee

A student's graduate committee is appointed by the college dean and is based on the recommendation of the department or division chair or head. The committee functions to guide the student in coursework selection, the degree project construction, and requirements completion of the degree. All committees will have at least one member of the UW Graduate Faculty from the appropriate department/division as chairperson and a member of the UW Graduate Faculty from outside the major department/division. The person outside the major department/division serves as the Graduate Faculty Representative.

Master's committees are usually constructed by the student's major professor in consultation with the student and the department/division head or chair. The proposed committee is submitted by the head or chair to the college dean for final approval. The master's graduate committee consists of at least a member of the UW Graduate Faculty from the appropriate department/division as chair (the major professor) and a member of the UW Graduate Faculty from outside the major department/division. Master's degree committees require a minimum of three members. The graduate committee is responsible for advising the candidate concerning coursework for the degree program and research or other creative endeavors required. The graduate committee is also responsible for conducting the final examination of the candidate and other degree-specific examinations.

Educational specialist committees consist of at least a member of the Graduate Faculty from that same department, and a member of the Graduate Faculty from outside the major department. The educational specialist's committee must have three members and will ordinarily not have more than five members.

Doctoral committees will consist of at least five members, including the major professor (the committee chair). Not fewer than three members will be from the major department/division. The major professor (committee chair) and the outside member must be members of the Graduate Faculty. Individuals with off-campus affiliations or with UW adjunct appointments may serve on graduate committees with the approval of the major professor, department head, and college dean.

The committee will serve in an advisory capacity for development of the student's coursework and research programs and must approve the official program of study filed with the Office of the Registrar. The committee will also determine pass or fail on the preliminary examination, approve or disapprove the dissertation or project report, and will conduct the final examination.

The doctoral committee must be on file with the Office of the Registrar before the program of study form is submitted. Changes in committee membership or major professor assignment can be requested at any time by the department/division head. This is normally done in consultation with the student and committee chair.

Graduate Committee Rules Approved by the Graduate Council – November 1, 2000

Appointment – Each student will be assigned a graduate committee by the college dean in consultation with the student's major professor and the department/division head.

Chair or Co-chairs – Each graduate committee will have at least one chairperson who is a member of the UW Graduate Faculty and is an "inside" member in the student's academic unit.*

Graduate Faculty Representative (outside member) – Each graduate committee will have a Graduate Faculty Representative or "outside" member who is a member of the UW Graduate Faculty and is outside the student's academic unit.* The Graduate Faculty Representative on the student's committee serves to provide academic assistance and to ensure that the "process" is fair for both the student and the university.

Number of members: See information provided above.

**Definition of "inside" and "outside" members*

Any faculty, adjunct faculty member, or academic professional in a department/division is considered an "inside" member for the department/division and cannot serve as the Graduate Faculty Representative for students within that department/division.

Administrators for graduate degree offering academic units (i.e. departments, divisions, colleges, etc.) will be considered only "inside" members for those units for which they have jurisdiction and cannot serve as the Graduate Faculty Representative for students within those units.

Faculty involved in interdisciplinary programs (American Studies, Food Science & Human Nutrition, International Studies, Natural Science, etc.) will be determined as "inside" or "outside" based on the committee chair(s) home department(s)/division(s). The Graduate Faculty Representative must be from a different department/division than the committee chair(s) and cannot be the program director (see definition B).

For the combined units of animal/veterinary sciences, these faculty can only serve as inside members of these combined units, i.e., the Graduate Faculty Representative for an animal science committee cannot be from veterinary sciences.

For the combined Curriculum & Instruction program, secondary and elementary/early childhood faculty are considered to be department (inside) members.

Policy instituted August 2, 1994:

Faculty with split appointments can chair graduate committees for the two or more departments in which they hold split appointments provided that they are members of the Graduate Faculty for the two or more units.

Role of the Graduate Faculty Representative: Each graduate student's committee includes a representative outside of the disciplinary program or department. In the past, this member of the Graduate Faculty was referred to as the "outside" member. Following the 1992 review of the Graduate School, the designation of the outside member was changed to "representative of the Graduate Faculty."

In keeping with the name change, the duties of this member of a student's graduate committee were also changed. The representative of the Graduate Faculty not only serves as a source of outside expertise for the student, but also serves as a representative of the Graduate Faculty in that he/she monitors and evaluates the process of graduate education for that particular student.

To avoid possible conflicts of interest, the representative of the Graduate Faculty must not be a member of the department in which the graduate student will be receiving his/her graduate degree. A faculty person's home department is that department in which he or she is evaluated for tenure, promotion, and salary adjustments. For purposes of serving as a representative of the Graduate Faculty, persons with true split appointments (i.e., evaluated for tenure, promotion, and salary adjustments in two or more departments) will be considered as members of the two or more departments in which they are evaluated for tenure, promotion, and salary adjsuments.

Other members of graduate committees: Restrictions on members other than the chair and the Graduate Faculty Representative are few. Usually, the members should be tenure-track faculty; however, use of non-tenure-track persons can be made on a case-by-case basis. Qualified non-faculty are welcomed as full voting members of committees. Some examples of non-faculty are: employees of federal research laboratories, public school administrators, and others where graduate-level expertise is required of their position. Ordinarily, such persons should have attained at least the same academic degree as that being sought by the student.

Appointment of husband-wife teams and significant-other teams to graduate committees will be made only under most unusual circumstances and only on a case-by-case basis. Although such teams usually serve with the most honorable intentions, the perceptions of unfairness by either students or other committee members do not warrant making such appointments. Graduate education must withstand the reasonable scrutiny of interested persons. Appointment of husband-wife teams or significant-other teams to graduate committees causes almost automatic questioning.

Petitions and Appeals

Graduate Student Appeals

The purpose of the GSAB is to review appeals by graduate students (the appellant) and decisions made by university representatives (the appellee) concerning:

retention in graduate programs,
employment as graduate assistants,
charges of academic dishonesty or scientific misconduct, unless extramural funding is involved, and
selected other issues related to graduate education as deemed appropriate to forward to the GSAB by the chair of the board, the graduate dean, provost or president of the university.

The GSAB will not hear appeals of course grades or charges of academic dishonesty associated with a course other than a research course, e.g. thesis, non-thesis, or dissertation research. Policies and procedures concerning appeals may be found at http://uwadmnweb.uwyo.edu/uwgrad/info.asp?p=2960.

Hours Earned Before Admission

With committee and college approval, a student may submit up to a total of 12 pre-admission hours that may be a culmination of non-degree, reserved, and/or transfer hours. The total number of hours allowed from each category is as follows: 12 non-degree graduate hours; 9 transfer; and 6 undergraduate. A student may elect to utilize a combination of the three different areas to total the 12 maximum allowed (i.e. 6 non-degree hours, 3 transfer hours, and 3 reserved hours). Please review the individual sections of the bulletin that cover the specific policies for non-degree hours, reserving coursework for graduate credit, and transfer credit.

Incomplete Grades

The incomplete grade (I) is a temporary grade used under circumstances where awarding a grade would be unjust or not reflective of the student's actual performance in a course. An incomplete grade may not be assigned unless accompanied by a written authorization. Time allowed for completing course requirements will normally not exceed 120 calendar days beyond the end of the semester in which the I was given. The dean of a college may designate certain research courses where the 120-day limit may be extended by the instructor.

The I will revert to an F if the final grade for the course is not received in the Office of the Registrar by the date indicated on the authorization. Students receiving an incomplete in any course(s) listed in their program of study must have the incomplete removed by the end of the semester in which they turn in their intent to graduate. If the incomplete is not removed, the student will not graduate that semester.

In-Residence Coursework (Residency)

In-residence coursework includes courses and/or research work on the UW Laramie campus, at an approved UW off-campus course site, and/or research work done for credit in the field under the direction of a UW faculty member.

The minimum number of semester credit hours that must be earned on the UW Laramie campus or at an approved UW setting for a particular degree program shall be determined by the individual colleges. In no case shall these minimum numbers of credit hours be less than 21 hours beyond the bachelor's degree for the master's degree, 21 hours beyond the master's degree for the educational specialist degree, or 24 hours beyond the bachelor's degree for the doctoral degree.

In computing the in-residence requirements for the Plan A thesis and doctoral degrees, credit earned working on the thesis or dissertation shall apply.

Language or Other Tool Requirements for Doctoral Candidates

The prospective Ph.D. student should refer to the specific department in which he/she desires to major to ascertain what languages or research tools are required. Certification of a language or tool, if required, will be made by the appropriate agency or department of the university to the Graduate School when proficiency requirements have been met to fulfill the tool requirements. Students may demonstrate proficiency on a standardized language examination prepared by the Educational Testing Service, or by receiving at least a grade of B in a course (or courses) specified by a department on this campus or on a reading test administered by the department. It will be each student's responsibility to see that certification of proficiency for tool requirements is made. Coursework certification may be made from transcripts filed by the student with the Office of the Registrar.

Limitation of 4000-level Coursework Hours

Beginning with students admitted to the spring 2007 semester, only 12 credit hours of 4000-level coursework will be permitted on the graduate program of study.

Master's Candidates

The functional and contractual document for the individual student master's degree is the program of study. It includes a declaration that the student will pursue a particular project plan: either a Plan A thesis or a Plan B non-thesis. Once the program of study has been approved for a master's student, the student advances to candidacy. After the student's program of study has been filed with the college, the approvals of the major professor and the college dean are required to transfer from one project plan type to another. If such a change is made, some credit under the original program of study may not meet requirements of the new program of study. The master's program of study, whether a declared thesis or non-thesis project plan, must include a minimum of 30 hours of graduate credit.

Current policy specifically requires a culminating defense for Plan A master's programs but does not address a similar requirement for non-thesis, Plan B programs.

Recognizing that plan A and B programs are academically equivalent and that a capstone event is an integral component of the graduate learning experience. Plan B programs also require an oral defense.

The defense structure and format is flexible but it should allow opportunity for the student to demonstrate content comprehension and application, critical and quantitative analysis, creative thinking, problem solving, synthesis and evaluation.

Following the defense, regardless of the outcome, the student will submit a Report of Final Examination form to the Office of the Registrar. This form is available on the Graduate Student Resources Web site.

Plan A Master's

This program type must reflect a minimum of 26 hours of acceptable graduate coursework and four hours of 5960. Thesis Research. The Plan A thesis option accommodates original research, although the degree of originality and the definition thereof is sometimes program specific. The planning, development, and production of the thesis is guided by the committee chair and the graduate committee.

The thesis is the final, written product of the project. General required guidelines for preparing a thesis are available in the "Thesis and Dissertation Format Guide." The thesis must be submitted to the student's committee at least two weeks before the intended date of final examination. To finalize the master's program and project, an electronic copy of the thesis is submitted to ProQuest and the Report of Final Examination is on file in the Office of the Registrar.

The electronic copy must meet the standards established by the Graduate Faculty and those of the University Libraries. This copy submitted to ProQuest will ultimately be deposited in the University Libraries. Each student should normally plan to produce at least three copies of his/her thesis: one for the thesis director, one for the department, and one to retain for personal use.

Plan B Master's

This program type carries a minimum of 30 hours of coursework, but some variants require more than 30 hours of credit (see specific program requirements in this bulletin). At least 14 of these hours must be in the student's major field. The student's committee in specific programs may modify this requirement. The Plan B non-thesis program type differs from the thesis program type in that it may include additional hours of coursework instead of thesis hours. It permits a wider distribution of courses and permits a wider array of possible final products than the Plan A thesis program type. For example, the Plan B project may resemble a thesis, but the topic is not research or original. The non-thesis project may take the form of a business plan or a professional portfolio. The Plan B project can, but does not have to, be a paper (see the next section). Each academic unit that engages in Plan B non-thesis activities often has its own set of principles that guide students in that unit.

Most, but by no means all, of the academic units that have students pursuing master's degrees in the Plan B non-thesis category have the students prepare a paper, or sometimes two papers, as their final project. In the selection of a subject and preparation of the paper(s), the student shall be guided by the adviser or, in some academic units, by the instructor(s) in charge of the course(s) connected to the paper(s). The paper(s) should present the results of study and at a level of scholastic quality commensurate with a Plan A thesis project. The Plan B non-thesis is different from the Plan A thesis in that it is not an in-depth research project. The student and his or her adviser often, but not always, decide if a project will be Plan A or Plan B. Academic units have principles that guide students in this selection. Many units have rules that precisely dictate the type of program and project a student can conduct.

The format for the Plan B non-thesis paper should follow that of the Plan A thesis. However, Plan B non-thesis paper titles do not appear on the student's transcript, whereas, Plan A thesis titles do; further, Plan B non-thesis papers are not filed in the University Libraries and they are not submitted to ProQuest. They are filed with the major academic unit.

Students pursuing the master of arts in teaching or the master of science in teaching should follow the regulations listed under the specific requirements for the master's degree with the minor modifications listed below.

M.A.T./M.S.T. Degrees

Candidates for the M.A.T. or the M.S.T. should have completed the requirements for teacher certification prior to application for admission to graduate study. In exceptional cases, however, applicants may be admitted to graduate study even though they fall short of certification requirements. The M.A.T./M.S.T. program is completely separate from the certification requirements. Hours used to meet certification requirements cannot be applied toward the M.A.T./M.S.T. degrees.

The M.A.T./M.S.T. degrees are only modifications of the Plan B non-thesis option and are subject to the requirements of the admitting department and the general requirements of the Graduate Faculty.

At least 24 of the 30 semester hours required must be in a particular teaching area (e.g., chemistry, history, etc.), with at least 12 hours in one department. A student working jointly in two departments must take at least 12 hours from each department.

The M.S.T. is designed for one teaching area and must include 18 hours in, or the total required by, that area. A program designed for two teaching areas must include 12 hours in, or required by, each of the specified two areas. Courses offered by the Science and Mathematics Teaching Center do not constitute a separate area in themselves but may be applied to an appropriate area. A program designed for two teaching areas must be approved by the heads of both departments, and the graduate committee for this program must include one member from each department. The M.S.T. is intended for individuals teaching at the secondary level. The program should represent the student's needs.

New Parent Accomodation Policy

The University of Wyoming is dedicated to ensuring optimal success for all graduate students. However, new parents are frequently forced to interrupt their education cycle, sometimes in a transient manner but often permanently.

The New Parent Accommodation policy is designed to allow new parents to maintain full-time, registered student status and facilitate their return to full participation in graduate activities in a seamless manner without penalty. The policy applies to full-time students enrolled in a graduate program. If both members of the new parent partnership are UW graduate students, one but not both will be eligible for the full accommodation. However, university encourages accommodation of schedules for exams, assignments and programs of study for the graduate student partner. This accommodation does not apply to part-time students.

A student anticipating becoming a new parent is eligible for accommodation consideration for a period of up to one semester. The exact accommodation period will begin on the date specified on the New Parent Accommodation petition approved by the college dean. This petition must be filed and approved prior to the actual date of childbirth or adoption. Additional information can be found at http://uwadmnweb.uwyo.edu/uwgrad/info.asp?p=2960.

Non-Degree Hours

You may request that up to 12 hours of graduate-level coursework, taken during your graduate, non-degree status, be used toward a program of study should you choose to pursue a graduate degree at the University of Wyoming. This would be subject to the approval of your graduate committee and the college dean. These hours can be affected by other pre-admission hours. See the ***Hours Earned Before Admission*** section.

Patenting or Copyright by UW

In some cases, where significant university funds or resources have been used in dissertation research, the university may claim an interest in patenting or copyrighting the results. When this seems likely, the student (or the student's major professor) should consult with the college dean or the vice president for research.

Petitions and Appeals

The University of Wyoming, as a fully-accredited public institution of higher education, must comply with general laws, regulations, and principles of fairness, uniformity, and accountability. Exceptions to uniform application of general regulations are justified only in extraordinary circumstances. Exceptions to regulations may be petitioned by submitting the appropriate form to the college dean. If any of the signers recommend that the petition be denied, the registrar may deny the exception, make further inquiries, or refer the matter to the vice president for academic affairs for direction. If all the signers recommend that the exception be granted, the registrar may concur (and process the exception) or may deny the exception and refer the matter to the vice president for academic affairs for direction. If the petition is denied by the registrar, the student may elect to pursue the petition with the vice president for academic affairs.

The Graduate Student Appeals Board (GSAB) was established to provide an appellate body to review appeals of graduate students concerning retention in graduate programs, employment as graduate assistants, and charges of academic dishonesty or scientific misconduct. The GSAB will not hear appeals of course grades or charges of academic dishonesty associated with a course (these appeals will be handled by the procedures of the college in which the course is offered). Appeals emanating from Plan B, thesis, or dissertation research will be heard by the GSAB even though thesis and dissertation research are designated by course numbers. Policies and procedures for graduate student appeals will be modeled after those used by the University Board of Student Appeals and published as part of the regulations of the Graduate Faculty.

Program of Study

Unless otherwise specified, each student must submit a program of study to the Graduate School for approval. The program of study form is available online at www.uwyo.edu/uwgrad. Return the completed form with all required attachments to the Office of the Registrar. Degree Analysts will transcribe the program into a CAPP audit, which constitutes an agreement between the student, the student's committee, and the university wherein the minimum coursework requirements for that student's degree are listed. The program should be filed no later than the beginning of the student's second semester (or second Summer Session if enrolling only in summers). No master's student will be a candidate for a degree until his/her program is approved by the head of the appropriate department and the college dean. Master's degree candidacy occurs with the approval of the program of study. Candidacy in the doctorate occurs upon certification of successful completion of the preliminary examination.

Some degree programs require more hours of credit than the minimum requirement of the university. Students should consult their advisers as well as the college and department sections in this bulletin. The program filed must include the appropriate minimum number of semester hours of graduate credit required. Changes to the approved program must be petitioned on the Graduate School's Request for Change in Graduate Program form.

Re-enrollment or Re-admission

Any student not registered at UW during the previous 12 months must be readmitted.

A departmental request for readmission must be submitted to the college dean in writing.

Students are required to be continuously enrolled unless a formal leave of absence has been approved.

When enrollment is interrupted for one or more years, without an approved leave, students are automatically reclassified as inactive students and must reapply for admission.

Students are encouraged to review previously submitted programs of study. Coursework older than six years old will need to be petitioned.

Students are encouraged to review previously submitted committees.

Students who do not reenroll immediately after being readmitted may become inactive again and will need to repeat the process.

Repetition of Courses

No more than two courses (total of six credit hours) available for graduate credit may be repeated by students at the graduate level. This regulation does not apply to those courses carrying variable credit (e.g., research or independent study). Variable credit courses are considered repeated only when so certified in writing by the instructor and the registrar.

Report on Final Examination

This form provides documentation from the student's committee that the student has passed the Final Examination/Defense. If applicable, it also indicates the committee has approved the thesis/dissertation and the student agrees to make publically available via ProQuest. This form must be on file with the office of the prior to graduation.

Students wishing to embargo/copywrite or otherwise delay release of their thesis/dissertation must have previous authorization of the college dean on file in the Office of the Registrar.

Research, Investigations, or Independent Study

Courses such as Individual Problems; Special Problems; Research in .....; Investigations in .....; etc. may not be used to develop information or material that will be submitted as a thesis or dissertation.

Reserving Coursework for Graduate Credit

Approved graduate level courses taken prior to completing the baccalaureate degree, but not part of that degree's requirements, may be applied to the master's or doctoral program with the approval of the student's committee. Approval for reserving the coursework is rendered jointly by the adviser and graduate dean, and applies only to courses taken within 12 months of completion of the baccalaureate degree.

If a course is dual listed at the 4000/5000 level, the course must be taken at the 5000 level to receive graduate credit. Each 4000- or 5000-level course must be reserved for graduate credit by completing the Request to Reserve Coursework for Graduate Credit form, obtained online at www.uwyo.edu/uwgrad. The form must be completed and submitted to the Office of the Registrar prior to the semester or Summer Session in which the coursework is taken.

These courses will appear on the undergraduate transcript with a notation that they have been reserved for graduate credit.

NOTE: Students will only be allowed to transfer six hours of coursework that has been reserved for graduate credit into their degree program.

Satisfactory/Unsatisfactory Grades

All courses taken to fulfill the requirements for the degree program must be taken for letter grade (A-F) except those courses given for S/U only.

The grade of S (satisfactory) is interpreted to include grades A-C and the grade of U (unsatisfactory) to include grades D-F on the conventional grade scale for courses numbered less than 5000 (for courses 5000 or above, the grade of S is interpreted to included grades A and B). Credit hours of S/U courses are counted as hours attempted toward graduation. However, neither the S nor U grade carries grade points and neither will be included in the calculation of the cumulative grade point average.

The faculties of the various colleges shall determine the number of credit hours of S that may be used to satisfy degree requirements in their programs. They may also place restrictions upon the use of S credits to satisfy college or major requirements. In addition, they may designate particular courses in their colleges as courses to be offered for S/U only.

Second Baccalaureate Degrees

A student working toward a second baccalaureate degree is subject to all regulations concerning undergraduates and is not considered a graduate student. Students requesting to reserve coursework for graduate credit must be able to complete their undergraduate degree within 12 months of the request. NOTE: Only six hours of undergraduate coursework reserved for graduate credit will be allowed for consideration in a graduate degree program.

Second Graduate Degrees and Use of Courses from First Graduate Degree

Requirements for a second degree are considered separate from the first degree. Hours from the first master's degree may not be used for completing the hours toward the second master's. Hours from the first doctoral degree may not be used for completing the hours toward the second doctorate. Hours from an earned doctorate may not be used in a subsequent master's degree. In accordance with the academic unit's policy or the decision of the candidate's graduate committee, the hours earned toward the Ed.S. degree may, under specified conditions, be used to meet the requirements for a doctorate.

Survey of Earned Doctorates

The Graduate School requires the Survey of Earned Doctorates provided and the certified Completion of Requirements form on or before the date established by the Graduate School for fulfilling the requirements for advanced degrees each semester. The survey (for registration with the National Research Council) is available on the Graduate Student Resources Web site. All doctoral students must complete this survey.

Thesis or Dissertation

The candidate shall submit an electronic thesis or dissertation showing by its form and organization the candidate's ability to write acceptably and use the language. The thesis or dissertation must be approved by the student's graduate committee. Approval shall be indicated using the Report of Final Examination form. No attempt will be made to evaluate the thesis or dissertation in terms of credit hours. The thesis or dissertation must meet the standards established by the University Libraries, the Graduate Faculty, and ProQuest Information and Learning and be approved by the committee chair. It must be submitted to the candidate's committee at least three weeks prior to the final examination. The thesis or dissertation must be available for inspection by any other member of the Graduate Faculty who may wish to examine it.

Format for Utilization of Journal Articles in Thesis and Dissertations

The master's thesis and doctoral dissertation are integral components of the graduate learning experience. Writing the thesis or dissertation not only sharpens vital communication skills but also provides the opportunity to expand upon research detail, include unpublished results and engage in creative speculation and synthesis of research outcomes to a degree greater than normally allowed by journal editors.

For many disciplines, publication of student research in peer-reviewed journals is a hallmark of successful graduate education. It validates the significance of the scholarly results and is beneficial for student, mentor and the institution. To encourage publication of thesis or dissertation results and to avoid requiring degree candidates to recreate thesis or dissertation chapters from peer-reviewed publications, the university permits the utilization of published papers as the foundation for theses and dissertations subject to the following conditions:

The publications must be refereed and must have been accepted for publication in scholarly journals of high quality. The source should be cited in the comprehensive introductory chapter.

The publications must be written by the student. Editorial oversight by the mentor and committee is allowable and desirable; however, the mentor and committee have the responsibility to ensure that the student is the main author.

If there is more than one publication, the articles submitted must form a coherent whole, having a well-defined intellectual focus and advancing novel contributions along a clearly identified line of inquiry.

For multi-authored articles, the contribution of each author must be clearly stated in the preface or introduction to the thesis or dissertation.

A comprehensive, cohesive and coherent introduction and discussion must be incorporated as separate chapters. These chapters should summarize the current state of knowledge and the rationale for the research. They should clarify how each chapter is interconnected and provide a meaningful synthesis and discussion of chapter results as part of a coherent whole.

Appendices can be attached to include expanded methodology, unpublished data, tables, etc. Where appropriate, the appendices may be in electronic formats, provided the data are readily accessible to the international scholarly community.

An abstract is not sufficient to address these criteria.

Time Allowance and Limitations

Master's students and educational specialists have six calendar years to complete their degrees from the beginning of the first course taken and listed on the program of study. Doctoral candidates have four calendar years after the successful completion of their preliminary examination to complete their degree.

Time Spent in the Armed Services

Time spent in the armed services is not computed in the total time allowed to complete the requirements for an advanced degree; however, students who are eligible and wish to use this time exclusion must petition for an extension.

Transfer Credit

To transfer hours earned at another institution to a graduate program at UW, the student must provide an official transcript from the institution where the credits were earned. This official transcript must be part of the student's permanent file. The student must also provide evidence that the course was approved for graduate credit at the institution where the course was taken.

No more than 9 semester hours that have been transferred from another accredited institution may be used for meeting the credit hour requirements of a master's student's program. Transferred hours must carry a B or better grade and will not reduce the residence requirements. Transferred credit will be subject to the approval of the appropriate major professor and the college dean and must be completed prior to approval of a master's degree program of study for which the credit is to apply. S/U or P/F transfer hours are not acceptable on a program of study.

Coursework hours approved for transfer from another college or university are considered as part of the 12-credit-hour pre-admission course limitation for master's and educational specialist students.

Hours transferred from other institutions for a doctoral program must carry a letter grade of B (3.0) or better (A=4). Doctoral (Ed.D. and Ph.D.) candidates may transfer up to 48 credit hours of such coursework, only four of which can be thesis research. Transfer hours for doctoral students are not considered as part of the 12-hour pre-admission course limitation.

International Students

Upon arriving at the University of Wyoming, international students are required to visit the International Students and Scholars (ISS) office. This office:

- provides support and counsel for UW's international students and scholars population regarding aspects of immigration regulations and procedures,
- orients this population to the policies and expectations of the university, the educational system, and the U.S. culture,
- hosts a mandatory orientation program for all new international students before the beginning of each semester.

Please see the ISS Web site for detailed information (www.uwyo.edu/iss).

International graduate assistants with teaching responsibilities must complete the English Proficiency Assessment Program and must participate in the Graduate Student Teaching and Learning Symposium. Check the Graduate Student Resources Web site (www.uwyo.edu/uwgrad) for dates and times.

Graduate Students

The following courses, all numbered at the 5900-level, are offered under each respective prefix for all graduate departments/divisions. They are listed here but are referred to at the end of the course listings for each department/division.

5900. Practicum in College Teaching
5920. Continuous Registration (On Campus)
5940. Continuous Registration (Off Campus)
5959. Enrichment Studies in ___
5960. Thesis Research (Master's)
5980. Dissertation Research (Doctorate)
5990. Internship

Two courses are offered under the GRAD prefix:

5910. Teaching Methodologies & Applications 3. Graduate level course designed to provide graduate students with an in-depth introduction to reaching and learning in preparation for an academic career. Prerequisite: Graduate standing.

5961. Graduate Projects 1-4 Max. 4. Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. Prerequisites: Must be enrolled in Plan B program and have department approval.

Please note that ANY course with the number 5959 and any course offered by the College of Education with the number 4740 are NOT applicable toward undergraduate or graduate degrees.

Graduate Minors

Graduate minors are available in statistics, environment and natural resources, American Indian studies, applied economics, international studies, and women's studies. See the respective departments/programs listed in the bulletin for requirements. Contact the departments for further information. Students who choose minors may be required to have a representative of the minor department on their graduate committee.

Interdisciplinary Master's Degrees

New careers are being developed. People beginning their graduate education are in the enviable position of having many new, exciting careers from which to choose or to create. The new focus is on broader, interdisciplinary understandings; thus, interdisciplinary degrees will play an increasing role in tomorrow's world.

The degree will be listed as interdisciplinary master of science or interdisciplinary master of arts. The transcript will reflect the areas of study as a "major." Determination of whether the degree selection is science or arts is determined by the greater emphasis in the program of study.

With interdisciplinary studies, there are no departmental or college-specific designations or requirements except those of the Graduate School. As with all graduate degrees, the degree will be awarded by the Graduate School. It is truly interdisciplinary in nature, allowing each participating student and the student's committee to select coursework from up to three subject areas (plus coursework listed as "tools") to build a degree program meeting the student's stated needs.

Interdisciplinary Program Admission Requirements

A 3.25 undergraduate grade point average.

A 1,100 combined verbal and quantitative GRE score.

Three positive letters of recommendation addressing the potential for success at the graduate level under the circumstances of an interdisciplinary degree program from individuals qualified to make the recommendation.

A letter of intent, written by the applicant, indicating the reasons the degree is being sought and a description of what courses will be requested.

The admission of students to the interdisciplinary master's degree program will be established through the following process:

An applicant will have a preliminary discussion with the dean of the Graduate School. If agreement is reached to pursue admission to the program, the applicant will be encouraged to submit the application materials. A final evaluation will be made by the Graduate School regarding the applicant's qualifications to meet admission criteria and program requirements.

Once the faculty committee has agreed to meet initially, the members will meet with the applicant to discuss degree requirements. Any member of the committee may commit to providing office space, graduate assistantship, completion of administrative paperwork, provisions for mail delivery, etc. If agreement on these support issues is reached, the department head of the committee member making the commitments must agree in writing.

If the recommendation for admission is made by the committee, the committee will be formally appointed by the dean of the Graduate School and the student will be admitted to pursue an interdisciplinary degree under the committee's guidance.

Interdisciplinary Degree Requirements

The program must include a minimum of 44 hours, to include 40 hours of graduate coursework to be established by the graduate committee and four hours of 5960 Thesis Research. All interdisciplinary master's programs will be Plan A thesis programs.

An appropriate number of credit hours must be at the 5000 level to ensure depth of discipline knowledge. The graduate committee must be established at the initiation of the program and a formal program of study must be on file with the Office of the Registrar within the first semester of study.

Any member of the graduate faculty at UW is eligible to serve as the student's committee chair or graduate faculty representative. The third member of the committee may come from the non-graduate faculty ranks. Existing graduate committee regulations apply to the interdisciplinary degree programs.

Interdisciplinary students may request research and/or lab access and will negotiate with the appropriate academic unit administering the space and/or equipment. Admission to the degree program does not obligate an academic unit to provide space or equipment. This discussion will most commonly occur through one of the committee members in advance. Since the degree program is interdisciplinary in nature, it is perceived that all support presently existing (including graduate assistantships) within academic units can/may be allocated at the discretion of the unit.

Preliminary and/or comprehensive examination standards will be established and documented at the time the program of study is submitted.

Students with Disabilities

The University of Wyoming is committed to providing equal access for students with disabilities. The University Disability Support Services (UDSS) office was established to provide leadership and assistance to the University of Wyoming in its efforts to comply with the intent of specific federal regulations. Physical and program accessibility at UW is a joint responsibility and can be achieved only through cooperative efforts of university faculty, staff and students. UDSS provides disability-related accommodations, technical assistance, consultation and resource information for students and campus visitors with disabilities, and to university departments, faculty and staff seeking to improve accessibility for individuals with disabilities.

Examples of services offered are as follows:

Priority Registration - available to students who may need to plan their classes around physical needs, as well as for students who need books in alternative format, or sign language interpreters.

Classroom Relocation - available to students whose class may be located in an older building that is not accessible to students with mobility impairments.

Note-Taking Services - available to students who are deaf or hard-of-hearing, who have learning disabilities affecting auditory discrimination, or who have hand function limitations.

Text Recording and Alternative Format Services - available to students with severe visual impairments or a learning disability that affects reading.

Testing Accommodations - available to students who have a specific documented impact of a disability.

Interpreter Services - available to students with hearing impairments who use sign language as a means of communication.

Accessible Parking - available for students, employees, and visitors who have a temporary or permanent physical disability. Contact Transit and Parking Services (766-9800) for more information on parking and parking permits.

If you have a physical, cognitive, sensory, or psychological disability and require accommodations or academic adjustments, please contact the UDSS office. Documentation of disability is required prior to initiating accommodations. For more information, contact:

University Disability Support Services
Student Educational Opportunity
Department 3808
1000 E. University Avenue
Laramie, WY 82071
Phone: (307) 766-6189
TTY: (307) 766-3073
udss@uwyo.edu
www.uwyo.edu/udss

Registration and Enrollment in Courses

Registration Procedures

Eligible students can register, drop, add, and list their courses through WyoWeb. To insure that students have seen an adviser, access numbers for each semester's registration are distributed through the academic advisers. Directions for registration are contained in the appropriate *Class Schedule*. *Class Schedules* are available online no later than one week prior to advising week. Students are responsible for following directions and deadlines contained in the *Class Schedules*.

The following categories of continuing students in good standing or on academic probation are eligible to register for the semesters indicated:

1. *For the fall semester:*
   a. All students who were enrolled the previous fall or spring semester.
   b. Summer session students cleared by the Admissions Office for fall. (This does not include those admitted for summer only.)
2. *For the spring semester:*
   All students who were enrolled the previous spring or fall semester.
3. *For the summer session:*
   Students who were enrolled the previous summer, fall, or spring semester.

All other applicants and students should complete admission requirements by the admission deadline. (Refer to the sections on undergraduate and graduate admissions in this bulletin for deadlines.)

All information requested during admission and registration is important to the student and to the university and should be kept accurate and complete. If a student's address, telephone, major, adviser, or other vital information changes after enrollment, the Office of the Registrar should be informed without delay.

Academic Adviser

Academic advising is a decision-making process involving a partnership between the academic adviser and the student (advisee). In this partnership, issues and questions regarding personal, professional, and educational goals are examined and evaluated. This includes, but is not limited to, planning an appropriate course of study and the scheduling of classes.

The purpose of academic advising is to promote rational, informed, and independent choices by the student. To that end, the academic adviser is a significant link for the student to other resources in the university community. Students are expected to take the initiative in developing the adviser-advisee relationship and to assume an ever-increasing role in developing their own academic, career, and personal goals.

Change of Registration

Modification of a course schedule during the drop/add time period is accomplished through WyoWeb. After the end of the drop/add period, individual class withdrawals must be processed on the appropriate form obtained from the Office of the Registrar or its web site. Changes to a student's registration or withdrawals are not official until the required forms are completed and returned to the Office of the Registrar as prescribed.

The period of time allowed for modifying a student's schedule or withdrawing during the summer session or other special terms is established in regulations or by the registrar, subject to the approval of the vice president for academic affairs.

During the fall and/or spring semester(s):

1. *Dropping a class or changing sections:* A student may drop classes or change sections of the same course during the first eight class days of the semester (four class days for blocked courses).
2. *Adding a course or changing grading option:* A student may add classes or change grading options or hours in variable-credit courses during the first ten class days of the semester (five class days for blocked courses).
3. *Withdrawal from a course:* After the designated drop/add period, students may officially withdraw from individual regular term courses until ten class days after mid-semester. They may withdraw from blocked courses until five class days after the middle of the course. A mark of W will be assigned indicating withdrawal.
4. *Withdrawal from the university (termination of enrollment):* A student may terminate all fall or spring semester enrollments if formal procedures are completed through the Dean of Students Office prior to the last 15 calendar days of the semester. A mark of W is assigned to each course, indicating official termination for that semester.

Choice of College and Major

The academic adviser is an excellent source of information about the adviser's professional field for students who have selected a major. Students who are undecided about the selection of a college and/or major and who seek specialized assistance in choosing educational and vocational objectives should contact the Center for Advising and Career Services. These units have programs designed to help the undecided student acquire the tools to make an intelligent decision regarding an appropriate major discipline.

Change of College, Major, or Adviser

Students who wish to change their college, major, or adviser should obtain the appropriate form from either the Office of the Registrar or the office of the dean of the college of their current enrollment. Students wishing to transfer from one college to another must secure the signatures of both their present and future deans. Graduate students need the approval of the college dean and the head of the department to which the student is transferring. After all appropriate signatures have been obtained, the student should take the form to the Office of the Registrar.

Students who have completed their undergraduate work at the university and who wish to embark upon a graduate program, even through continuing their graduate work in the same field they pursued as undergraduates, will need to apply for graduate admission. (Refer to the section on graduate admission in this bulletin for deadlines.)

Definitions for Student Classifications

Code	*Class*	*Definition by earned hours*
FR	Freshman	Under 30 credits
SO	Sophomore	30 but less than 60 credits
JR	Junior	60 but less than 90 credits
SR	Senior	90 or more credits
GR	Graduate Student	
LW1	Law student (professional level) first year	
LW2	Law student (professional level) second year	
LW3	Law student (professional level) third year	
MD1	Medical student (professional level) first year	
PH1	Pharm.D. (professional level) first year (0-33 semester hours)	
PH2	Pharm.D. (professional level) second year (34-69 semester hours)	
PH3	Pharm.D. (professional level) third year (70-104 semester hours)	
PH4	Pharm.D. (professional level) fourth year (105+ semester hours)	

Credit Hour Load

Undergraduates: An average of 15 hours of work each semester is considered a normal load. Maximum credit loads are 20 hours in all colleges. Normally, not more than 12 hours of undergraduate credit may be earned during the summer session. An approved *Overload Petition* form must be filed to exceed these maximums. *Overload Petition* forms are available online or from the Office of the Registrar.

Graduate students: 14 hours of credit is the average and 16 hours the maximum amount of credit allowed per semester for full-time graduate students. A student who has been assigned an assistantship for the academic year is usually restricted to a load of 13 semester hours. Normally, not more than 8 hours of credit may be earned in course work during an eight-week summer session. An approved *Overload Petition* form must be filed to exceed these maximums. *Overload Petition* forms are available online or from the Office of the Registrar.

Auditing a Course

The privilege of non-credit enrollment in a class is available, upon approval of the adviser and the instructor, to any university student. The auditing privilege is subject to the same fee schedule as credit courses. Auditors are expected to attend class regularly and complete such graded work as required by the instructor. It is the responsibility of the student to determine and fulfill the requirements for a satisfactory audit. Though this auditing privilege carries full rights of class participation, it definitely offers no academic credit, does not count toward full- or part-time status, and will result in a mark of satisfactory (SA/S) or unsatisfactory (UA/U). Subsequent credit for the course by special examination is not available.

Graduate Credit for Seniors

Undergraduate students taking graduate-level courses which are not in any way a part of their undergraduate degree have the option of later using such courses for purposes beyond the bachelor's degree requirements. If the student intends to pursue a graduate degree or needs the courses noted on the academic transcript as reserved for graduate credit for job classification (i.e. advancement on teacher salary schedules, etc.) the student should file a petition. The petition should be filed by midterm of the semester which is requested. The form is available from the Office of the Registrar. Courses may not be retroactively reserved once a semester has ended.

Repeating a Course

Students may repeat course work; however, credit earned in any given course (or equivalent course) is applicable toward a degree requirement only once. All grade entries remain on the student's record, but only the last grade earned will be calculated in the UW cumulative grade point average. Refer to the Cumulative Grade Point Average section of this bulletin for further information. Variable-credit courses are not considered as repeats unless the department head provides written certification that the course content was, in fact, repeated. Courses repeated will remain as entries on the academic transcript. Courses applied towards one completed degree may be repeated as part of a second degree; however, the grade and grade point average in the original degree will not be changed. A student is limited to a maximum of three (3) attempts in any course at the University of Wyoming. An "attempt" includes any instance in which the student earns a grade for the course or withdraws from the course. The three-attempt limit does not apply to courses identified in the General or Graduate Bulletin as being appropriate for students to take multiple times. A student can petition for exceptions to this limitation through established university procedures (UW Regulation 8-238).

Class Attendance

Each student shall attend the lectures, recitations, and laboratories, and participate in field work deemed necessary to adequately fulfill the academic requirements of each course. Each instructor, at the beginning of every semester, shall stipulate the attendance policy necessary for satisfactory completion of the course.

The Dean of Students Office may issue authorized absences for participation in university-sponsored activities and for other unusual circumstances. If students have been hospitalized, or if they have been directed by the Student Health Service or their private physician to stay at their place of residence because of illness, the Student Health Service or their private physician may issue a statement giving the dates of the student's confinement which the student may show to the instructor without verification from the Dean of Students Office.

All instructors shall permit students who have official authorized absences to make up missed course work without penalty. An authorized absence, however, merely gives the individual who missed the class an opportunity to make up the work and in no way excuses him or her from the work required.

Withdrawal from the University
(Termination of Enrollment)

Withdrawal from the university is the official termination of student status prior to the end of a term. Students wishing to withdraw from all on-campus classes should initiate the procedure with the Dean of Students Office. Withdrawal from the university is not permitted during the last 15 days of a term.

After clearing with the Dean of Students Office, the withdrawal form must be presented to the university cashier for initial processing. The Office of the Registrar will report withdrawals to instructors concerned.

Students withdrawing from Outreach courses should contact the Outreach School.

Course Withdrawal

Students wishing to withdraw from some but not all course work can obtain the required forms from the Office of the Registrar or its web site. See the Change of Registration section on preceding pages for deadlines.

A class withdrawal is not official unless filed with the Office of the Registrar. Unauthorized discontinuance of enrollment or unofficial abandonment of classes will result in a failing grade.

Academic Dishonesty

Whatever form academic dishonesty may take, the university community regards it as a serious offense. An act is academically dishonest when, and only when, it is an act attempted or performed in order to misrepresent one's involvement in an academic task in any way. Such conduct will result in imposition of sanctions pursuant to University Regulations.

It is the responsibility of both the student and person in charge of an academic task, respectively, to make reasonable efforts to learn of, or make known, the expectations and standards of conduct required in the performance of an academic task. Failure on the part of the student to observe and maintain required standards of academic honesty will require corrective action by officials.

Graduation Requirements and Procedures

Graduation Requirements

Students are personally responsible for knowing degree requirements and enrolling in courses that fulfill their degree program. Students, with the help of their advisers, design their program to satisfy their needs and aims. Students will be required to complete assessment activities as determined by the university prior to the awarding of degrees. Students are likewise held responsible for knowing regulations governing the standard of work required for continuance in the university involving academic probation and suspension.

Although this bulletin is intended to set forth the various provisions for study and requirements for the awarding of degrees, periodic revisions of the provisions for study and degree requirements are appropriate (because of advances in knowledge, changes in occupational requirements, academic preparation of students, and in faculty and facilities at the university). In order for the bulletin to be available in spring of each year, publication must begin the previous October. This is almost a year before the requirements specified therein become effective the following fall and almost five years before a student entering at that time could graduate. Accordingly, the university cannot guarantee the awarding of a degree based on the unchanged requirements as set forth in a particular bulletin.

Adjustment to Changing Requirements

Students are expected to inform themselves of changes in degree requirements by reviewing the bulletins that are published annually and their CAPP degree progress reports; then, when necessary, adjust their degree plans accordingly.

If university or college requirements are changed, students are encouraged to adopt the new requirements; however, students will have the option of graduating under the requirements in effect when they entered the university or one of Wyoming's community colleges, provided the courses are still available. The student must accept either the new requirements or the requirements in effect when they entered the university or one of Wyoming's community colleges in their entirety, not a combination from each. Students changing colleges within the university or reentering the university after one or more years away are expected to adopt the requirements in effect at the time of the reentry. Any substitution to the above must be approved in writing by the student's adviser and the college dean and added to the student's advising folder in the department or college.

If departmental requirements are changed, students will ordinarily be permitted to continue under the requirements in effect when they entered that major department provided there has not been an interruption in their education for a year or more; however, students are encouraged to adopt the new requirements in total, or to accept, with the written approval of the student's adviser within the department, those of the new requirements which would not be an undue hardship. Notice of changes will be available from departmental offices and advisers. It is the responsibility of students to keep in touch with their major departments, to learn of changes in requirements, and to plan ahead so that necessary courses can be taken by the expected time of completing a degree. Many courses are not given every semester and some not every year.

If required prerequisites for a course are changed, notice may be obtained from the department offices. The university cannot continue two courses, one with and one without a newly-adopted prerequisite. The student must therefore meet the new prerequisite or obtain permission from the instructor to enroll in the course. In the event of any doubt as to the adequacy of preparation for a course, the student should consult with the instructor or an adviser in the department as far in advance as possible. Independent study, if approved, may be accepted in lieu of a specific course prerequisite.

Declaring a Graduation Date

All students must formally declare their graduation date in writing. This is accomplished by submitting an Anticipated Graduation Date form to the Office of the Registrar no later than the term of Graduation. If circumstances require deferring graduation to a later term, a new form must be submitted.

Graduation Fee

Payment of the graduation fee of $25.00 for each degree to be earned is due from all graduates at least three weeks before graduation. A late fee of $5.00 is added if the graduation fee is paid less than three weeks before graduation.

Grades

Final grades covering completion of course work in correspondence study, outreach courses, transfer, special examinations, and incomplete work from previous attendance must be in the Office of the Registrar prior to when final grades are due for the term in which the degree is to be conferred.

Final Approval

Final recommendation of the faculty and approval of the University Trustees for conferral of degrees is required. The trustees may, for good cause, decline to confer a degree upon any candidate.

Participation in Commencement Exercises

The official graduation dates for the 2009-10 academic year are August 7, 2009, December 11, 2009, and May 8, 2010. To be eligible for a graduation date, all work must be completed prior to that date.

All academic colleges hold commencement exercises on the May graduation date. Several of the colleges also have commencement exercises in December. Check the appropriate college dean's office for specific information. Seniors are considered candidates for graduation. **Participation in the exercise does not automatically confer degrees. Confirmation of graduation will occur after a review of final course work.**

Commencement exercises are a historical academic custom involving participation by all segments of the university and attendance by members of the graduate's families and friends as well as the general public. Those students who participate in commencement exercises are expected to wear appropriate traditional academic regalia.

Special Programs and Facilities for Research and Study

The Libraries

Mary M. Farrell, Dean
William Robertson Coe Library, (307) 766-3279

The University Libraries include the William Robertson Coe Library, housing general reference, humanities, social science, psychology, medicine, and education materials, as well as government publications and maps; the Library Annex, located in the basement of the Biological Science Building; the Brinkerhoff Earth Resources Information Center, located in the S.H. Knight Geology Building; the Learning Resource Center, located in the Education Building; the Rocky Mountain Herbarium Research Collection, located in the Aven Nelson Building; the Grace Raymond Hebard Collection located in the American Heritage Center; and the National Park Service Research Center collection in Jackson, Wyoming. The UW/Casper College Center is served by the Casper College Goodstein Foundation Library.

The libraries' cataloged collections total nearly 1.5 million volumes, with over 35,000 volumes added annually. 14,000 active periodical and serial titles are supplemented with access to over 57,000 unique electronic journals. In addition, the libraries provide extensive microforms collections and a library of over 169,000 maps, and serve as a depository for United States government publications.

Through participation in the Wyoming Libraries Database (WYLD), Colorado Alliance of Research Libraries ("Alliance"), the Bibliographical Center for Research in Denver, the National Network of Libraries of Medicine, on-line information retrieval systems, and the interlibrary loan network, access is provided to other library resources from throughout the nation and the world.

The College of Law maintains a separate Law Library.

Library Faculty:

SANDRA M. BARSTOW, B.A. Kalamazoo College 1973; M.L.S. Western Michigan University 1977; M.B.A. Rollins College 1983; Librarian, University Libraries 2004, 1994, 1988.

STEPHEN C. BOSS, B.M. Simpson College 1983; B.A. 1984; M.L.S. University of Denver 1985; M.A. 1986; Associate Librarian, University Libraries 2008, 2002.

KAIJSA CALKINS, B.A. University of Washington, Bothell 2001; M.L.S. University of Washington, Seattle 2004; Assistant Librarian, University Libraries 2006.

JANET E. DOMBROWSKI, B.S. University of Colorado, Boulder 1981; M.L.S. University of Maryland, College Park 1991; Assistant Librarian, University Libraries 2008.

MARY M. FARRELL, B.A. University of Missouri, Kansas City 1984; M.L.S. University of Arizona 1988; M.P.A. Arizona State University 1992; Dean of Libraries, University Libraries 2002.

JENNY GARCIA, B.A. Regis University, 1989; M.L.S. Emporia State University 1992; Assistant Librarian, University Libraries 2003.

GENA M. GEORGE, B.A. University of North Texas 1993; M.L.S. University of North Texas 1997; Assistant Librarian, University Libraries 2005.

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MARTHA J. HANSCOM, B.A. Kalamazoo College 1970; M.L.S. Western Michigan University 1972; Associate Librarian, University Libraries 1990, 1978.

MARY ANN HARLOW, B.S. University of Wyoming 1989; M.L.S. University of Arizona 1990; Associate Librarian, University Libraries 1997, 1991.

TAMSEN L. HERT, B.A. Colorado State University 1975; M.L.S. Emporia State University 1984; M.A. 1988; Associate Librarian, University Libraries 1991, 1986.

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DAVID KRUGER, B.S. South Dakota State University 1991; B.S.Ed. Minot State University 1994; M.A. Kansas State University 1996; M.L.S. University of Missouri 1998; Associate Librarian, University Libraries 2004, 1998.

CASSANDRA KVENILD, B.A. University of Wyoming 1996; M.L.I.S. University of Washington, Seattle 2000; Assistant Librarian, University Libraries 2008.

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JENNIFER MAYER, B.A. University of Wyoming 1991; M.L.I.S. University of Oklahoma 1996; Associate Librarian, University Libraries 2005, 1999.

DEBORAH McCARTHY, B.A. Lycoming College 1983; M.L.S. Texas Women's University 1989; M.B.A. New Mexico State University 2003; Assistant Librarian 2004.

TAMI MORSE McGILL, B.A. University of California, Davis 1981; M.A. University of California, San Diego 1987; M.L.S. San Jose State University 2001; Assistant Librarian, University Libraries 2006.

MICHAEL L. NELSON, B.A. Kalamazoo College 1973; M.Lib. University of Washington 1978; M.A. Montana State University 1980; Associate Librarian, University Libraries 1991, 1984.

LORI J. PHILLIPS, B.A. University of Wyoming 1989; M.L.S. University of Arizona 1991; Associate Librarian, University Libraries 1999, 1992.

LAWRENCE SCHMIDT, B.S. Montana State University 1987; M.S. 1995; M.L.S. Emporia State University 2002; Associate Librarian, University Libraries 2008, 2002.

ROBERT A. STALEY, B.A. Gettysburg College 1969; M.A. University of Manitoba 1974; M.L.S. University of Pittsburgh 1974; Associate Librarian, University Libraries 2008, 2002.

LORI J. TERRILL, B.A. University of Wyoming 1993; M.L.S. Emporia State University 1995; Associate Librarian, University Libraries 2006, 2000.

BRYAN P. TRONSTAD, B.S. Montana State University 2000; M.L.S. University of Alabama 2003; Assistant Librarian, University Libraries 2004.

WILLIAM O. VAN ARSDALE, III, B.A. Southwestern College-Kansas 1968; M.A. University of Denver 1973; Associate Professor, University Libraries 1987, 1981.

LAURN W. WILHELM, B.A. Utah State University 1970; M.Ed. 1971; Associate Librarian, University Libraries 1986, 1975.

SARA R. WILLIAMS, B.A. Nebraska Wesleyan University 1976; M.A. Boston College 1980; M.S.L.I.S. Simmons College 1981; Associate Librarian, University Libraries 2006.

SUSAN C. WYNNE, B.A. Clemson University 1995; M.L.I.S. University of South Carolina 2004; Assistant Librarian, University Libraries 2006.

Centennial Complex

Designed by internationally prominent architect Antoine Predock to represent a town at the foot of a mountain, this dramatic building contains the collections of the American Heritage Center and the UW Art Museum. It is located at 2111 Willett Drive, just north of the Arena Auditorium and War Memorial Stadium.

American Heritage Center

Mark Greene, Director
(307) 766-4114

The American Heritage Center is the university's repository of manuscripts, rare books library, and official archives. The Center places service to UW undergraduates, graduate students, and faculty, as its highest priority. But because the Center's collections are known worldwide, UW undergraduates using the Center's holdings are likely to be working alongside scholars from Japan or Nigeria or the producers of PBS's American Experience.

The Center's collections are of interest to far more than history majors. The Center's collections go beyond Wyoming's or the region's borders and support a wide range of research and teaching activities in the humanities, sciences, arts, business, and education. So far, students from courses in 16 departments—African-American Studies, American Indian Studies, American Studies, Anthropology, Art, Geography, History, the Lab School, English, Music, Nursing, Pharmacy, Secondary Education, Sociology, University Studies, Women's Studies—regularly do research in the American Heritage Center.

The Center is one of the largest and most-consulted primary source repositories in the U.S. Major areas of collecting include Wyoming and the American West, the mining and petroleum industries, Western politics, environment and natural resources, journalism, air and rail transportation, the history of books, and 20th century entertainment such as popular music, radio, television, and film.

Students and faculty are encouraged to visit and make use of the collections – no appointments are necessary. The American Heritage Center is open from 8 a.m. to 5 p.m. Tuesday through Friday, Mondays 10 a.m. to 9 p.m.

American Heritage Center Faculty:

SHANNON BOWEN, A.B. Randolph-Macon Woman's College 1996; M.A. University of Wyoming 2001; Associate Archivist 2008, 2001.
CAROL L. BOWERS, B.A. University of Florida 1971; M.A. University of Wyoming 1994; Associate Archivist 2008, 1997.
RICHARD G. EWIG, B.A. University of Wyoming 1979; M.A. 1980; Associate Archivist 2005, 2000, 1994.
MATTHEW FRANCIS, B.A. Bluffton University 2002; M.A. Wright State University 2008; Assistant Archivist 2008.
SHAUN HAYES, B.A. Bowling Green State University 2006; M.L.I.S. University of Pittsburgh 2008; Assistant Archivist 2009.
LAURA UGLEAN JACKSON, B.A. Colorado State University 2004; M.L.S. Simmons College 2007; Assistant Archivist 2008.
GINNY KILANDER, B.A. Indiana University 1992; M.A. University of Wyoming 1998; Associate Archivist 2005, 1999.
ANNE MARIE LANE, B.A. University of Missouri 1973; M.A. University of Kansas 1980; M.L.S. University of Arizona 1992; Archivist/Curator of Rare Books 2006, 1995.
LESLIE C. WAGGENER, B.A. University of Texas, Austin 1995; M.L.I.S. 2000; Associate Archivist 2007, 2000.
D. CLAUDIA THOMPSON, B.A. Metropolitan State College, Denver 1977; M.A. University of Denver 1978; Associate Archivist 2006, 2001, 1995.
JOHN WAGGENER, B.A. University of Wyoming 1994; M.A. 2001; Associate Archivist 2007, 2000.

Art Museum

Susan Moldenhauer, Director & Chief Curator
(307) 766-6622

Located on the east side of campus in the award-winning Centennial Complex, the UW Art Museum was established to bring the world of art to Wyoming. With "imagine learning from the masters" as a guiding principle, a rotating schedule of exhibitions range from ancient artifacts to contemporary art to subjects about the American West. The Art Museum's permanent collection of 7,000 objects spans Modern and Contemporary Art, American and European Art, Photography, and art of the Americas, Asia and Africa.

Exhibitions are accompanied by a wide-range of public programs, including panel discussions, exhibition tours with curators, and lectures by artists and scholars. An active K -12 program enhances the museum experience through tours, hands-on studio activities, and after-school-classes.

Art Express, the museum's outreach programs include the *Ann Simpson Artmobile Program* and the *Touring Exhibition Service*. The Artmobile takes original art and a museum educator to Wyoming's communities for programs in schools, community centers, museums, and galleries. The *Touring Exhibition Service* circulates as many as eight exhibitions of original art to venues across the state and beyond.

The Museum Store supports the Art Museum's education mission by offering items related to exhibition subjects and collection themes in addition to fine gifts, specialty children's items, and a growing array of museum reproduction prints, cards, watches, and T-shirts.

The Art Museum is free to all and is open Monday through Saturday, 10 a.m.–5 p.m. Hours are extended to include Sunday 1-5p.m. June through August and Mondays until 9 p.m. in the months of February, March, April, September, October, and November. Additional information on the Art Museum and its programs may be found at www.uwyo.edu/artmuseum.

Anthropology Museum

The Anthropology Museum is located on the main floor of the Anthropology Building. Rotating displays are drawn from ethnographic materials, physical anthropology collections and extensive faunal and archaeological collections. The museum's theme, "The Human Odyssey," examines human biological and cultural change with emphasis on Native American cultures. Other exhibits relate to research and course offerings in the Department of Anthropology. They are designed with the interest of the general public in mind.

The Anthropology Museum is open 8 a.m. to 5 p.m. Monday through Friday during the academic year. During the summer, hours are from 7:30 a.m. to 4:30 p.m. Monday through Friday. The museum is currently under construction and is expected to open to the public in January 2009.

Center for Rural Health Research and Education (CRHRE)

230 Health Sciences Center
(307) 766-6544
E-mail: CRHRE@uwyo.edu
Web site: www.health.uwyo.edu

The mission of CRHRE (pronounced "share") is to facilitate interdisciplinary approaches to integrating technology with research and education to improve the health of rural populations. Through its expertise in biomedical and health informatics, distance education technologies, and information management, the CRHRE supports the development of new methods for delivering health care to rural areas and for training and sustaining a rural health care workforce. For more information, contact the CRHRE director, Dr. Rex Gantenbein, via the contact information above.

Department of Physics and Astronomy

204 Physical Sciences Building
Dept. 3905, 1000 E. University Ave.
(307) 766-6150
E-mail: physics@uwyo.edu
Web site: faraday.uwyo.edu

The University of Wyoming Department of Physics and Astronomy operates the Wyoming Infrared Observatory (WIRO), consisting of a 2.3-meter infrared telescope. Planning for this facility was done in the early 1970s. Funding for the facility was obtained in 1975 from the Wyoming State Legislature (contributing 60 percent) and from the National Science Foundation (40 percent). WIRO became operational in September of 1977 and it still ranks as one of the premier observatories in the world.

WIRO is located approximately 125 miles northwest of Denver, 25 miles southwest of Laramie, and situated atop Jelm Mountain at 9,656 feet. The site was chosen because of the dryness of the air, comparatively low turbulence in the air above the mountain, low air and light pollution levels, and proximity to the University of Wyoming. The site had pre-existing electricity, phone lines, and a road to the top because the U.S. Forest Service and BLM formerly used Jelm as a fire lookout station.

Over the years, using the WIRO facilities, University of Wyoming faculty and visiting astronomers have made lasting contributions to the fields of astronomy and astrophysics. The WIRO telescope controls were recently upgraded to allow smooth operation of the telescope and instrumentation over the Internet. Current instrumentation includes infrared and visible wavelength cameras and a visible wavelength spectrograph.

Division of Information Technology

Robert Aylward, Vice President for Information Technology
Information Technology Center 372A, (307) 766-4860
Web site: www.uwyo.edu/InfoTech

Academic computing labs, central computer facilities, instructional technologies, selected software licensing, computer training, telephone, and data communication service are important parts of academic and administrative life at the University of Wyoming. The Division of Information Technology's goal is to manage UW's computing and communications facilities in a professional, service-oriented manner for the campus community.

Information Technology maintains academic and administrative software applications, a state-of-the-art Windows domain, UNIX systems, and a wide range of peripheral computer equipment. An extensive campus-wide data network provides connectivity to these computers and the Internet from the various computer labs across campus, most campus buildings, university housing, and from off-campus via dial-in modems. There are approximately 200 wireless Ethernet access points across campus. Current information, updates, access point location maps, and "How-To" directions for students, faculty and staff are available online at www.uwyo.edu/InfoTech/wireless. Use of these University computing and data facilities is governed by UW Regulation 3-690, Ethical Use of Computers and Data Communications Facilities.

The central computers operate 24 hours a day, with the exception of system maintenance time. System maintenance work is required periodically on the data network, computing systems and servers. Maintenance on Information Technology supported systems is scheduled between 12:01 a.m. and 12:00 noon on Sundays.

High-speed data ports installed in the University residence halls, fraternities, sororities, and the River Village apartments connect directly to the campus data network. Other university residences have dial-up access to the network and Internet through the modem pool. More information can be found at www.uwyo.edu/ResNet or call Residence Life's ResNet Help Line at 766-2989 for further university residence related information.

Several computer labs are located throughout campus for students, faculty, and staff. Many labs are staffed by student lab assistants who are able to answer lab-related questions. The computer labs contain personal computers with a wide variety of software and computing equipment. The computer lab in Biological Sciences room 37 is open and staffed 24 hours during the normal academic year, except during system maintenance time. The standard computer lab node configuration is also available through remote connections for use with a high-speed Internet connection. The UWStudent Remote Lab System is a collection of lab nodes that are designed to be accessed from a remote network connection. The remote lab nodes are configured identical to the UWStudent lab nodes found on campus. Access to student H: drive storage, roaming profiles, and specialized software are all available through the remote lab nodes.

More information, including a link to the UW Student Remote Lab System, a complete listing of labs, lab schedules, and software policies, is available online at microlab.uwyo.edu. Scheduled hours for labs are also posted at the entrance of each lab. For questions and assistance, please e-mail asu-it@uwyo.edu or call the HelpDesk at 766-4357, option 1.

The Classroom Technology Support group (CTS) provides support and maintenance for Audio Visual, lecture capture in specific classrooms, and other technology used in classrooms across campus. They can be contacted by phone at 766-2872 or by e-mail at clrmtech@uwyo.edu. For immediate assistance in a classroom where a class is being taught, please call 766-4357 (6-HELP), option 1. Someone will arrive to provide assistance. Training for classroom technologies is available by appointment. Call 766-2872 for more information. Training for the Classroom Building is provided by ECTL and CTS at the beginning of each semester. Please go to www.uwyo.edu/classroombuilding for further details.

Information Technology provides a range of telephone services on campus. In addition to basic phone service, long distance, voice mail, caller ID and call waiting ID are also available. Contact Information Technology's Telecom Help Desk in the Information Technology Center (ITC), room 160, or call 766-4357, option 2, for more information.

Also available are sales and maintenance support for PCs, laser printers, and other peripheral equipment as well as Apple Computer products. PC Sales Consultants are located in the ITC and may be contacted at 766-2875; Apple Sales Consultants are also located in the ITC and may be contacted at 766-2749. PC or Apple sales can be contacted via e-mail at itsales@uwyo.edu. Computer repair requests may be submitted by filling out the Web form at www.uwyo.edu/ITRepair or by contacting the Help Desk at 766-4357, option 1.

Information Technology provides Help Desk, telephone, remote desktop, online chat, walk-in and in-office support during normal business hours. Call the Client Support Services Help Desk at 766-4357, option 1 or visit the reception area, 104A, in the ITC. Help Desk phone and online chat support is available outside normal business hours. Help Desk hours are posted at www.uwyo.edu/InfoTech/support/helpdesk.htm. Client Support also maintains "How To" help documents which cover subjects such as University computer accounts, how to connect to the network and how to access available software in the computing facilities. A complete listing of available documentation is online at www.uwyo.edu/AskIT.

Selected software licensing checkout, software purchase, and training class reservations may also be made at the reception desk in the ITC. To accomodate student personal productivity, students who are enrolled at UW are eligible to obtain a set of Microsoft products including Microsoft Office for Windows, Microsoft Office for Macintosh, and Windows Operating System upgrades at little or no cost. Free antivirus software is also available for student use. Visit the WyoWare student software Web site at www.uwyo.edu/software/students for more information or to download the software after enrolling for a class.

The Division of Information Technology's main office is located in room 202 of the Ivinson Building and is open during normal business hours. Those in need of assistance are encouraged to call the Client Support Help Desk at 766-4357, option 1 or the Division Office at 766-4860.

Geological Museum

(307) 766-2646, 2650
E-mail: uwgeoms@uwyo.edu
Web site: www.uwyo.edu/geomuseum

The Geological Museum, in the east wing of the S.H. Knight Geology Building, contains exhibits that interpret the story of ancient Wyoming. Highlight exhibits include: one of the world's only six mounted fossil skeletons of the well-known dinosaur Apatosaurus (Brontosaurus); skeletal cast and displays of the world-renowned "Big Al" the Allosaurus; a 50-million-year-old garfish from Wyoming's Green River Formation (one of the largest complete freshwater fossil fish on display in the world); a skull cast of Wyoming's state dinosaur, Triceratops; a one-of-a-kind, life-size, copper-plated Tyrannosaurus rex statue; and a fluorescent mineral room, featuring specimens from Wyoming and the world.

The museum maintains important display collections (particularly vertebrate and invertebrate fossils) that are available for study by students, as well as scientists from other institutions. The museum provides unique opportunities for undergraduate students to pursue research and display projects in Wyoming paleontology.

The Mountain-Plains Consortium: Rural and Non-Metropolitan Transportation Research

Dr. Khaled Ksaibati
Dept. of Civil and Architectural Engineering
2094 Engineering Bldg.
Dept. 3295; 1000 E. University Ave.
(307) 766-6230

The University of Wyoming has been involved in the Mountain-Plains Consortium (MPC) since its beginning in 1988. MPC is one of the University Transportation Centers Programs (UTCP) sponsored by the U.S. Department of Transportation.

MPC conducts research and training in the field of transportation. Goals include attracting the nation's best talent to the study of rural transportation and to develop new strategies and concepts effectively addressing transportation issues. Nine primary research areas include low volume roads and bridges, rural transportation planning and finance, rural transit, and tourism. Individuals interested in financial support for graduate work in transportation engineering should contact the MPC via the contact information above.

Red Buttes Environmental Biology Laboratory

Within a few miles of Laramie, the Department of Zoology and Physiology operates the Red Buttes Environmental Biology Laboratory, a 9,600-square-foot facility equipped to handle both aquatic and terrestrial vertebrates. An aquatic ecology and toxicology laboratory, uniquely designed to accommodate a wide range of test conditions of water flow, temperature and composition, is available within the facility. Animal holding and surgical rooms are specifically constructed to accommodate experimentation on small (e.g. mice, squirrels), medium (e.g. coyote, badger) and large (e.g. elk, bighorn sheep) mammals. Outdoor corrals and fish runs are also available on the 400-acre site.

Inquiries concerning the Red Buttes Environmental Biology Laboratory should be addressed to the Department Head, Department of Zoology and Physiology, Dept. 3166, 1000 E. University Ave., Laramie, WY 82071.

Red Buttes Observatory

Department of Physics and Astronomy
204 Physical Sciences Building
Department 3905
1000 E. University Avenue
Laramie, WY 82071
Phone: (307) 766-6150
E-mail: canterna@uwyo.edu
Web Address: www.uwyo.edu/rbo/

Red Buttes Observatory is a 24-inch telescope located nine miles south of Laramie. The observatory was completed in October of 1994, funded by a $344,000 grant from the National Science Foundation. The department uses the facility as a focus for the undergraduate astronomy curriculum by offering student researchers a state-of-the-art, computer-controlled telescope that is easy to use. Faculty and graduate students also use this facility for long-term monitoring programs. Some major programs at RBO are a NASA-funded program for gamma ray burst monitoring, observations of star clusters, and monitoring variable stars in the infra-red. The observatory is also used for community outreach and to provide complementary NSF funded instrumentation and observation for projects being done at the 2.3 meter Wyoming Infrared Observatory.

Rocky Mountain Herbarium

Located in the Aven Nelson Building, the Rocky Mountain Herbarium and the associated U.S. Forest Service National Herbarium contain more than 850,000 plant specimens. The primary functions of the herbarium are to (1) serve as a source of information on the flora of the Rocky Mountain region in general and of Wyoming in particular; (2) aid in the identification of plants submitted by ranchers, farmers, county agents, and state and federal agencies throughout the region; and (3) serve as a source of research and teaching material in systematic and ecological botany. Thousands of specimens are loaned each year to recognized institutions throughout the United States where research requires a knowledge of western plants.

Open to university students and other qualified researchers, the herbarium invites queries regarding the identification of plants. Those persons wishing assistance in the identification of a plant should send two specimens to the herbarium. Inquiries should be addressed to The Curator, Rocky Mountain Herbarium, Department of Botany, Dept. 3165, 1000 E. University Ave., Laramie, WY 82071.

Statistical Consulting Center

Ken Gerow, Director
337 Ross Hall, (307) 766-6600
Web site: www.uwyo.edu/stats/consultingcenter.asp

The Statistical Consulting Center, a unit of the Department of Statistics, exists to coordinate the statistical knowledge and skills available within the department with the subject-matter expertise of other scientists throughout the university, and to bring that combination to bear on applied research problems in diverse areas. The center can provide assistance in research design, sampling, data collection, and/or data analysis for the full range of research needs. The initial consultation is free. Thereafter, a variety of mechanisms are available to acknowledge the contributions of statistical consulting to a given research project, including co-authorship on a scholarly publication, membership on a thesis or dissertation committee, direct compensation to the consultant at private consulting rates, subcontracting with the center on a grant project, etc. On occasion, the center can also offer paid employment and internships to graduate students who have appropriate training and skills to assist other researchers. For further information about any of the services available through the Statistical Consulting Center, please contact the center via the contact information above.

The University of Wyoming Insect Museum

4025 Agriculture Building
1000 E. University Avenue
Laramie, WY 82071
Phone: (307) 766-5338

The University of Wyoming Insect Museum, comprising the Rocky Mountain Systematic Entomology Laboratory (RMSEL) and the Insect Gallery, is a nonprofit research and teaching facility with diverse functions. The Rocky Mountain Systematic Entomology Laboratory, housed in room 4025 of the Agriculture Building, comprises the core of the insect collection. The collection, which was started around 1890 with the donation of the Nieswander collection, was moved into this new facility in the mid-1980s. Mainly it serves as a research and teaching resource for UW students and faculty, and as a "state collection" for general reference, but it also provides research materials to scientists around the globe. It is the largest insect collection in Wyoming, currently with approximately one million insect specimens, of which about half are pinned, and the remainder are stored in alcohol and envelopes. Although most of the insects are from Wyoming and Colorado, a significant proportion (25 percent) are from tropical areas including Costa Rica, Ecuador, Mexico, Brazil, Somalia, and Australia. Highlights include the spectacular Maurice Howard butterfly collection, donated in 1992.

The Insect Gallery (room 4018 Agriculture Building) was developed in the autumn of 1993, celebrating 100 years of Wyoming entomology. It serves as an educational display area for science education and is open week days to the public. Classes and other large groups should call the curator, Dr. Scott R. Shaw, at 766-5338 to arrange for a guided tour. There is no charge for tours, but tax-deductible donations to the Insect Museum Fund are greatly appreciated. The Insect Museum is supported entirely by student and faculty research projects, grants, gifts, and donations.

UW National Park Service Research Center

The research center operates a field station at the historic AMK Ranch in Grand Teton National Park. Located 65 km north of Jackson, Wyoming. The field station provides scientists abundant research opportunities in the diverse aquatic and terrestrial environments of Grand Teton and Yellowstone National Parks, as well as the National Forests and Wilderness areas that make up the entire Greater Yellowstone area. The station has housing for up to 60 researchers and provides terrestrial and aquatic laboratories, boats, field equipment, a darkroom, conference rooms, and a library, all on site. A small grants program provides funding for individual proposals up to $5,000 on research conducted in the Greater Yellowstone Area. A Weekly seminar series with barbecue dinner is presented throughout the summer season.

Inquiries concerning the UW-NPS Research Center program should be addressed to: Director, University of Wyoming-National Park Service Research Center, Dept. 3166, 1000 E. University Ave., Laramie, WY 82071.

Western Interstate Commission for Higher Education (WICHE)

The Western Interstate Commission for Higher Education (WICHE) was created in 1953 by the governors and legislators of the western states. The primary commitment is to provide access to educational programs through interstate cooperation. Wyoming provides opportunities for qualified residents in the following programs:

Professional Student Exchange Program (PSEP) offers certified Wyoming residents access to professional education in the fields of dentistry, medicine, occupational therapy, optometry, osteopathic medicine, physical therapy, physician's assistant, podiatry, and veterinary medicine. To be eligible for certification, the applicant must be a legal resident of the State of Wyoming for three continuous years immediately prior to enrolling in professional school classes. Applications for certification are located at www.uwyo.edu/hs/upao/WICHEWWAMI.asp and are due no later than October 15 of the year preceding the anticipated start date of professional school. Applicants who are accepted to a professional program and who receive state support pay reduced tuition. State support is dependent on continued appropriations from the Wyoming State Legislature.

Western Regional Graduate Program (WRGP): provides opportunities for qualified Wyoming residents to attend distinctive graduate programs in participating WICHE states. Those accepted pay resident or significantly reduced tuition at the school they attend.

Western Undergraduate Exchange (WUE): allows residents of participating states (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming) to attend a participating institution at reduced cost of 150% of the institution's resident tuition. Not all institutions in the participating states offer WUE opportunities.

The University of Wyoming invites competitive applicants from participating states and awards WUE to highly qualified students as part of the Peak Achievement Scholarship. Information can be obtained from the UW Admissions Office.

Information about WICHE programs may be obtained from the WICHE Certifying Office, Dept. 3432, 1000 E. University Ave., Laramie, WY 82071, (307)766-6704 or (307)766-3499 or WICHE Student Exchange Program, Box 9752, Boulder, CO 80301-9752, (303) 541-0214.

Wilhelm G. Solheim Mycological Herbarium

The Wilhelm G. Solheim Mycological Herbarium, housed on the third floor of the Aven Nelson Building, facilitates the study of symbiotic and biotrophic fungi. The herbarium contains approximately 50,000 specimens of fungi from around the world and the largest collection of fungi in the Rocky Mountain Region. These collections are available for study by qualified students and researchers. A mycological reference library is located with the collection. Specimens may be borrowed by institutions without charge for a one-year period. Inquiries should be addressed to The Curator, Solheim Mycological Herbarium, Department of Botany, Dept. 3165, 1000 E. University Ave., Laramie, WY 82071.

William D. Ruckelshaus Institute of Environment and Natural Resources

Ingrid C. Burke, Director; (307)766-5080

In the summer of 2002, the University of Wyoming Board of Trustees named the Institute of Environment and Natural Resources after William D. Ruckelshaus. Mr. Ruckelshaus, who was the U.S. Environmental Protection Agency administrator under Presidents Nixon and Reagan, served as institute board chairman from the institute's inception in 1994 until 2000. His leadership has guided the development of the institute as a forum for meaningful discussions on environmental and natural resource issues of concern to the state, the region, and the nation.

The William D. Ruckelshaus Institute of Environment and Natural Resources represents a partnership among UW faculty and students, a prominent advisory board of leaders in the field of environment and natural resources, and the aspirations of a land-grant university. The Institute's mission is to advance effective decision-making on environmental and natural resource issues by promoting and assisting collaborative, informed approaches that sustain both the economy and the environment. The institute strives to empower citizens and communities with accurate and unbiased scientific, technical, and socioeconomic information that can assist in formulating effective, collaborative solutions to complex environmental and natural resource issues.

The Ruckelshaus Institute is joined with the Helga Otto Haub School of Environment and Natural Resources at the University of Wyoming, and together with the Wyoming Conservation Corps, the institute and school comprise the Environment and Natural Resources program at UW. The Ruckelshaus Institute and Haub School work in tandem, with the institute focusing on research and outreach, and the school offering courses and degrees for undergraduates, graduate students, and mid-career professionals.

Inquiries about institute programs should be directed to the William D. Ruckelshaus Institute of Environment and Natural Resources, University of Wyoming, Dept. 3971, 1000 E. University Ave., Laramie, WY 82071-2000. E-mail: ienr@uwyo.edu.

Wyoming Cooperative Research Unit

The Wyoming Cooperative Fish and Wildlife Research Unit is supported by the University of Wyoming, the Wyoming Game and Fish Department, the U.S. Department of Interior and the Wildlife Management Institute. The three permanent unit staff members serve as full faculty in the Department of Zoology and Physiology.

Research is conducted on many types of fish and wildlife issues. The emphasis is on evaluating proposed or actual habitat modifications in the northern Rocky Mountain area on fish and wildlife species and/or communities of organisms. Much of the Wyoming Game and Fish Department's field research is conducted through the unit. Both students hired as technicians as well as graduate assistants are involved in unit research.

For further information contact Leader, Wyoming Cooperative Research Unit, Dept. 3166, 1000 E. University Ave., Laramie, WY 82071.

Wyoming Geographic Information Science Center

Jeff Hamerlinck, Director
Agriculture C, Room 337 (307) 766-2532
E-mail: info@wygisc.uwyo.edu
Web site: www.wygisc.uwyo.edu

The Wyoming Geographic Information Science Center (WyGISC) has a mission to advance the understanding and application of geographic information science through basic and applied research, education and training, information and technology transfer, and by promoting utilization of geospatial technologies for science, management, and decision making within the University and throughout the state and region. Examples of geospatial technologies include geographic information systems, geographic cartography and visualization, Global Positioning System-based mapping, and image processing of remotely-sensed Earth resource data derived from aircraft or satellites. Broad applications areas exist in both environmental and social sciences, as well as agriculture, engineering and business.

Established in 2001, WyGISC evolved from the former Spatial Data and Visualization Center (SDVC) which operated on campus between 1996 and 2001. The center operates under the Office of Academic Affairs and in close coordination with the Office of Research, providing assistance to all units on campus and to numerous private, local, state, and federal entities in Wyoming and the Rocky Mountain region. Services include research collaboration, technical expertise, geospatial technology short course training, and geospatial data dissemination.

WyGISC encourages undergraduate and graduate student participation in its research projects and has sponsored students from the McNair Scholars Program and other student research apprentice programs, as well as graduate students affiliated with participating departments and research centers. Part-time employment and internship opportunities are often available. Inquiries may be directed to the center using the contact information provided above.

Wyoming State Geological Survey

P.O. Box 1347
Laramie, WY 82073
Phone: (307) 766-2286

The university campus is an important center for research in many natural resources. Several state and federal agencies conduct cooperative programs in conjunction with university programs.

The Wyoming State Geological Survey, a state agency, is housed adjacent to the S.H. Knight Geology Building. The geological survey investigates all phases of Wyoming geology and provides geological information to state agencies and the general public. The survey may also support student investigations of state geological problems. Members of the staff participate in university instruction and research, and often serve on graduate committees.

Wyoming State Veterinary Laboratory

1174 Snowy Range Road, (307) 742-6638
E-mail: montgome@uwyo.edu
Web site: wyovet.uwyo.edu

Located west of campus and operated by the Department of Veterinary Sciences, the Wyoming State Veterinary Laboratory (WSVL) is responsible for diagnosis and reporting of animal diseases. Areas of expertise include morphological and clinical pathology, bacteriology, virology, toxicology, parasitology, electron microscopy, molecular diagnostics, and serology.

Cooperative diagnostic and research activities are conducted with various state and federal agencies. The WSVL building also houses a UW classroom, laboratories for the Wyoming Game and Fish Department, and Wyoming Department of Agriculture Analytical Services Laboratory. Students are encouraged to conduct domestic and wildlife disease research in an interdisciplinary setting.

For further information contact WSVL, 1174 Snowy Range Road, Laramie, WY 82070.

Wyoming Survey & Analysis Center

Burke D. Grandjean, Executive Director
UW Office Annex, Second Floor
Dept. 3925; 1000 E. University Ave.
Laramie, Wyoming 82071
Phone: (307) 766-2189, Fax: (307)766-2759
Email: wysac@uwyo.edu
Web site: www.uwyo.edu/wysac

The Wyoming Statistical Analysis Center was established at the University of Wyoming by Executive Order 2000-5 on September 16, 2000. In June 2004, it merged with the Survey Research Center to create the Wyoming Survey & Analysis Center (WYSAC).

WYSAC's purpose is to provide information for decision-makers by collecting, managing and analyzing data. WYSAC acts as a nucleus to the University for applied research, policy analysis, needs assessment and evaluation studies, with special emphasis on topics related to education, criminal justice and substance abuse. WYSAC personnel provide assistance to the academic community, University administrative units and both the public and private sectors throughout Wyoming and the region. Interested parties can call upon the center's expertise in survey methods, evaluation research, and information technology to carry out their data collection and analysis on a contract basis.

Services include opinion polling, drawing and construction of samples, design of questionnaires, computer data recording, tabulation of data, policy analysis and grant research. A computer-assisted telephone interviewing system (CATI) is maintained in the center for use by trained student interviewers. The center has staff knowledgeable in current US postal regulations for mail surveys, along with hardware and software for scanning the returns. Surveys are also conducted by e-mail, on the Internet, through in-person interviewing and in focus groups. The center offers paid employment and internships to students assisting in such tasks.

For further information on WYSAC or if interested in a graduate assistantship with WYSAC, contact WYSAC via the contact information provided.

Commonly Used Terms

Academic load: The total semester hours of credit for all courses taken during a specified time—semester or summer session.

Academic probation: Probation is the status of an undergraduate student who is not progressing satisfactorily toward his or her degree. An undergraduate student shall be placed on probation at the end of the semester or term when his or her cumulative grade point average (GPA) falls below a 2.0; 3.0 for graduate students.

Academic reinstatement: Restoration of a student's eligibility to register for courses after being on academic suspension. This process requires a petition that is first reviewed by the dean of the student's college or the Center for Advising and Career Services. Academic reinstatement does not guarantee restoration of financial aid eligibility which is a separate process handled by the financial aid office.

Academic suspension: The status of a person whose enrollment at UW has been terminated because of unsatisfactory academic progress towards either an undergraduate or graduate degree.

Accredited: A term applied to a school or specific program which has been recognized by a national or regional organization as meeting certain academic standards for quality and educational environment. The University of Wyoming, and all UW academic programs are accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools Commission on Institutions of Higher Education. This is the highest level of accreditation in the United States. Some academic programs have professional standards established by their respective accrediting associations.

Add and drop deadlines: The latest date in an academic term when a course may be added or dropped from a student's class schedule *without* approval of someone other than the student. Adding and dropping of courses is done through WyoWeb.

Admission: The process of being admitted to the university with the opportunity to take classes.

AP exam: An Advanced Placement Examination from the College Entrance Examination Board (CEEB) in a specific subject area available nationally to high school students. Obtain information on taking the examination from a high school guidance counselor. Information on university course credit for these examinations is available from the Office of the Registrar.

Audit: Individuals who want to take a course but who do not want either a grade or credit for taking it may register as an audit. The instructor for the course determines the amount of work and/or participation that is required. Marks of either Audit/Satisfactory or Audit/Unsatisfactory are assigned. Audit hours are charged tuition at the normal rate. Audit hours are not used to determine full- or part-time status.

Banner: Banner is a suite of products that are used as our student information system.

CAPP: CAPP is an electronic degree progress/advising support system that matches a student's completed and current UW course work (and any transfer work a student might have) with the current degree requirements to determine the student's progress toward earning a degree.

Class schedule: A publication containing a listing of all courses scheduled to be offered during a specific semester or summer session. The *Class Schedules* are available on the Web.

CLEP test: Subject area examination administered by the College Entrance Examination Board.

Concentration: A collection of courses within a major which focuses on a particular subject area.

Continuing probation: A student is placed on academic probation at the end of the semester or term when his or her cumulative grade point average (GPA) falls below a 2.0. A student is considered on continuing probation in subsequent semesters if the student earns a term GPA of 2.0 or above but whose cumulative GPA is still below a 2.0.

Corequisite: A course to be taken or a requirement to be fulfilled at the same time as a particular course is being taken.

Cross-listed course: A course which is identical in content, title, credit hours, and requirements which is offered by one or more academic departments. The four-digit course number must be the same. This designation must be approved by the University Course Review Committee.

Curriculum: The set of courses in a particular degree program. More generally, the courses (in total) offered in a college or university.

Degree requirements: Degree requirements include all requirements of the university (including University Studies Program), college, academic department, and major. All requirements must be successfully met in order to obtain a specific degree.

Drop: To discontinue enrollment in a course or courses prior to the end of the drop/add period at the beginning of a term. A dropped course does not appear on the student's academic transcript. Dropping from a class does not influence a student's Satisfactory Academic Progress measurement, but may impact the amount of financial aid a student earns for the semester in question.

Dual-listed course: A course which is offered at both the 4000- and 5000-level that is identical in course prefix, content, title, and credit hours. The last three digits of the four-digit course number must be the same. The 5000-level course must require additional work beyond that required for the 4000-level course. This designation must be approved by the University Course Review Committee.

Financial aid reinstatement: Restoration of one's financial aid eligibility based on being granted an exception to financial aid or scholarship rules. Financial aid restoration is a separate process from and is not guaranteed by academic reinstatement.

Full-time: A student taking 12 or more credit hours at the undergraduate level or 9 or more credit hours at the graduate level is considered a full-time student. During the summer session, undergraduate students enrolled in 6 or more credit hours and graduate students enrolled in 4.5 or more credit hours are considered full-time.

General Bulletin: The *General Bulletin*, or catalog, is the official document of the university which includes information on all undergraduate academic programs and their requirements, courses offered by each academic department, lists of faculty, policies and procedures related to admission, financial aid, all registration activity, and tuition and fees. A student's degree requirements are based on the *General Bulletin* in effect the year he or she enters either UW or another bulletin year as approved with a petition.

Grade point average: The semester grade point average (GPA) is the sum of all grade points earned in a semester or term divided by all credit hours attempted for letter grade. Credit hours in courses in which marks of I, W, S, or U were assigned are excluded. The cumulative grade point average is the average of all grades earned at UW.

Lower-division course: Courses normally taken during the freshman and sophomore years. Lower division courses are those numbered between 1000 and 2999.

Major: The primary disciplinary interest or academic subject area of a student as represented by one of the curricula offered by the various academic departments. The undergraduate degree may or may not carry the same title as the major. Every student has one or more majors but may or may not have a minor or concentration.

Minor: A secondary subject area interest (to the major) represented by a specified set of hours and/or courses. Differs from a concentration in that a minor is not a subdivision of the major subject area.

Option: A concentration of elective courses within a major which emphasizes one aspect of the major, chosen by a student according to his or her interests.

Orientation: A program of one to three days on campus designed to acquaint a new student with the facilities, policies, sources of information and assistance, and academic and social environment. Academic advising and registration are also included.

Prerequisite: A requirement to be completed before enrollment in a course or a degree program. Prerequisites for individual courses are listed in their course description in this bulletin. The statement, "or consent of instructor" is implied for all prerequisites. Students are responsible for being aware of a course's prerequisites prior to enrolling in the course.

Registration: The process of officially enrolling into one or more courses or matriculation at the university.

Satisfactory academic progress: Satisfactory Academic Progress only applies to federal financial aid applicants and recipients. Three measures of a student's advancement toward the earning of his or her stated degree objective are 1) a grade point average putting the student in good academic standing, 2) a ratio of credit hours earned compared to credit hours attempted in the student's most recent academic year, and 3) a comparison of the number of credit hours attempted in a college career compared to the number of hours required to earn the pursued degree.

Semester: The division of the calendar year used in academic scheduling. A semester is roughly 15 weeks in length.

Semester credit hour: The unit of academic credit for course work.

Transfer credit evaluations: An evaluation of previous college-level course work from another regionally-accredited academic institution, international post-secondary institution, standardized test, or military course work to determine whether courses are transferable to UW as well as to determine any UW equivalents.

Upper-division course: Courses normally taken during the junior and senior years. These courses are numbered from 3000 – 4999.

"W" Number: A student's unique identifier in the Banner/WyoWeb system will begin with "W". This "W" number replaces the Social Security Number as a student's unique identifier.

Withdrawal: To discontinue enrollment in a course or courses after the end of the drop/add period. When withdrawing from one or more, but not all, courses, a student should obtain and process an Individual Class Withdrawal form. To withdraw from all courses in a semester, a student should begin the process in the Dean of Students Office. A mark of W will be placed on the student's academic transcript for each course. Withdrawal from a course or from the university may impact both a student's current and future receipt of financial aid. Ask a financial aid office professional before withdrawal.

WyoWeb: The University of Wyoming portal used for communication with the campus community, registration activity, grade posting, financial aid, course management, and advising. A specialized version of WyoWeb is available for all enrolled students, faculty, staff, and alumni.

Courses of Instruction

Changes in Bulletin Information

The course offerings and requirements of the University of Wyoming are under examination and revision continually. This bulletin is not a contract; it merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will not change.

Not all courses are offered each term. The listing of courses does not imply a contractual obligation to offer the same during the year of publication of this bulletin. The university reserves the right to offer, limit, or cancel course offerings for academic, funding, or facility considerations, and to cancel any offered course for which there is not sufficient enrollment.

The university reserves the right to change approved course listings at any time during a student's term of residence.

Course Credits

The amount of credit offered for any course work published in this bulletin is based on and governed by prior university faculty recommendation and institutional determinations.

A credit hour denotes a unit of academic work. Normally, one credit hour is earned in a course meeting one hour per week for a semester (15-16 weeks). Each credit hour unit requires an average of three hours of student effort per week. In variable credit courses, the efforts required of the students are proportional to the credit hours attempted.

Even if topics differ in separate sections, variable credits limit the credits which can be earned in that course in one semester and career maximum limit the credits from that course considered toward any one degree.

Format of Course Listings

On the following pages, courses approved for offering are listed by college, program subject, and course level (number).

The heading which precedes the brief description of each course shows the current course identification number; former course number(s), if any, in brackets; course title; a designation in bold brackets (**[W1⧫WA],** e.g. **[USP 1991⧫USP 2003]**), if any, concerning applicability of the course to the University Studies Program (see below for designation); an indicator, if any, concerning applicability of the course in postgraduate-careers; the number of semester credit hours established for the course (fixed or variable with the semester); and the career maximum of credit for successive term enrollments in the identified course, if different from the established semester credit-hours limit. For example, "1-3 (Max.9)" means that a student may earn between 1 and 3 hours of credit for that course within one semester and a maximum of 9 hours within a degree career. The course description indicates any prerequisites for that course and if it is offered for satisfactory/unsatisfactory grading only.

Course Levels

University courses are distinguished by number indicating five levels of instruction as follows:

0000-0999	Preparatory courses (no credit)
1000-2999	Primarily for Freshmen and Sophomores
3000-4999	Primarily for Juniors and Seniors
5000-5999	Primarily for Graduate Students
6000-6999	Law courses, WWAMI courses, and Doctor of Pharmacy courses

A bracketed course number **[ ]** indicates a previous number of the same course. Double credit cannot be earned by repeating a course.

Prerequisites are the primary factor which normally govern whether a student enrolls for any particular course. However, individual departments and/or colleges may place additional restrictions on course enrollments (e.g. enrollment may be restricted by student classification).

Enrollment in engineering courses is generally limited to engineering students.

Law courses are normally open only to students approved for the program.

Graduate students may enroll in courses numbered 1000-3999 to satisfy undergraduate deficiencies but only courses numbered 4000 and above will be computed into the graduate GPA and allowed for graduate credit.

Course Prefixes and Description Index

College of Agriculture

Frank Galey, Dean
151 Agriculture Building
Phone: (307)766-4133 Fax: (307)766-4030
Web site: www.uwyo.edu/uwag

Graduate Degrees

Master of Science
- Agricultural Economics
- Agronomy
- Animal and Veterinary Sciences
- Entomology
- Molecular Biology
- Family and Consumer Sciences
- Rangeland Ecology and Watershed Management
- Soil Science

Master of Science - Interdisciplinary
- Agricultural Economics/Water Resources
- Entomology/Water Resources
- Food Science and Human Nutrition
- Rangeland Ecology and Watershed Management/Water Resources
- Reproductive Biology
- Soil Science/Water Resources

Doctor of Philosophy
- Agronomy
- Animal and Veterinary Science
- Entomology
- Molecular Biology
- Rangeland Ecology and Watershed Management
- Soil Science
- Family and Consumer Sciences/ Early Childhood Education

Agriculture (AGRI)

5010. Extension Prac. 8. Agricultural field experience in county extension programs. *Prerequisite:* AGRI 4010, junior standing and consent of instructor.

5520. Fld Prac: Ext Work. 1 - 4. (Max 9). Organization, teaching, and promotion of county programs. *Prerequisite:* AGRI 4010 or consent of instructor.

5900. Prac: College Tchg. 1 - 3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Cont Reg: On Campus. 1 - 2. (Max 16). *Prerequisite:* advanced degree candidacy.

5940. Cont Reg: Off Campus. 1 - 2. (Max 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Stds:. 1 - 3. (Max 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1 - 12. (Max 16). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

Department of Agriculture and Applied Economics

206 Agriculture Building, 766-2386
FAX: (307) 766-5544
Web site: www.uwyo.edu/ag/agecon
E-mail: ag-econ@uwyo.edu
Department Head: Roger Coupal

Professors:

NICOLE S. BALLENGER, B.A. University of California, Santa Cruz 1975; M.S. University of California, Davis 1980; Ph.D. 1984; Professor of Agricultural Economics 2004.

LARRY J. HELD, B.S. North Dakota State University 1971; M.S. 1973; Ph.D. University of Nebraska 1977; Professor of Agricultural Economics 1988, 1977.

DALE J. MENKHAUS, B.S. Purdue University 1967; M.S. Michigan State University 1970; Ph.D. Purdue University 1973; Professor of Agricultural Economics 1982, 1973.

DAVID T. TAYLOR, B.S. Montana State University 1972; M.S. 1973; Ph.D. Colorado State University 1987; Professor of Agricultural Economics 1994, 1985.

GLEN D. WHIPPLE, B.A. Brigham Young University 1974; M.S. Utah State University 1976; Ph.D. Washington State University 1980; Professor of Agricultural Economics 1990, 1985; Director, UW Extension.

Associate Professors:

EDWARD B. BRADLEY, B.S. University of Wisconsin 1971; Ph.D. Pennsylvania State University 1978; Associate Professor of Agricultural Economics 1987, 1977.

ROGER COUPAL, B.S. Utah State University 1978; M.S. University of Arizona 1985; Ph.D. Washington State University 1997; Associate Professor of Agricultural Economics 2003, 1997.

DON MCLEOD, B.S. St. John's College 1982; M.S. Oregon State University 1987; Ph.D. 1994; Associate Professor of Agricultural Economics 2003, 1995.

ALAN C. SCHROEDER, B.S. North Dakota State University 1971; M.S. University of Wisconsin 1974; J.D. 1974; Ph.D. 1982; Associate Professor of Agricultural Economics 1992, 1986.

Assistant Professors:

MATTHEW A. ANDERSEN, B.A. Colorado College 1991; M.S. Colorado School of Mines 2000; Ph.D. University of California, Davis 2005; Assistant Professor of Agricultural and Applied Economics 2007.

CHRISTOPHER T. BASTIAN, B.S. University of Wyoming 1987; M.S. 1990; Ph.D. Colorado State University 2004; Assistant Professor of Agricultural and Applied Economics 2005.

DANNELE E. PECK, B.S. University of Wyoming 2000; M.S. 2002; Ph.D. Oregon State University 2006; Assistant Professor of Agricultural Economics 2006.

BENJAMIN S. RASHFORD, B.S. University of Wyoming 1999; M.S. 2001; Ph.D. Oregon State University 2006; Assistant Professor of Agricultural Economics 2006.

MARIAH D. EHMKE, B.S. Kansas State University 1997; M.S. Ohio State University 2001; Ph.D. Purdue University 2005; Assistant Professor of Agricultural Economics 2005.

Academic Professionals:

COLE EHMKE, B.A. Bethany College 1997; M.S. University of Sydney, Australia 1999; Assistant University Extension Educator 2005.

THOMAS FOULKS, B.A. University of Montana 1985; M.S. University of Wyoming 1992; Associate Research Scientist 2005, 1998.

Tempoary Lecturers:

WILLIAM BILES, B.S. University of Nebraska, M.B.A. Wharton School, University of Pennsylvania.

CARL OLSON, B.S. University of Wisconsin; M.S. Montana State University; Ph.D. Oklahoma State University.

JIM THOMPSON, B.A. Occidental College; M.A., Ph.D. University of Illinois-Chicago.

Professor Emeritus:

James J. Jacobs

The Department of Agricultural and Applied Economics offers graduate work leading to the Master of Science degree. Students may choose among major options in the areas of agricultural and applied economics and agricultural business. The agricultural economics major emphasizes research with any of the following focus areas:

production economics and management,
marketing and market analysis,
resource and environmental economics,
international agriculture, and
economic and rural development

The agricultural business option offers advanced skills to students who desire professional careers in the business sector. Students in the agricultural business option may concentrate their coursework and writing in management, marketing, or finance. Dual majors in water resources, and environment and natural resources are also offered.

Finally, the Department offers a graduate minor in applied economics. This program is for currently enrolled graduate students in other disciplines seeking a foundation in economics as well as their major discipline.

Program Specific Admission Requirements

Undergraduate major in agricultural economics or economics is not required.

Students may be required to complete program prerequisite courses, without graduate credit, that were not completed in their undergraduate education.

Specifically, students who have not completed at least one course in calculus, statistics, intermediate microeconomic theory and intermediate macroeconomic theory will be required to complete these courses without graduate credit during their first semester in residence.

Program Specific Degree Requirements

Master of Science in Agricultural Economics

The following courses constitute the M.S. in Agricultural Economics core requirements and are required of both Plan A and Plan B candidates (20 hours).

Economic Theory
AGEC 5310
Theory of the Firm and Producer Behavior.. 3
AGEC 5630
Advanced Natural Resource Economics..... 3
AGEC 5710
Advanced Agricultural Market Theory..... 3
AGEC 5740
Theory of Consumer Behavior..... 3

Quantitative Methods
AGEC 5230
Intermediate Econometric Theory..... 3
Quantitative Methods in Agricultural Econ. 3

Research
AGEC 5650
Research Methods.....1
AGEC 5880
Advanced Seminar.....1

Plan A (thesis):

Minimum of 30 credit hours including AGEC M.S. core requirements, thesis hours and electives.

No more than three hours of AGEC coursework numbered below 5000-level count toward the 30 hour requirement.

Achieve a cumulative 3.0 GPA in the AGEC M.S. core requirements.

The student's graduate committee, nominated by the major professor, the student, and the department head determine the final program of study and thesis research topic.

Presentation of research results at a formal public seminar.

Completion of an oral examination covering the student's thesis research administered by the graduate committee.

Plan B (non-thesis):

Minimum of 32 hours of coursework;

Non-thesis business analysis paper accepted by the student's graduate committee;

Minimum of 13 credit hours of agricultural economics coursework numbered at the 5000-level are required, including:
AGEC 5310
AGEC 5740
AGEC 5880
AGEC 5630 or 5710
AGEC 5320 or 5230

In addition, students are required to complete 3 credit hours from each of the following three areas:
Management:
AGEC 4060, 4640 or 5460; or MGT 4410, 4420, 4440, 4470, or 4520
Marketing:
AGEC 4050, 4830, 4840, 4880, or 5710, or MKT 4240, 4430, 4520, or 4540
Finance:
AGEC 4500; or FIN 4510, 4520, 4610, 4810; or ECON 4740

Remaining credit hours will be filled with electives.

The student's graduate committee, nominated by the major professor, the student and the department head determine the final program of study and business analysis topic.

Presentation of the business analysis paper at a formal public seminar.

An internship experience is strongly encouraged as part of the agricultural business option (AGEC 5990).

Master of Science in Agricultural Economics/Water Resources; Plan A (thesis):

Students must complete the 26 credit hour agricultural and applied economics including M.S. core requirements plus 4 thesis hours and 10 credit hours in water resources approved courses.

Please refer to Water Resources Degree program in this *Bulletin* for updated degree requirements.

Achieve a cumulative 3.0 GPA in the AGEC M.S. core requirements.

The student's graduate committee, nominated by the major professor, the student and the department head determine the final program of study and business analysis topic, which must be in the water resources area.

Presentation of research results at a formal public seminar.

Completion of an oral examination covering the student's thesis research administered by the graduate committee.

Master of Science in Agricultural Economics/Environment and Natural Resources (ENR); Plan A (thesis):

Students must complete the 26 credit hour agricultural and applied economics including M.S. core requirements plus 4 thesis hours and 15 credit hours in environment and natural resources, as approved by the student's committee and the ENR academic adviser;

Achieve a cumulative 3.0 GPA in the AGEC M.S. core requirements;

The student's graduate committee, nominated by the major professor, the student and the department head determine the final program of study and business analysis topic, which must be in the area of environment and natural resources;

Presentation of research results at a formal public seminar;

Completion of an oral examination covering the student's thesis research administered by the graduate committee.

Graduate Minor in Applied Economics:

Graduate standing;

AGEC 5310, or 5740, AGEC 5320 or 5230, and 6 additional credits of graduate AGEC courses;

Committee selection for the student's major thesis or dissertation committee should include at least one faculty member from AGEC.

Agricultural Economics (AGEC)

5230. Intermediate Econometric Theory. 3. Covers simple and multiple regression models, problems of estimation, hypothesis and diagnostic testing, dummy variables, autoregressive and distributed lag models, and time-series analysis. The objective is to understand the underlying theory of econometric modeling and obtain operational ability to construct, estimate, and test econometric models. Dual listed with AGEC 4230. *Prerequisites*: ECON 3020, STAT 2050 and MATH 2350.

5310. Theory of Producer Behavior. 3. Economic models of optimization as they apply to firm-level production decisions. Topics include the properties of production functions, theories of linear and non-linear optimization, firm decision making under perfect and imperfect competition and firm decision making under uncertainty. *Prerequisites:* ECON 3020, STAT 2050 and MATH 2350.

5320. Quantitative Methods in Agricultural Economics. 3. Covers mathematical programming and simulation techniques for solving applied problems in agricultural economics. Emphasizes the formulation of economic research problems in quantitative terms and the use of computer software packages to derive solutions. *Prerequisites:* ECON 3020, STAT 2050 and MATH 2350.

5450. Negotiation. 3. Examines how to use negotiation to resolve conflict. Describes conflict; outlines way to address conflict; examines different negotiation strategies and the impact of cognitive bias, power, ethics, and individual and cultural differences; and explores mediation practices. Students complete negotiations, role-plays, and questionnaires. Dual listed with AGEC 4450. *Prerequisite:* COJO 1010 and junior standing.

5600. Community Economic Analysis. 3. Analysis of regions and rural communities; their problems, socioeconomic characteristics, land use and economic development. Provides training in regional economic theory, regional economic analysis, fiscal impact analysis and benefit cost analysis. *Prerequisite:* ECON3010, 3020 and MATH1400; or consent of instructor.

5630. Advanced Natural Resource Economics. 3. An in-depth treatment of theoretical issues, quantitative techniques, and institutional arrangements in the natural resource field. Topics include welfare economics, property rights, market failure and externalities, and benefit cost analysis. *Prerequisites:* ECON 3010 and 3020, STAT 2050 and MATH 2350.

5650. Research Methods. 1. Examines scientific methods as they specifically relate to a masters level research project in applied economics. This includes formulating the research question, developing hypotheses, determining a theoretical framework from which the data gathering and analysis will proceed and lead to reporting research outcomes. *Prerequisites:* ECON 3010 and 3020, STAT 2050.

5660. Community and Economic Development. 3. Community development from an interdisciplinary perspective, integrating theory, concepts and methods from sociology, economics, political science, and community development. Students learn how community theory can be used to design and support effective economic development programs. Includes readings, lectures, guest lectures, field trips and community analysis projects. Dual listed with AGEC 4660. *Prerequisite:* AGEC/ECON 1020 or SOC 2090 and junior standing.

5710. Advanced Agricultural Market Theory. 3. Theoretical foundations of the study of agricultural markets and how business is conducted in those markets. Topics include pure competition, industrial organization concepts related to imperfect competition including game theory, principal-agent theory, transaction costs economics, intermediary theory, and welfare implications of alternative agricultural market structures. *Prerequisites:* ECON 3020 and MATH 2350.

5740. Consumer Behavior and Prices Analysis. 3. Focuses on microeconomic consumer theory and its application. Topics include utility theory, market demand theory, expected utility theory, and econometric applications. *Prerequisites:* ECON 3020, MATH 2350 and STAT 2050.

5880. Advanced Seminar. 1-2 (Max. 2). Involves reporting to the seminar group on research methods and results obtained in the investigation of a topic or question relevant to the field of agricultural economics. *Prerequisite:* 9 credits in AGEC and/or ECON.

5890. Advanced Problems in Agricultural Economics. 1-3 (Max. 6). Supervised study and research on current problems in marketing, farm and ranch management, policy prices, land economics or finance. *Prerequisite:* graduate standing in AGEC or ECON.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite*: graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Animal Science

101 Animal Science/Molecular Biology Bldg., 766-2224
FAX: (307) 766-2355
Web site: uwyo.edu/anisci
Department Head: Doug Hixon

Professors:

STEPHEN P. FORD, B.S. Oregon State University 1971; M.S. West Virginia University 1973; Ph.D. Oregon State University 1977; Professor of Animal Science 2000.

DOUGLAS L. HIXON, B.S. University of Illinois 1968; M.S. 1970; Ph.D. 1980; Professor of Animal Science 1995, 1986; Head of Department of Animal Science 2001.

BRET W. HESS, B.S. University of Nevada, Reno 1991; M.S. 1993; Ph.D. University of Missouri-Columbia 1996; Professor of Ruminant Nutrition 2008, 2002.

STEVEN W. HORN, B.S. Colorado State University 1969; M.S. 1974; Ph.D. 1979; Professor of Animal Science 1993.

RICHARD J. MCCORMICK, B.S. University of Connecticut 1979; M.S. 1980; Ph.D. Kansas State University 1985; Professor of Animal Science 1997, 1985.

GARY E. MOSS, B.S. Montana State University 1969; M.S. 1972; Ph.D. Washington State University 1977; Professor of Animal Science 1994, 1985.

WILLIAM J. MURDOCH, B.S. Delaware Valley College of Science and Agriculture 1975; M.S. West Virginia University 1977; Ph.D. 1980; Professor of Animal Science 1991, 1980.

DANIEL C. RULE, B.S. University of California, Davis 1977; M.S. 1980; M.S. Washington State University; Ph.D. Iowa State University 1984; Professor of Animal Science 1999, 1987.

Associate Professors:

PAUL A. LUDDEN, B.S. University of Nebraska-Lincoln 1991; M.S. Purdue University 1994; Ph.D. University of Missouri-Columbia 1997; Associate Professor of Ruminant Nutrition 2004, 1998.

WARRIE J. MEANS, B.S. Colorado State University 1979; M.S. 1982; Ph.D. 1985; Associate Professor of Animal Science 2002, 1992.

STEVEN I. PAISLEY, B.S. University of Wyoming 1993; M.S. 1995; Ph.D. Oklahoma State University 1998; Extension Beef Cattle Specialist; Associate Professor of Animal Science 2007, 2001.

ROBERT H. STOBART, B.S. Montana State University 1971; M.S. 1976; Ph.D. Texas A&M University 1982; Associate Professor of Animal Science 1988, 1982.

Assistant Professors:

BRENDA M. ALEXANDER, B.S. University of Wyoming 1986; M.S. 1988; Ph.D. 1999; Assistant Professor of Animal Science 2006.

KRISTI M. CAMMACK, B.S. South Dakota State University 1999; M.S. University of Nebraska-Lincoln 2001; Ph.D. University of Missouri Columbia 2005; Assistant Professor of Animal Science 2006.
MIN DU, B.S. Zhejiang University 1990; M.S. China Agricultural University 1993; Ph.D. Iowa State University 2001; Assistant Professor of Animal Science 2003.
SCOTT L. LAKE, B.S. University of Nevada 1998; M.S. 2001; Ph.D. University of Wyoming 2005; Assistant Professor of Animal Science 2008.
MEIJUN ZHU, B.S. China Agricultural University 1991; M.S. 1994; Ph.D. Iowa State University 2004; Assistant Professor of Animal Science 2008.

Adjunct Professors:

Thomas Hansen, John Johnston, Tom McDonald, Peter Nathanielsz, Mark Nijland, Donal Skinner, D. Paul Thomas, Heywood Sawyer

Professors Emeriti:

Ray Field, Frank Hinds, Conrad Kercher, Johannes Nel, Bibek Ray

The Departments of Animal Science and Veterinary Science offer programs leading to the M.S. (Plan A and Plan B) and Ph.D. degrees in animal and veterinary science. A M.S. degree in food science and human nutrition is offered in cooperation with the Department of Family and Consumer Sciences. The Department of Animal Science also participates in the interdisciplinary M.S./Ph.D. Reproductive Biology Program.

Program Specific Degree Requirements

Master's Program - Plan A (thesis)

The student, major professor, and graduate committee determine the program of study and research project, which meets the needs of the individual student. The candidate's graduate committee should be established and functioning by the time the student has completed 12 semester hours of formal coursework. The master of science program should be approved and filed by the end of the student's second semester of graduate study in animal science. This committee shall also determine if the student is making satisfactory progress to be advanced to a candidate for a master's degree or continued in a doctoral program by the end of the student's third semester following matriculation.

The student can specialize in breeding, food science and human nutrition, nutrition, physiology, meat science, reproduction or wool for coursework and thesis/dissertation project. In addition, supporting coursework is available in agricultural economics, biochemistry, microbiology, range management, genetics, statistics, and other areas of interest to the individual. In certain cases it is possible to develop a joint research project between animal science and another department.

Students may use the research facilities and herds of beef cattle, sheep, and swine at the university livestock center near the university or at one of the university research and extension centers in the state. Research laboratories are located on campus and include a semi commercial wool scouring and processing laboratory and a modern meat processing facility.

The Plan A program is a 30 hour program, 26 hours of coursework and 4 hours of thesis research.

Master's Program - Plan B (non-thesis)

The Plan B program requires a cousrework-intensive, non-thesis master of science program for those students whose career paths may not require a thesis research program.

The program requires 32 hours of coursework in addition to an acceptable non-thesis research paper as defined by the student's graduate committee.

Doctoral Program

The program requires 72 hours. Students must follow minimum Graduate requirements.

Animal Science (ANSC)

5050. Animal Growth and Development. 3. Explores aspects of animal growth and development, with a focus on skeletal muscle, adipose, soft connective tissues, and bone. Addresses genetic, endocrine, nutritional, and environmental impacts on tissue development and growth. Dual listed with ANSC 4050. *Prerequisite:* LIFE 2022.
5061. Cell Signaling. 3. Cell signaling pathways in animal growth and development. Defines how cells respond to external stimuli. Includes: G-protein couple signaling, calcium signaling, growth factor associated signaling, redox signaling, lipid related signaling, and apoptosis. Dual listed with ANSC 4061. *Prerequisite:* MOLB 3610 or an equivalent biochemistry or cell biology course.
5100. Nutritional Management. 3. Integration and application of the principles of nutrition. Addresses nutrient requirements, feed composition and nutritional value, in addition to feeding management strategies for various classes of farm animals. Provides practical nutritional experience through laboratory. Dual listed with ANSC 4100. *Prerequisite:* ANSC 3100.
5120. Principles of Mammalian Reproduction. 4. In addition to attendance in the lecture component of this course, graduate students will be expected to participate in in-depth weekly discussions of the scientific literature and to prepare a research grant proposal on a specific topic. Dual listed with ANSC 5120. *Prerequisite:* a course in systemic anatomy and physiology or consent of instructor.
5150. Physiology of Ruminant Digestion. 3. The anatomical structure, function, and symbiotic relationship of the ruminant digestive system. Dual listed with ANSC 4150. *Prerequisite:* ANSC 3100.
5170. Feed and Food Analysis. 3. A lecture-laboratory course designed to provide students in animal science, food science and nutrition with instruction and hands-on experience with proximate analysis and instrumentation used for nutrient analysis of foods and feedstuffs as well as discussion of sampling, dilutions, and calculations. Cross listed with FDSC 5170. *Prerequisite:* 6 credits in chemistry or biochemistry, or consent of instructor.
5180. SAS Applications in Agriculture. 2. Use of PC Statistical Analysis (SAS) software for analysis of data generated using experimental designs common to the agricultural sciences. Course will emphasize applied programming and interpretation of results. *Prerequisite:* STAT 5080 or equivalent.
5260. Mammalian Endocrinology. 3. Introduction to the principles of endocrinology. The role of endocrine systems in regulating metabolism, growth, reproduction, and lactation in mammals are discussed. Dual listed with ANSC 4260. *Prerequisite:* ANSC 3010.
5510. Mineral Metabolism. 3. Lectures on current mineral nutrition topics with student reports on recent journal articles. *Prerequisite:* ANSC 3100.
5530. Topics in Range Nutrition. 3. Lectures on current range nutrition topics with student reports on recent journal articles. *Prerequisite:* ANSC 3100 and consent of instructor.
5550. Investigations in Animl Nutrition. 2-3 (Max. 6). Special problems involving nutritional research with domestic or laboratory animals. *Prerequisite:* ANSC 3100 and consent of instructor.
5620. Wool Measurement Methods. 3. Theory and practice relating to routine and standard analytical fiber measurements. *Prerequisite:* ANSC 3040 and STAT 2050 or consent of instructor.
5680. Wool Problems Analysis. 1-5 (Max. 10). Scientific papers on assigned topics. *Prerequisite:* STAT 2050.

5770. Lipid Metabolism. 3. An in-depth study of lipid metabolism and regulation of genes and enzymes involved in transport, synthesis, mobilization, and oxidation of lipids with application to ruminant and non-ruminant species as well as to humans. Cross listed with FDSC 5770. *Prerequisite:* ANSC 3100 or MOLB 3610 or FCSC 4145.

5780. Investigations in Animal Breeding. 1-3 (Max. 6). Assigned problems involving genetic and physiological research with domestic or laboratory animals. *Prerequisite:* ANSC 4550.

5790. Investigations in Animal Physiology. 2-3 (Max. 6). Special problems involving reproductive physiology or other physiology research with domestic or laboratory animals. *Prerequisite:* ANSC 3010, 4120 and consent of instructor.

5865. Advanced Seminar in Nutrition. 1-2 (Max. 2). Preparation and presentation of seminars on a variety of topics relating to animal nutrition, metabolism, and livestock production. *Prerequisites:* graduate standing.

5870. Reproductive Biology Seminar. 1 (Max. 12). A graduate seminar designed to examine a variety of topics relating to the physiological processes of reproduction in mammals. *Prerequisite:* graduate standing.

5880. Advanced Topics. 1-3 (Max. 6). Special topics will be offered based on interest of students and faculty. Credit hours are variable 1-3 and are repeatable. *Prerequisite:* graduate standing.

5890. Advanced Seminar. 1-2 (Max. 6). Preparation, presentation, and discussion of assigned reports. Invitational lectures by visiting guests.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5961. Graduate Project. 1-4 (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of the Plan B project. *Prerequisites:* must be enrolled in Plan B program and have departmental approval.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). P*rerequisite:* graduate standing.

Food Science (FDSC)

5090. Food Microbiology. 3. Discusses microorganisms and theory of their growth and survival in relation to spoilage and preservation of foods and health hazards in foods. Dual listed with FDSC 4090. *Prerequisite:* MOLB 2210.

5100. Food Microbiology Laboratory. 1. Laboratory techniques used in food microbiology. Dual listed with FDSC 4100. *Prerequisite:* FDSC 4090 or 5090, taken concurrently.

5170. Food Analysis. 3. A lecture-laboratory course designed to provide students in animal science, food science and nutrition with instruction and hands-on experience with proximate analysis and instrumentation used for nutrient analysis of foods and foodstuffs as well as discussion of sampling, dilutions, and calculations. Cross listed with ANSC 5170. *Prerequisite:* six credits in chemistry or biochemistry.

5220. Techniques of Food Science. 3. A laboratory course designed to introduce undergraduate and graduate students to sophisticated techniques used in food science research. *Prerequisites:* one semester of graduate study and consent of instructors.

5720. Food Chemistry. 3. A study of the chemical composition of foods and food products with emphasis upon processing and storage. Dual listed with FDSC 4720. *Prerequisite:* CHEM 2300.

5770. Lipid Metabolism. 3. An in-depth study of lipid metabolism and regulation of genes and enzymes involved in transport, synthesis, mobilization, and oxidation of lipids with application to ruminant and non-ruminant species as well as to humans. Cross listed with FDSC 5770. *Prerequisite:* ANSC 3100 or MOLB 3610 or FCSC 4145.

5771. Muscle Structure and Function. 1. Explores properties of skeletal muscle with emphasis on cellular and extracellular proteins, ultrastructure and function. Dual listed with FDSC 4771. *Prerequisite:* FDSC 3060 or equivalent.

5772. Conversion of Muscle to Meat. 1. Explores molecular and biochemical changes in postmortem muscle and their impact on meat quality. Dual listed with FDSC 4772. *Prerequisite:* FDSC 3060 or equivalent.

5773. Advanced Meat Processing. 1. Explores chemical and physical properties of meat and non-meat ingredients and their effect on meat processing. Dual listed with FDSC 4773. *Prerequisite:* FDSC 3060 or equivalent.

5774. Advanced Concepts in Meat Microbiology. 1. Explores spoilage and pathogenic microorganisms in meat products, including shedding, virulence, resistance, and detection methods. Dual listed with FDSC 4774. *Prerequisite:* FDSC 3060 or equivalent.

5880. Advanced Problems and Topics. 1-3. (Max 6). Designed to allow graduate students to pursue advanced research problems and advanced topics and to obtain experience in the teaching process. *Prerequisite:* graduate standing and consent of instructor.

5890. Seminar in Food Science and Nutrition. 1. A seminar course on topics in food science and human nutrition. Dual listed with FDSC 4890. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may NOT be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisites:* enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Family and Consumer Sciences

251 Agriculture Building, 766-4145
FAX: (307) 766-5686
Web site: www.uwyo.edu/family
Department Head: Karen Williams

Professors:
DONNA M. BROWN, B.Sc. University of New South Wales, Australia 1983; Ph.D. 1987; Professor of Textiles and Merchandising 2004, 1993, 1987.
MICHAEL LIEBMAN, B.S. University of New Hampshire 1974; M.S. Virginia Polytechnic Institute and State University 1977; Ph.D. 1980; Professor of Human Nutrition 1994,1985.
VIRGINIA B. VINCENTI, B.S. Mansfield University of Pennsylvania 1968; M.S. The Pennsylvania State University 1975; Ph.D. 1981; Professor of Family and Consumer Sciences 1992.
RANDOLPH R. WEIGEL, B.S. Colorado State University 1971; M.S. Kansas State University 1973; Ph.D. Iowa State University 1985; Professor of Family and Consumer Sciences 2004, 1993,1986.
KAREN WILLIAMS, B.A. University of Illinois 1972; B.S. University of Wyoming 1978; M.A. Pacific Oaks College 1987; Ph.D. University of Wyoming 1993; Professor of Child and Family Studies 2006, 1995.

Associate Professors:
K. SHANE BROUGHTON, B.S. Colorado State University 1981; M.S. Washington State University 1985; Ph.D. 1988; Associate Professor of Human Nutrition 1996, 1990.
BRUCE A. CAMERON, B.Sc. University of New South Wales, Australia 1983; Ph.D. 1986; Associate Professor of Textiles and Merchandising 1997, 1986.
SONYA S. MEYER, B.S. Emporia State University 1973; M.S. Kansas State University 1979; Ph.D. 1986; Associate Professor of Textiles and Merchandising 1992, 1986.
RHODA SCHANTZ, B.S. North Dakota State University 1976; M.S. 1978; Ph.D. Kansas State University 1988; Associate Professor of Food and Nutrition 1995, 1990.

Assistant Professors:
D. ENETTE LARSON-MEYER, B.S. University of Wyoming 1987; M.S. MGH Institute of Health Professions, Boston 1990; PH.D. University of Alabama at Birmingham 1998; Assistant Professor of Human Nutrition and Food 2005.
KARI MORGAN, B.S. University of Wyoming 1991; M.S. University of Maryland 1993; Ph.D. University of Wisconsin-Madison 1998; Assistant Professor of Child and Family Studies 2005.
CHRISTINE WADE, B.S. Willamette University 2001; M.S. University of Wyoming 2005; Ph.D. 2008; Assistant Professor of Human Development and Family Studies 2008.

Academic Professionals:
Mark Bittner, Suzanne Pelican, Treva Sprout

Distance Instructors:
Dianne Barden, Susan Blumel-Berg, Heidi Christensen, Gail Gordon, Gail Lee, LisaMarie Mariglia

Professor Emeritus:
Margaret Boyd, Saul Feinman, Judith A. Powell

The department of Family and Consumer Sciences offers a program of study leading to the master of science degree in family and consumer sciences with a concentration in one of three areas: child and family studies; human nutrition and food; or textiles and merchandising. The department also participated in interdisciplinary degrees in food science and human nutrition, and early childhood development. An early childhood director's certificate is also available.

Program Specific Degree Requirements

Master of Science in Family and Consumer Sciences

Plan A (thesis)

Completion of minimum of 30 hours of course credit to include: 14 hours from FCSC (includes one credit of graduate seminar annually), 6 hours from supporting courses, 10 hours of research (includes four thesis hours).

Completion of research project that adheres to a topic and format previously agreed up on by the student's graduate committee and approved by the department head.

Students may be required to take more than the minimum of 30 hours, either because they have to satisfy prerequisites for some courses, or because a student's committee determines that more than 30 hours will be needed for the student to reach his/her professional objective.

No more than nine hours of 4000-level courses will be allowed.

Plan B (non-thesis)

Completion of minimum of 30 hours of course credit to include: 14 hours from FCSC (includes one credit of graduate seminar annually),6 hours from supporting courses, 10 hours of research.

Completion of research project that adheres to a topic and format previously agreed upon by the student's graduate committee and approved by the department head.

Students may be required to take more than the minimum of 30 hours, either because they have to satisfy prerequisites for some courses, or because a student's committee determines that more than 30 hours will be needed for the student to reach his/her professional objective.

No more than nine hours of 4000-level courses will be allowed.

Master of Science in Family and Consumer Sciences/Early Childhood Development

Please refer to the Early Childhood Development section of this *Bulletin* for degree requirements.

Food Science and Human Nutrition Interdisciplinary Degree

Family and consumer sciences faculty participate in an interdisciplinary program that offers a master of science degree in food science and human nutrition. Please see Food Science and Human Nutrition in this *Bulletin* for more information.

Family and Consumer Sciences (FCSC)

5101. Special Topics in Family and Consumer Sciences. 1-3 (Max. 6). Intended to accommodate a seminar series and a course offering by visiting faculty whose subject matter is not included in other course offerings.
5102. Special Problems. 1 - 12 (Max. 18). Study in a selected problem area for broader perspective or greater specialization in the student program. *Prerequisite:* advanced or graduate standing and consultation with department head and instructor in subject matter area.
5103. Graduate Seminar in Family and Consumer Sciences I. 1. Integrative Seminar in Family and Consumer Sciences. Students are exposed to faculty research, discuss common readings and present their own research. Offered S/U only for those taking Graduate Seminar I and students will be taking Graduate Seminar II for a letter grade. *Prerequisite:* graduate student standing.
5104. Graduate Seminar in Family and Consumer Sciences II. 1. Integrative seminar in Family and Consumer sciences. Students are exposed to faculty research, will discuss common readings, and will present their own research. Graduate Seminar II can only be taken for a letter grade. *Prerequisite:* FCSC 5103.
5105. Child Care Health Consultation. 3. Topics include consultation skills, children's mental health, child care health and safety, child abuse and neglect, nutrition, injury prevention, oral health, caring for ill children in child care settings, working with children with special needs, issues of diversity, model child care health policies, and injury prevention. Cross listed with NURS 5105. *Prerequisite:* graduate standing.
5107. Family and Consumer Sciences Extension Practicum. 8. To provide experience in county extension programs. *Prerequisites:* AGRI 4010, advanced standing and consent of instructor.

5112. Family Decision and Resource Management. 3. Utilizes theories to facilitate understanding of problem-solving and resource management in various family structures/contexts across the life span. Emphasizes internal family dynamics, global interdependence, critical thinking, cultural examination, ethical decision-making, and self-reflection. Designed to meet family studies requirement for license in marriage and family therapy at graduate level. Companion website used. Dual listed with FCSC 4112. *Prerequisites:* FCSC 2131 or a psychology course or a sociology course, junior standing.

5113. Consumer Issues. 3. Provides research/applied understanding of consumer rights/responsibilities, government/business roles, legislation, advocacy, and redress. Emphasizes introductory consumer law/legal research, critical thinking, self-reflection, and cultural examination. Ethical theories and issues examined within an interdependent world. Meets requirements for certification in family and consumer sciences education. Internship opportunities possible upon successful completion. Companion website used. Dual listed with FCSC 4113. *Prerequisites:* ECON 1000 or SOC 1000 or PSYC 1000, junior standing.

5114. Lifespan Human Development. 3. An overview of human growth and development throughout the life span, with an emphasis on major theories, conceptual issues, research findings, and practical applications for professionals working in health care, human service and educational environments. *Prerequisite:* PSYC 1000 or FCSC 2121.

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing and psychology. Cross listed with EDEC, NURS, PSYC, HLED, SPPA 5115. *Prerequisite:* graduate standing.

5117. Working with Non-Profits and Boards. 3. Introduces students to the scope and functions of professionals working in rural communities as leaders. Students will explore community dynamics, leadership skills and managing change, and understand the complexities of leadership within systems. Understanding communities and leadership increases the likelihood of success for community based professionals. Dual listed with FCSC 4117. *Prerequisites:* senior status and satisfactory completion of a WB course.

5118. Family Policy. 1-3 (Max. 3). Explores the relationships between family functioning and public/private policies. The roles of family professionals in advocacy and education regarding policies are discussed. Attention is paid to the policy process at the state level. Dual listed with FCSC 4118. *Prerequisites:* FCSC 2131; junior standing.

5120. Infancy and Toddlerhood. 3. Examines development and behavior, focusing on a broad range of topics which includes: physical development, prenatal influences, sensory processes, biological factors, cognitive development, language development, social interaction and relationship. A broad family and consumer sciences perspective (the family in its environment) are applied. *Prerequisite:* FCSC 2121 or equivalent course in child development.

5123. Behavior Disorders of Children and Adolescents. 3. An overview of common behavior problems, conduct disorders, and psychopathology from infancy through adolescence, with an emphasis on the etiology, recognition, and developmental path of various disorders. *Prerequisite:* FCSC 2121 or PSYC 2300.

5129. Seminar in Child Development. 3. Advanced study of the cognitive, social-emotional, communicative, moral, and physical/motor development of children and adolescents, with an emphasis on cultural and contextual influences on development. *Prerequisites:* graduate standing, WC and one of the following: FCSC 2121, PSYC 2300, FCSC 3220, EDST 2450.

5132. Seminar in Family Studies. 3. Provides an in-depth examination of: guiding theories in family studies; the purpose and methods of theory-building; and current research in major topical areas of family science and family and consumer science are compared. *Prerequisites:* 6 hours of undergraduate family related courses and consent of instructor.

5137. Individual and Family Assessment. 3. An introduction to both quantitative and qualitative methods of assessing children, adults, couples and families; observational approaches to assessing individuals and families; and interpretation of commonly used tests and measures. *Prerequisite:* STAT 5010.

5138. Family Stress/Coping. 3. Theoretical and empirical research on family stress, coping and resiliency is emphasized as well as the study of normative and nonnormative stressors and crises in the lives of families. Attention is paid to professional practice applications. Dual listed with FCSC4138. *Prerequisites:* FCSC 2131; junior standing.

5140. Nutritional Aspects of Proteins and Amino Acids. 3. Advanced study of protein and amino acid metabolism in various physiological conditions. *Prerequisites:* general biochemistry and FCSC 4145 or equivalent in nutrition.

5141. Carbohydrate and Ethanol Metabolism. 3. Advanced study of carbohydrate and ethanol metabolism in various physiological conditions. *Prerequisites:* general biochemistry and FCSC 4145 or equivalent in nutrition.

5142. Nutritional Research Techniques. 2. Techniques for nutrient analysis of body fluids and tissues, assessing nutrient status of populations, and methods for animal studies in nutrition instrumentation. *Prerequisite:* FCSC 4145/5145.

5144. Lipids II. 3. Examines lipoprotein metabolism and how it is influenced by alterations in diet composition. This area is followed by sections on prostaglandin and leukotriene biosynthesis and the regulatory role of these eicosanoids. *Prerequisite:* FDSC 5770.

5145. Advanced Nutrition. 4. Discusses functions of components of diet in human metabolism. Applies principles of nutrition. Dual listed with FCSC 4145. *Prerequisite:* FCSC 1140 or 1141; CHEM 2300; senior standing.

5146. Therapeutic Nutrition. 4. Rationale for dietary modifications in pathological conditions; experience in menu planning and diet instruction; dietary and nutrient assessment of the sick individual with discussion of case studies. Dual listed with FCSC 4146. *Prerequisite:* FCSC 4145 or senior standing.

5147. Nutrition and Weight Control. 3. Advanced course in physiological determinants of weight control emphasizing pathology, psychodynamics, assessment, and treatment of obesity. Dual listed with FCSC 4147. *Prerequisites:* FCSC 1140 or 1141, ZOO 3115.

5150. Experimental Foods. 3. Studies physical and chemical properties of raw and processed food materials and tests for evaluation of food quality. Students develop ability to use and interpret research findings, as well as skills in planning, conducting, and reporting food experiments. Dual listed with FCSC 4150. *Prerequisites:* FCSC 1150, CHEM 2300, STAT 2020, ENGL 4010, FCSC major.

5151. Sensory Analysis. 1. Examines the principles and techniques applied to the subjective evaluation of food. *Prerequisites:* FCSC 4150/5150, STAT 5080 and ENGL 4010.

5172. Advanced Textile Chemistry. 3. A study of the chemistry of amino acids and proteins, especially silk and wool; the photochemistry of dyes and fibers; the physical chemical concepts of dyeing.

5173. Textile Science Seminar. 3. Advanced study of textile science, physical and chemical modification of fibers, developments in dyeing and finishing technology. Environmental aspects of textile technology. Extensive use of current literature is utilized.

5175. Textile Testing and Product Analysis. 3. Explains meaning of quality control and why it is important. Discusses variety of laboratory tests and standards available to assess the various aspects of textile/apparel quality. Examines performance specifications of textile materials to determine if they are suitable for desired end uses. Dual listed with FCSC 4175. *Prerequisite:* FCSC 3170 and FCSC 4171.

5176. Historic Clothing. 3. Surveys history of clothing in the Western World. Course content includes information from approximately 3000 BC through the 20th century. Dual listed with FCSC 4176. *Prerequisite:* FCSC 2170.

5178. Fiber Arts. 3. Development and enhancement of technical and creative apparel construction/design skills culminating in the creation of a distinctive piece of wearable art. Dual listed with FCSC 4178. *Prerequisite:* FCSC 3174.

5179. Historic Textiles. 3. History of all major textile industries is explored. Processes and technical terms are explained. The role and impact of textiles in western economies and societies are examined. *Prerequisite:* graduate standing.

5181. Global Textiles. 3. To gain an understanding of the global textile industry, how the U.S. fits into the global industry, textiles and apparel trade policy and balancing conflicting interests in the world market place. Dual listed with FCSC 4181. *Prerequisite:* FCSC 1171 or FCSC 2171.

5182. Textile Industry Environment. 3. Examines the environment, the impact of the textile industry on the environment, and issues facing the textile industry to provide more environmentally friendly products. Dual listed with FCSC 4182. *Prerequisites:* FCSC 1171, FCSC 4171.

5188. Interior Design II. 3. Advanced study of space planning and interior design. Dual listed with FCSC 4188. *Prerequisites:* FCSC 2180 and 2188.

5890. Seminar in Food Science and Nutrition. 1. A seminar course on topics in food science and human nutrition. Cross listed with FDSC 5890. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1 - 12. (Max 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5961. Graduate Projects. 1-4 (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. *Prerequisite:* must be enrolled in a Plan B program and have departmental approval.

5985. Devel Comm Leadership. 2 - 3. (Max 98). Emphasizes basic core components of individual leadership: assessment of leadership skill and style; community based experiences for understanding of community and resources; group community development projects for student engagement with others and the community. Upon completion of course, students will understand various leadership styles and philosophies and articulate their personal leadership philosophy. Dual listed with FCSC 4985. *Prerequisites:* senior or post graduate equivalent status and consent of instructor.

5990. Internship. 1 - 12. (Max 24). *Prerequisite:* graduate standing.

Department of Molecular Biology

203 Animal Science/Molecular Biology Bldg., 766-3300
6012 Agriculture Building, 766-2171
FAX: (307) 766-5098
Web site: www.uwyo.edu/MolecBio
Department Chair: Mark M. Stayton

Professors:

DALE D. ISAAK, B.S. Eastern Montana College 1970; M.S. Montana State University 1973; Ph.D. 1976; Professor of Molecular Biology 1994, 1985.

DONALD L. JARVIS, B.S. Idaho State University 1978; M.S. 1980; Ph.D. Baylor College of Medicine 1986; Professor of Molecular Biology 2000, 1998.

RANDOLPH V. LEWIS, B.S. California Institute of Technology 1972; M.S. University of California-San Diego 1974; Ph.D. 1978; Professor of Molecular Biology 1989, 1980.

KURT W. MILLER, B.S. Pennsylvania State University 1977; Ph.D. Boston University 1982; Professor of Molecular Biology 2007, 1992.

NANCY SUE PETERSEN, B.S. Harvey Mudd College 1965; M.A. Brandeis University 1968; Ph.D. University of California-Irvine 1972; Professor of Molecular Biology 1995, 1983.

DON ALLEN ROTH, B.S. University of New Hampshire 1974; M.S. Virginia Polytechnic Institute and State University 1975; Ph.D. 1978; Professor of Plant Pathology 1988, 1978.

PETER E. THORSNESS, B.A. Colorado College 1982; Ph.D. University of California-Berkeley 1987; Professor of Molecular Biology 2002, 1991.

JORDANKA ZLATANOVA, M.S. St. Petersburg University 1968; Ph.D. Institute of Molecular Biology, Bulgarian Academy of Sciences 1980; Dr.Sc. Institute of Genetics, Bulgarian Academy of Sciences 1989; Professor of Molecular Biology 2004.

Associate Professors:

DAVID FAY, B.S. Tufts University 1988; Ph.D. Yale University 1995; Associate Professor of Molecular Biology 2006, 2001.

MARK GOMELSKY, B.S. Moscow Institute of Chemical Technology 1986; M.S. 1988; Ph.D. Institute of Genetics and Selection of Industrial Microorganisms 1991; Associate Professor of Molecular Biology 2005, 1999.

PAMELA J. LANGER, B.S. Indiana University-Indiana 1973; Ph.D. Massachusetts Institute of Technology 1980; Associate Professor of Molecular Biology 1994, 1987.

MARK M. STAYTON, B.S. University of Missouri at Kansas City 1975; Ph.D. Iowa State University 1980; Associate Professor of Molecular Biology 1994, 1988.

ANNE W. SYLVESTER, B.S. University of Washington 1980; M.S. 1982; Ph.D. 1987; Associate Professor of Molecular Biology 2006.

Assistant Professors:

DAVID A. LIBERLES, B.A. Oberlin College 1991; M.S. California Institute of Technology 1995; Ph.D. 1997; Assistant Professor of Molecular Biology 2005.

DANIEL WALL, B.A. Sonoma State University 1988; Ph.D. University of Utah 1994; Assistant Professor of Molecular Biology 2007.

NAOMI WARD, B.Sc. (Hons.) University of Queensland 1993; Ph.D. University of Warwick 1997; Assistant Professor of Molecular Biology and Botany 2007.

CYNTHIA WEINIG, B.A. (Hons.) Brown University 1991; Ph.D. Indiana University; Assistant Professor of Botany and Molecular Biology 2007.

Program Specific Admission Requirements

A minimum composite score of 1,000 on the verbal and quantitative sections of the GRE, an analytical writing score of 4.0, and a subject test score of 550 (biochemistry, cell and molecular biology). ETS only reports GRE scores taken within five years of the date of request.

Candidates for the program must have received a bachelor of science degree in the physical or biological sciences with a B (3.0, A=4) average or higher.

A statement of education objectives and three letters of recommendation are required, even if a candidate does not wish to be considered for financial assistance.

At the time of application for admission to the master of science plan A, plan B, or the Molecular Biology doctoral program, the applicant must obtain a letter of support from a departmental faculty member.

Alternative graduate programs can also be designed if a student wishes to engage in interdepartmental cooperative research programs, which may include biological or physical sciences elsewhere on campus.

Prospective graduate students should visit the departmental Web site for more information.

Program Specific Degree Requirements

Master of Science in Molecular Biology

Plan A (thesis)

A program of study for a student must be on file in the Office of the Registrar before the end of the fall semester of the first year. The program of study must include a minimum of 30 semester hours, 26 hours of coursework and 4 hours of thesis research, at the 5000 level from UW or equivalent levels from another approved university.

Seventeen of the thirty hours must be completed as specified below:

- 6 hours total of General Biochemistry MOLB 5600 and MOLB 5610 with grades of B or better. If a student has already taken the MOLB 4600/4610 sequence as an undergraduate or MOLB 5600/5610 as a graduate student and received grades of B or better in each course, the general biochemistry requirement will have been fulfilled and thus only 11 of the 30 hour requirement will be specified.
- 2 hours of seminar presentation courses MOLB 5050 (one CH of MOLB 5050 must be taken the first semester a student enrolls).
- 3 hours of lab rotation credits (MOLB 5520-02) if appropriate.
- 6 hours in the advanced molecular biology courses.
- 4 hours of thesis research (MOLB 5960) are applied to the 30 CH requirement.
- MOLB 5051 and MOLB 5052 credits: students are also required to register and attend the departmental seminar each semester and in the summer.

Recommendations for fulfiling the 13 remaining credit hours for the 30-hour requirement:

- Other advanced molecular biology courses and lab pods.
- Please note that credits earned in ENGL 5910 cannot be included in the program of study even if a student is required to take this course.
- MOLB 5900 can be included in the program of study.

Plan B (non-thesis)

After consultation with the student's adviser and the graduate program chairperson, and with consideration of academic background and research interests, students will devise a program of study before the end of their first semester in the program. Students are expected to complete a Plan B master's program in one full year. A student must successfully complete a minimum of 30 hours of credit, 14 of which must be in the student's major field.

Requirements for fulfilling 14 specified hours of the 30-hour requirement:

- 6 hours total of General Biochemistry MOLB 5600 and MOLB 5610 with grades of B or better. If a student has already taken the MOLB 4600/4610 sequence as an undergraduate or MOLB 5600/5610 as a graduate student and received grades of B or better in each course, the general biochemistry requirement will have been fulfilled and thus only 11 of the 30 hour requirement will be specified.
- 2 hours of seminar presentation courses MOLB 5050 (one CH of MOLB 5050 must be taken the first semester a student enrolls).
- 3 hours of Advanced Problems in Molecular Biology (MOLB 5520-01).
- 3 hours of advanced molecular biology core courses.
- MOLB 5051 and MOLB 5052 credits: students are required to register and attend the departmental seminar (MOLB 5051 or MOLB 5052 in the summer) each semester.

Recommendations for fulfilling the 16 remaining hours of the 30-hour requirement:

- Other advanced molecular biology courses and lab pods.
- MOLB 5010 (total max. 6 credis per degree program); 5520-01 credits (total max. 10 credits per degree program).
- Please note that ENGL 5910 credis cannot be included in the program of study even if a student is required to take this course
- MOLB 5900 hours can be included in the program of study.

In addition to general requirements, the Molecular Biology M.S. Plan A program requires the following:

Submission of a research proposal based on a literature review and the proposed research for the thesis;

Completion of a thesis which is acceptable to the student's thesis committee. During this period, the candidate will be expected to participate in the usual activities of scientific research such as attending and presenting research seminars and publishing original research papers;

Presentation of thesis research results at a formal public seminar. The seminar will be followed by an oral examination carried out by the student's thesis committee;

Additional requirements specified in the Departmental Policies for the Graduate Programs, available from the graduate program chairperson.

Molecular Biology Doctoral Program

A greater amount of course work, original research and a more extensive examination process is required.

It is designed to take about four years of study.

The student's coursework is arranged to fit the student's individual needs by mutual consultation among the student, his/her major professor, and graduate committee.

The department does not require any formal certification of language.

The student normally chooses a major professor at the beginning of the first year's residence. The major professor supervises the student's original research and provides general guidance during the course of study.

In addition to the general requirements by the university, the molecular biology Ph.D. program requires the following:

- Filing a program of study that is acceptable to the student's thesis or dissertation committee and the university;
- Submission of a research proposal based on a literature review and the proposed research for the dissertation;
- A preliminary examination consisting of written and oral portions which is taken after four semesters of study;
- Completion of a dissertation which is acceptable to the student's dissertation committee. During this period, the candidate will be expected to participate in the usual activities of scientific research such as attending and presenting research seminars and publishing original research papers;
- Presentation of dissertation research results at a formal public seminar. The seminar will be followed by an oral examination carried out by the student's dissertation committee;

Additional requirements specified in the Department Policies for the Graduate Programs, available from the graduate program chairperson.

Molecular Biology (MOLB)

5010. Problems in Molecular Biology. 1-3 (Max. 6). Introduces the graduate and undergraduate student to biochemical literature, scientific reports, and introductory research. Introduces graduate molecular biology students to the teaching process. Prerequisite: courses in molecular biology and related areas necessary to pursue problems selected; consent of instructor.

5050. Student Seminar. 1 (Max. 4). Examines selected topics appearing in journal literature with oral presentation and discussion. Exposes undergraduate students to current research in molecular biology. Dual listed with MOLB 4050. *Prerequisite:* molecular biology course.

5051. Department Seminar. 1 (Max. 15). Students are required to attend a series of weekly seminars presented by faculty from other universities on a diverse set of research topics. Undergraduates will be able to use one credit hour of this course to partially fulfill the seminar requirement. Dual listed with MOLB 4051.

5052. Summer Seminar. 1-5 (Max. 5). Consists of one week of lectures, presented by a renowned scientist from either academics or industry. The material presented is taken from the research program of the speaker. Dual listed with MOLB 4052.

5170. Cloning and DNA Sequencing Laboratory. 1. An introduction to cloning and DNA sequencing. Dual listed with MOLB 4170. *Prerequisite:* MOLB 3610 or 4600.

5180. Protein Isolation and Characterization Laboratory. 1. Protein isolation using HPLC techniques followed by limited chemical characterization. Dual listed with MOLB 4180. *Prerequisite:* MOLB 3610 or 4600.

5220. Anaerobic Microbiology Techniques. 1. A laboratory course concerning methods for cultivation identification and study of the obligately anaerobic bacteria. *Prerequisites:* MOLB 2210 or equivalent, 1 semester of biochemistry.

5250. Microbial Genetics Laboratory. 1. Provides hands-on laboratory experience in manipulating the genetics of virus, bacteria and fungi. Both classical and molecular genetic techniques will be used. Dual listed with 4250. *Prerequisite:* MOLB 2021, 3610 or 4600 or LIFE 4000.

5260. Quantitative Microscopy. 1. Acquaints students with principles of light microscopy, use of fluorescent probes and image processing software. Students use phase contrast, fluorescent, and confocal microscopes learning to measure and compare size and intensity of images. Dual listed with MOLB 4260. *Prerequisite:* MOLB 4600 or LIFE 4600, and PHYS 1120.

5400. Immunology. 4. Biology of the immune system; cellular and molecular mechanisms; host resistance to infectious agents; as well as hypersensitivities, autoimmunity, tumor and tissue rejection. Includes laboratory for immunological techniques. Dual listed with MOLB 4400. *Prerequisite:* MOLB/MICR 2220.

5440. Microbial Genetics. 3. Introduction to reading the molecular genetics literature. Discusses historical background and current literature. Dual listed with MOLB 4440. *Prerequisite:* MOLB 2021, 3610, or LIFE 4000.

5450. Cell Development and Genetics. 3. Integrates the genetic control of cell regulation and animal development in both vertebrate and invertebrate model systems such as Drosophila, C elegans and the mouse. Includes studies of eukaryotic signal transduction, gene control, and current transgenic technologies. Dual listed with MOLB 4450. *Prerequisite:* MOLB 3000 and MOLB 4610 or concurrent enrollment; or MOLB 300 and MOLB 3610.

5460. Microbial Physiology and Metabolism I. 3. Studies life processes of microbes as mediated by their structures acting in consort, in response to changing environments. Dual listed with MOLB 4460. *Prerequisite:* MOLB/MICR 2210 and two semesters of biochemistry.

5470. Microbial Physiology and Metabolism II. 3. A continuation of Microbial Physiology and Metabolism I and places special emphasis on microbes as models for understanding of fundamental biological and biochemical phenomena as well as the practical implications of microbial physiology and metabolism. *Prerequisite:* Microbial Physiology I or equivalent.

5485. Computers in Biology. 1. Prepares students to use existing internet resources as research tools in biology without the need to write or install software. Topics include literature searching, multiple sequence alignment and phylogenetic tree construction, primer design, protein homology modeling, and the use of model organism databases. Dual listed with MOLB 4485. *Prerequisites:* MOLB 3000 and 3610 or 4610 or LIFE 3600.

5490. Microbial Gene Expression Laboratory. 1. Provides theoretical background and hands-on experience in biochemical, spectroscopy, DNA microarray, and bioinformatics techniques used to study bacterial physiology. Will measure and analyze changes in physiological parameters as well as changes in patterns of gene expression in rhoderbacter sphaeroides in response to environmental conditions. Dual listed with MOLB 4490. *Prerequisites:* MOLB 4460/5460 or MICR 3000 and MOLB 4610/5610 (the latter may be concurrent).

5495. Bioinformatics. 3. Topics range from classic algorithms in bioinformatics like multiple sequence alignment and phylogenetic tree construction to problems of functional analysis, including computational genomics, gene expression, protein structure, and systems biology analyses. Dual listed with MOLB 4495. *Prerequisite:* graduate standing.

5510. Introduction to Virology. 3. Prokaryotic and eukaryotic viruses as infectious agents and models for modern molecular biology. Examines concepts and principles of pathogenesis, host response and the regulation of virus-host interactions. Genome organization, structure and replication will be examined within the context of the co-evolution of virus and host. Dual listed with MOLB 4510. *Prerequisites:* MOLB 3610 or 4600 plus 4610.

5520. Advanced Problems in Molecularbiology. 1-3 (Max. 10). *Prerequisite:* 6 semester hours above MOLB 4610 and consent of instructor.

5530. Techniques in Molecular Microbiology. 4. *Prerequisite:* graduate standing.

5600. General Biochemistry I. 3. The first semester of a comprehensive two-semester course for biochemistry majors and all biological and physical science majors. Students wishing to acquire laboratory experience in biochemistry should enroll in Molecular Biology laboratory pods. Dual listed with MOLB 4600. *Prerequisite:* CHEM 2300 or CHEM 2340 or 2440.

5610. General Biochemistry II. 3. The second semester of a comprehensive two-semester sequence for molecular biology majors. Dual listed with MOLB 4610. *Prerequisite:* MOLB 4600.

5620. Membranes and Hormones. 3. An advanced seminar in the structure, function, and dynamics of biological membranes. *Prerequisite:* MOLB 4610.

5630. Advanced Topics in Molecularbiology. 1-3 (Max. 15). Lectures, literature reviews and discussion of selected current topics in different areas of microbiology. Please check class schedule for current offerings each semester. *Prerequisite:* 9 hours of molecular biology and consent of instructor.

5650. Protein Structure and Function. 3. Designed to provide an in-depth look at proteins and their structure. Topics will include protein purification, structure analysis, folding, modification, interactions with other molecules, enzyme mechanism, and other current topics. *Prerequisite:* MOLB 4610.

5660. Maintenance and Flow of Genetic Information: A Molecular Perspective. 3. Current research in the maintenance and flow of genetic information - replication, recombination, repair, transcription, and translation - are discussed. Students will be exposed to new knowledge of DNA and protein structure and function, organization of the genome, gene expression, and principles of contemporary experimental methods. Dual listed with MOLB 4660. *Prerequisite:* MOLB 3000 or MOLB 4610.

5670. Development and Molecular Cell Biology. 3. An advanced course dealing with molecular aspects of intracellular protein localization, organelle biogenesis, and cellular architecture. Molecular aspects of development are also addressed. Current literature sources are used. *Prerequisite:* MOLB 4610.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). Prerequisite: advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1 - 12. (Max 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1 - 12 (Max. 24). *Prerequisite:* graduate standing.

Microbiology (MICR)

5130. Mammalian Pathobiology. 3. Anatomical basis of disease in mammals. Emphasis on concepts of pathogenesis of disease, and the gross, microscopic and clinicopathological changes associated with lesions: cell injury and death; cellular degeneration; disturbances of growth and circulation; neoplasia; inflammation; and recognition of gross and microscopic tissue changes. Background in immunology will be beneficial. Dual listed with MICR 4130; cross listed with PATB 5130. *Prerequisite:* C or better in LIFE 2022.

5220. Molecular Mechanisms of Bacterial Pathogenesis. 3. Intended for students majoring in microbiology or a related field. Consists of lectures and small group decisions. Student responsibilities include note-taking and preparation for discussion by completion of reading assignments consisting of classic and/or recent journal articles addressing the weekly topic. Dual listed with MICR 4220; cross listed with PATB 4220/5220. *Prerequisites:* PATB/MICR 2220 and statistics (or epidemiology).

5440. Microbial Genetics. 3. Introduction to reading the molecular genetics literature. Discusses historical background and current literature. Dual Listed with MICR 4440. *Prerequisite:* MOLB 2021, MOLB 3610 or 4610, LIFE 3050.

Department of Plant Sciences

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Web site: www.uwyo.edu/uwplant
Department Head: Stephen K. Herbert

Professors:

ROLLIN H. ABERNETHY, B.S. Kansas State University 1970; M.S. 1970; Ph.D. University of Arizona 1974; Professor of Plant Science 1989, 1978; Associate Vice President, Academic Affairs 1999.

GARY D. FRANC, B.S. University of Wisconsin 1978; M.S. University of Minnesota 1982; Ph.D. Colorado State University 1988; Professor of Plant Pathology 2002, 1991.

JAMES M. KRALL, B.S. Montana State University 1973; M.S. Kansas State University 1975; Ph.D. University of Wyoming 1979; Extension Agronomist and Professor of Agronomy 1997, 1984.

STEPHEN D. MILLER, B.S. Colorado State University 1968; M.S. North Dakota State University 1970; Ph.D. 1973; Professor of Weed Science 1984; Assoc. Dean and Director of Agricultural Experiment Station, 2005.

Associate Professors:

ROBIN W. GROOSE, B.S. University of Wisconsin 1978; M.S. 1983; Ph.D. 1985; Associate Professor of Plant Genetics 1993, 1987.

STEPHEN K. HERBERT, B.S. Seattle Pacific University 1980; Ph.D. University of Washington 1988; Associate Professor of Botany 1999.

Assistant Professors:

M. ANOWARUL ISLAM, B.S. Bangladesh Agricultural University 1990; M.S. Institute of Postgraduate Studies in Agriculture, Bangladesh 1996; Ph.D. University of Sydney, Australia 2003; Assistant Professor of Forage Agroecology 2008.

ANDREW R. KNISS, B.S. University of Wyoming 2001; M.S. University of Nebraska-Lincoln 2003; Ph.D. University of Wyoming 2006; Assistant Professor of Weed Ecology 2007.

RICHARD (RIK) D. SMITH, B.S. Western Washington University 1990; Ph.D. University of California-Davis 2003; Assistant Professor of Agroecology 2004.

Academic Professionals:

JACK CECIL, B.S. University of Wyoming 1974; M.S. 1978; Assistant Research Scientist 1993.

MARK FERRELL, B.S. University of Wyoming 1976; M.S. 1980; Ph.D. 1984; Extension Pesticide Coordinator 1983.

ABDEL MESBAH, B.S. National Institute of Agriculture, Morocco 1982; M.S. University of Wyoming 1990; Ph.D. 1993; Research Scientist 1997.

KAREN PANTER, B.S. Colorado State University 1979; M.S. University of Nebraska 1981; Ph.D. Colorado State University 1985; Extension Horticulture Specialist 1998.

RAINA SPENCE, B.A. Central Washington University 1999; M.S. Washington State University 2002; University Extension Educator, Assistant 2007.

DAVID WILSON, B.S. Montana State University 1978; M.S. University of Wyoming 1993; Ph.D. 2000; Senior Lecturer 2007, 1993.

Adjunct Professors:

Terry Booth, Stephen Enloe, Linda Hanson, Drew Lyon, Lee Panella, Dale Shaner, Robert Wilson, Dale Woods

Professors Emeriti:

Ron Delaney, David Koch, Thomas D. Whitson, Alan Gray, Fred Gray

The Department of Plant Sciences offers curricula leading to the master of science and doctor of philosophy degrees in agronomy. Courses within the department are offered in crop science, horticulture, plant pathology, weed science, and agroecology. Interdisciplinary coursework and research projects are common for agronomy graduate students.

At present, no program for a graduate degree in agroecology is offered; however, some courses at the graduate level are available. Responsibility for the undergraduate program is shared with the Department of Renewable Resources. For course descriptions, refer to listings under Plant Sciences in this *Bulletin*.

Program Specific Admission Requirements

In addition to university minimum requirements, a majority of the department faculty and department must approve the admission. A faculty member must agree to advise the student.

Program Specific Graduate Assistantship Information

The department typically offers at least 10 graduate assistantships, M.S. assistantships include an $11,349.00 stipend, plus tuition and fee waiver, and health insurance. Ph.D. assistantships include a $15,795.00 stipend, plus tuition and fee waiver, and health benefits. These assistantships are for the 9 month academic year, but summer support is typically available.

Program Specific Degree Requirements

Master of Science in Agronomy

Plan A (thesis)

The requirements for the master of science degree include 26 hours of coursework numbered 4000 or above, 4 hours of thesis research, a research proposal, original research, and oral defense of the thesis.

Typically completed in two years. The student's coursework is selected to fit the student's individual needs by mutual consultation among the student, his/her major professor and graduate committee.

Doctoral Program

The requirements for the doctor of philosophy degree include 60 hours of coursework numbered 4000 or above, 12 hours of dissertation research, a research proposal, original research, written and oral preliminary exams to be taken when most or all coursework is completed, and an oral defense of the dissertation.

Dissertations may be in a modified journal article format but must meet university formatting requirements.

Typically completed in four years. The student's coursework is selected to fit the student's individual needs by mutual consultation among the student, his/her major professor and graduate committee.

The department does not require language certification.

The student is expected to participate in the usual activities of scientific research such as attending and presenting at research seminars and professional meetings and publishing his/her research.

Plant Sciences (PLNT)

5000. Plant Disease Control. 3. Advanced study of plant diseases. Important diseases of field, forage and horticultural crops are studied. Includes history and current distribution of crops. Emphasis is placed on pathogen biology and development of integrated disease management. Current and classic research papers on plant disease control are discussed. Dual listed with PLNT 4000. *Prerequisite:* PLNT 3220.

5020. Sustainable Agriculture. 3. Focuses on the sustainability of agroecosystems and the human communities that maintain them in the context of regional, national and global food and fiber requirements. Topics include: the scale of agriculture, low-input systems, current energy and transportation challenges, markets, and integrated crop and livestock production. Dual listed with PLNT 4020. *Prerequisite:* 8 hours of Life Sciences.

5070. Weed Science and Technology. 4. Management and physiological principles involved in control of economically important farm and range weeds. Dual listed with PLNT 4070. *Prerequisite:* AECL 1000, LIFE 1010

5100. Pesticide Science. 3. Pesticide development and registration. Classification and structure of agricultural pesticides. Mode of action; biological and environmental factors that influence efficacy; environmental concerns and pesticide resistance. Cross listed with ENTO 5100. *Prerequisite:* graduate standing or 3 hours of biochemistry.

5180. Horticultural Herbacceous Plant Production. 4. Production methods for a wide range of herbaceous plants including bedding plants, perennials, vegetables, flowering potted plants, and foliage plants. Emphasis is placed on current production techniques in controlled environments and in the field. Dual listed with PLNT 4180. *Prerequisite:* PLNT 3300.

5200. Greenhouse Design and Management. 4. Emphasis on greenhouse structural and functional design concepts of economy, efficiency and energy conservation. Primary emphasis is on the limitations and advantages of greenhouses in the Rocky Mountain region, including alternative energy concepts. The management and operational concerns associated with private, commercial, educational and public greenhouses are included. *Prerequisite:* AECL/PLNT 2025 or LIFE 2023 and a QA course.

5380. Crop and Weed Ecology. 4. Focuses on agroecosystems and the ecology of weeds. Main objective is to understand how ecological processes determine agroecosystem function and weed invasions. Some of the processes to be covered include: competition, succession, disturbance, nutrient cycling, diversity and evolution. *Prerequisites:* basic ecology course, senior standing with permission of instructor.

5410. Advanced Crop Physiology and Management. 3. Review and interpretation of current crop management and physiology literature. *Prerequisite:* 6 hours of biochemistry or plant physiology

5470. Seed Science and Technology. 3. Presents aspects of seed biology and processing including development, physiology, ecology, germination, viability, dormancy, production, conditioning, storage, certification and marketing. *Prerequisite:* 8 hours of plant biology.

5500. Clinical Plant Pathology. 2. Designed to give students practical experience in disease diagnosis. Students are exposed to a variety of current techniques used in the diagnosis and control of plant problems caused by abiotic and biotic factors. Primary emphasis is on the identification of biotic agents; including fungi, bacteria, nematodes and viruses. Students should gain experience and insight in the practical aspects of plant pathology. *Prerequisite:* PLNT 4000.

5600. Research in Crops. 1-4 (Max. 10). Investigation of research problems to include a written and oral presentation of results. *Prerequisite:* basic training in the field of problem selected.

5720. Plant Disease Problems. 1-3 (Max. 10). Biology, epidemiology, and control of specific crop, field and forage diseases. *Prerequisite:* PLNT 3220.

5790. Topics in Plant Sciences. 1-10 (Max. 10). Dual listed with PLNT 4790. *Prerequisite:* senior standing.

5820. Graduate Seminar. 1 (Max. 6). Discussion in production, physiology, breeding and weed science. *Prerequisite:* basic training in plant sciences.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

Department of Renewable Resources

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Professors:

ANN L. HILD, B.A. University of Iowa 1975; M.S. Texas Tech University 1991; Ph.D. 1995; Professor of Rangeland Ecology and Watershed Management 2008, 1996.

DAVID E. LEGG, B.S. University of Missouri 1978; M.S. 1980; Ph.D. University of Minnesota 1983; Professor of Entomology 2003, 1988.

LARRY C. MUNN, B.S. Ohio State University 1972; M.S. 1974; Ph.D. Montana State University 1977; Professor of Soil Science 1992, 1981.

RICHARD A. OLSON, B.S. University of Wisconsin (River Falls) 1970; M.S. South Dakota State University 1975; Ph.D. North Dakota State University 1979; Professor of Wildlife Habitat Ecology and Management 2000, 1989.

KATTA J. REDDY, B.S. A.P. Agricultural University (India) 1978; M.S. 1980; Ph.D. Colorado State University 1986; Professor of Water Quality 2006, 2000.

SCOTT R. SHAW, B.S. Michigan State University 1977; M.S. University of Maryland 1981; Ph.D. 1984; Professor of Entomology 1998, 1989.

MICHAEL A. SMITH, B.S. Texas Tech University 1967; M.S. 1972; Ph.D. Utah State University 1977; Professor of Rangeland Ecology and Watershed Management 1992, 1978.

THOMAS L. THUROW, B.S. University of Idaho 1977; M.S. Brigham Young University 1979; Ph.D. Texas A&M University 1985; Professor of Rangeland Ecology and Watershed Management 1999.

GEORGE F. VANCE, B.S. Michigan State University 1981; M.S. 1985; Ph.D. University of Illinois 1989; Professor of Soil and Environmental Chemistry 1998, 1989.

JAMES K. WANGBERG, B.A. Humboldt State College 1969; M.A. California State University-Humboldt 1973; Ph.D. University of Idaho 1976; Professor of Entomology 1986; Associate Dean 1999.

STEPHEN E. WILLIAMS, B.S. New Mexico State University 1970; M.S. 1972; Ph.D. North Carolina State University 1977; Professor of Soil Biology and Biochemistry 1987, 1976.

Associate Professors:

TIMOTHY R. COLLIER, B.S. University of California—Riverside 1987; Ph.D. University of California—Santa Barbara 1994; Associate Professor of Entomology 2008, 2002.

ALEXANDRE V. LATCHININSKY, B.S. St. Petersburg State University (Russia) 1979; M.S. 1980; Ph.D. University of Wyoming 2001; Associate Professor of Entomology 2008, 2003.

SCOTT N. MILLER, B.S. Brown University 1991; M.S. University of Arizona 1995; Ph.D. 2002; Associate Professor of Rangeland Ecology and Watershed Management 2008, 2002.

J. DANIEL RODGERS, B.S. East Texas State University 1963; M.S. Texas Tech University 1966; Ph.D. Utah State University 1980; Associate Professor of Rangeland Ecology and Watershed Management 1980.

PETER D. STAHL, B.S. Oklahoma State University 1978; M.S. University of Wyoming 1982; Ph.D. 1989; Associate Professor of Restoration Ecology 2005, 2000.

JAMES W. WAGGONER, JR., B.S. New Mexico State University 1970; M.S. 1972; Ph.D. University of Illinois 1975; Associate Professor of Rangeland Ecology and Watershed Management 1994.

DAVID G. WILLIAMS, B.A. University of Texas 1985; M.S. Texas A&M University 1988; Ph.D. Washington State University 1992; Associate Professor of Rangeland Ecology and Watershed Management 2002.

Assistant Professors:

JEFFREY L. BECK, B.S. Brigham Young University 1993; M.S. 1996; Ph.D. University of Idaho 2003; Assistant Professor of Rangeland Ecology and Watershed Management 2007.

THIJS KELLENERS, B.S. Wageningen University, The Netherlands 1988; M.S. 1993; Ph.D. 2001.

JAY B. NORTON, B.S. University of Montana 1985; M.S. Iowa State University 1996; Ph.D. University of Montana 2000; Assistant Professor of Soil Science 2006.

VIRGINIA B. PAIGE, B.A. Colorado College 1984; M.S. University of Massachusetts 1992; Ph.D. University of Arizona 2000; Assistant Professor Rangeland Ecology and Watershed management 2004.

Academic Professional:

RACHEL D. MEALOR, B.S. University of Wyoming 2004; M.S. 2007; Assistant University Extension Coordinator 2007.

SCOTT SCHELL, B.S. University of Wyoming 1991; M.S. 1994; Assistant Extension Entomologist 2005.

SHIKHA SHARMA, M.S. University of Lucknow, India 1993; Ph.D. 1998; Assistant Research Scientist 2006.

Adjunct Professors:

Justin Derner, Brian Mealor, Jack Morgan, Ursula Norton, Ed Schmidtmann, Gerald Schuman, Nancy Shaw, Ramesh Sivanpillai, Jeffrey Smith

Professors Emeriti:

Robert Heil, Robert Lavigne, William Laycock, John Lloyd, Robert Pfadt, Quentin Skinner, Thomas Wesche

The Department of Renewable Resources is an interdisciplinary department made up of five disciplinary areas: entomology, rangeland ecology, soil sciences, agroecology, and watershed management. The department offers the master of science and doctor of philosophy degrees in entomology, rangeland ecology and watershed management, and soil science. A water resources dual major may be obtained in conjunction with each of these master's degrees. For the rangeland ecology and watershed management degrees, thesis and dissertation problems may be developed in aspects of range ecology, wildlife habitat, reclamation of disturbed lands, watershed management, utilization and improvement of rangelands, and many other facets of range and forest ecology management. For the entomology degrees, thesis and dissertation problems may be developed in many areas of basic and applied aspects of insect ecology. For the soil degrees, thesis and dissertation problems may be developed in many basic and applied aspects of soil science. The degree programs reflect the department's diverse expertise in natural resource and agriculture sciences. Students completing degrees offered through the department are well prepared for careers in natural resource management and sustainable agriculture (e.g., range management, watershed management, restoration ecology/reclamation of degraded land, wildlife habitat management, biocontrol/integrated pest management, soil science and various types of environmental consulting) or other science careers.

A graduate certificate in reclamation and restoration ecology may be obtained after completion of a B.S. degree or in conjunction with an M.S. or Ph.D. degree.

At present, no program for graduate degrees in agroecology is offered; however, some courses at the graduate level are available. Responsibility for this program is shared with the Department of Plant Sciences.

Program Specific Admission Requirements

Admission is contingent upon a faculty member being willing to assume responsibility for working with the student as an adviser.

Applicants are encouraged to initiate correspondence with faculty who share similar research interests as part of the process of securing faculty advising commitment.

In special circumstances, and with the faculty adviser's support, a student may be admitted in a provisional status with continued enrollment dependent upon meeting performance requirements specified at the time of admission.

Program Specific Graduate Assistantship Information

Current graduate assistantship availability, subject of study, and remuneration can be determined by checking: www.uwyo.edu/uwrenewable. Prospective students are also encouraged to directly correspond about future opportunities for graduate assistantships with faculty that share similar research interests.

Program Specific Degree Requirements

Master of Science in Entomology

Plan A (thesis)

The master of science degree normally is offered under Plan A which requires at least the university minimum degree requirements and an oral examination.

Plan B (non-thesis)

Requires 30 hours of graduate credit to include 9 hours of required courses, 11 hours of required electives, and 10 hours of other electives.

Plan B project - follows format of Plan A thesis.

A Plan B master of science will be a terminal degree program in the Department of Renewable Resources. Students completing this option will not qualify for a subsequent Ph.D. program in Department of Renewable Resources at the University of Wyoming.

Master of Science in Entomology/Water Resources

Please refer to the Water Resources section of this Bulletin for degree requirements.

Master of Science in Rangeland Ecology and Watershed Management

Plan A (thesis)

The master of science degree normally is offered under Plan A which requires at least the university minimum degree requirements and an oral examination.

An oral defense of the thesis is required.

Plan B (non-thesis)

Plan B is available under special circumstances and requires 30 hours of graduate coursework.

Plan B candidates must also prepare one professional paper (i.e., content and form compatible with publication in a scientific journal) or, if the adviser requests, two professional papers in selected topic areas.

An oral defense of the paper(s) is required.

Master of Science in Rangeland Ecology and Watershed Management/Water Resources

Please refer to Water Resources section of this bulletin for degree requirements.

Master of Science in Soil Science

Plan A (thesis)

Plan A requires the university minimum degree requirements and an oral final examination.

Plan B (non-thesis)

Plan B is available and requires 30 hours of graduate coursework.

An oral defense of the paper(s) is required.

Master of Science in Soil Science/Water Resources

Please refer to the Water Resources section of this bulletin for degree requirements.

Doctoral Programs

Doctor of Philosophy in Entomology

Candidates must complete the minimum requirements for the doctor of philosophy degree, plus a preliminary examination (written and oral) covering knowledge related to the discipline (taken after most coursework complete) and an oral final examination.

Doctor of Philosophy in Rangeland Ecology and Watershed Management

Candidates must complete the minimum requirements for the doctor of philosophy degree, plus a preliminary examination (written and oral) covering knowledge related to the discipline (taken after most coursework complete) and an oral final examination.

Doctor of Philosophy in Soil Science

Candidates must complete the minimum requirements for the doctor of philosophy degree, plus a preliminary examination (written and oral) covering knowledge related to the discipline (taken after most coursework complete) and an oral final examination.

Graduate Certificate Program Reclamation/Restoration Ecology Graduate Certificate

The Reclamation/Restoration Ecology (RRE) graduate certificate prepares the student to use basic and applied ecological concepts to reclaim and/or restore processes and functions to disturbed ecosystems. Reclamation and/or restoration of disturbed ecosystems requires an understanding of the edaphic, biotic, hydrologic, geologic, and topographic factors comprising these ecosystems, including the complex interrelationships that support and perpetuate ecosystem function. The graduate certificate will be granted to students who have completed a B.S. in an appropriate science-oriented discipline or are currently enrolled in an M.S. or Ph.D. program.

The graduate certificate will also be available to professionals working in reclamation/restoration oriented fields seeking to upgrade their training in reclamation and restoration ecology. Those interested in the graduate certificate will be required to complete the course work listed below as well as write a synopsis paper with a formal presentation advertised as an open forum seminar.

Required Certificate Courses:

Reclamation and restoration ecology courses
REWM 4200, REWM 5580 .....6 hours
Reclamation problems
SOIL 5565 or REWM 5640.....4 hours

Reclamation process course (choose one)
GEOL 5070, GEOL 5111, BOT 5700, BOT 5740, BOT 5730, BOT 5780, PLNT 5070, PLNT 5470, GEOL 5444, GEOL 5570, REWM 5280, REWM 5710, RNEW 5540, SOIL 5100, SOIL/MATH 5110, SOIL 5120, SOIL 5130, SOIL 5140, SOIL 5150, ZOO 5550 .....3 hours

Planning/policy courses (choose one
ENR 4900, ENR 5900, G&R 5260, LAW 6660, POLS 5050 .....

Minimum total credits needed: 16 hours

Courses of instruction in the department are offered in agroecology, entomology, rangeland ecology and watershed management, renewable resources, and soil science.

Renewable Resources (RNEW)

5130. Applied Remote Sensing for Agricultural Management. 3. Addresses specific applications of remote sensing to cropland and rangeland management. Covers an overview of remote sensing, specific applications of remote sensing for crops and specific applications of remote sensing to range management. Foundation is agriculture-specific remote sensing of green plants. Dual listed with RNEW 4130; cross listed with BOT 5130. Prerequisites: QA and 9 hours in student's major field and junior/senior standing.

5200. Spatial Analysis of Watersheds and Ecosystems. 3. Covers topics related to analysis of spatial and temporal processes at watershed and ecosystem scales using Geographic Information Systems (GIS). Topics include land classification and suitability analysis interpolation techniques, terrain analysis, model integration, and visualization. Sources of potential error and ramifications are examined. *Prerequisite:* GEOG 4210, GEOG 4140 or equivalent.

5400. Invasive Plant Ecology. 3. Ecological impacts of invasive, non-indigenous plant species, the ecological, genetic and evolutionary hypotheses for invasiveness as well as management strategies for invasive plant species. Dual listed with RNEW 4400. *Prerequisite:* LIFE 3400.

5500. Stable Isotope Ecology. 3. Application of stable isotope measurements to organismal and systems ecology. Lectures address the theory underlying the use of stable isotopes at natural abundance levels as tracers and integrators of important physiological and ecological processes. Laboratory exercises provide hands on experience with stable isotope ratio measurements. *Prerequisite:* graduate classification in a natural science or agriculture discipline.

5510. Research Planning in Renewable Resources. 3. An interdisciplinary course examining the process and nature of scientific inquiry in renewable resources. Topics include: types of inquiry, forming and testing hypotheses, literature review, methodology, data summary and scientific writing. Each student prepares a study plan, grant or research proposal, journal article or initial thesis draft. Writing is emphasized. Dual listed with RNEW 4510. *Prerequisite:* basic training in renewable resources, ecology or related discipline.

5540. Shrubland Ecology. 3. Ecology of shrub-dominated lands and shrub species in grasslands. Location, importance and environmental constraints of shrub distributions. Topics include herbivory, woody plant invasions, competitive interactions, monitoring and population dynamics. Emphasizes familiarity with scientific literature. *Prerequisite:* REWM 3000, 4800, BOT 4700.

5545. Shrub Ecology Trip. 2. Field study in North American shrublands of western US ecosystems. Participants learn from researchers, managers, field activities, required readings and written assignments. Participants will be camping and a fee is required. *Prerequisite:* RNEW 5540.

5730. Plant Physiological Ecology. 4. Acquaints advanced students with environmental factors which affect the establishment and growth of plants. Emphasizes adaptive mechanisms. Lecture with inclusive hands-on laboratory. Dual listed with RNEW 4730; cross listed with BOT 4730/5730. *Prerequisite:* one course in physiology and one course in ecology.

5775. Forest Ecology. 4. Integrative study of the structure, function, and ecological diversity of forested ecosystems, and the physical factors that influence this diversity, including emergent properties of energy flow and nutrient cycling. Special emphasis is given to understanding forest disturbances and succession, and implications for impacts of management and sustainability are discussed throughout. Dual listed with RNEW 4775; cross listed with BOT 5775 and ECOL 5775. *Prerequisite:* LIFE 3400.

5959. Enrichment Studies. 1-3 (Max. 3). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5985. Seminar. 1-3 (Max. 3). Current issues relevant to renewable resources research and management. Offered S/U only. *Prerequisite:* graduate standing.

5990. Topics In Renewable Resources. 1-4 (Max. 8). Special topics pertaining to renewable natural resource management. Intended to accommodate instruction in various specialized subjects not offered on a regular basis. Students may enroll in more than one section of this course provided topics are different. Dual listed with RNEW 4990. *Prerequisites:* none.

Entomology (ENTO)

5080. Statistical Methods for the Agricultural and Natural Resource Sciences. 3. Brief review of statistical principles. Use of SAS programming. Numerous analysis of variance techniques along with commonly used experimental designs. Multiple mean comparisons, linear contrasts, power of F test, simple linear regression, polynomial regression, analysis of covariance, and some categorical data techniques for student in the agriculture and natural resources sciences. Credit cannot be earned in more that one of the following courses: STAT 2100, 3050, 5050, 5060, 5070, 5080. Cross listed with STAT 5080. *Prerequisite:* STAT 2050 or equivalent.

5100. Pesticide Science. 3. Pesticide development and registration. Classification and structure of agricultural pesticides. Mode of action; biological and environmental factors that influence efficacy; environmental concerns and pesticide resistance. Cross listed with PLNT 5100. *Prerequisite:* graduate standing, 3 hours of biochemistry.

5300. Applied Insect Ecology. 3. Examines concepts of insect ecology and their application to the management of agricultural and rangeland insect pests. Control of rangeland weeds using insects is also examined. Covers population dynamics, predator-prey and insect-plant interactions, biological control and integrated pest management. Dual listed with ENTO 4300. *Prerequisite:* ENTO 1000 or 9 hours of biology or ecology related coursework.

5360. Medical Entomology and Parasitology. 4. Emphasis is on medically important arthropods, protozoa and worms; clinical effects of infection, epidemiology, avoidance/control and identification/diagnosis. Dual listed with ENTO 4360; cross listed with PATB 5360. *Prerequisite:* 8 hours of biological science.

5601. Insects for Teachers: Collection and Identification of Insects. 1. Designed for school teachers K-12. Basic concepts such as insect classification, insect habitats, insect metamorphosis, and destructive and beneficial insects are discussed with emphasis on the presentation of these concepts in the school classroom. Half of the class is devoted to field trips, laboratories, workshop activities, and films. Each student will make an insect collection, and learn how to preserve, mount, and identify specimens to order level. Course may be taken independently of ENTO 5602. Identical to NASC 4790. *Prerequisite:* junior standing. Offered summer term only.

5602. Insects in the Classroom: Insects and Their Ways. 1. Designed for school teachers K-12. Basic concepts of insect structure and function (insect morphology, insect physiology, insect ecology, and insect behavior) are discussed with emphasis on the presentation of these concepts using living insects in the classroom. Half of the class is devoted to field trips, laboratories, workshop activities, and films. Each student will design, conduct, and write-up an experiment with insects. Course may be taken independently of ENTO 5601. Identical to NASC 4790. *Prerequisite:* junior standing. Offered summer term.

5665. Insects Affecting Lifestock. 3. Biology, importance and control of insect pests of livestock. Recognition of live and preserved specimens. Recent research. Dual listed with ENTO 4665. *Prerequisite:* ENTO 1000.

5672. Biology Of Honey Bee. 3. Bee evolution, physiology, behavior, genetics, and pathology. Also honey production, management, and pollination. *Prerequisite:* ENTO 1000 or one course in biology or zoology.

5678. Aquatic Entomology. 3. Biology, ecology, distribution and taxonomy of aquatic insects will be emphasized. Additional material covered will include aquatic insects as indicators of pollution. Students must make and identify a collection of immature aquatic insects. Dual listed with ENTO 4678. *Prerequisite:* 1 year of basic biology.

5682. Insect Physiology. 5. Structure and function of the insect body, with particular emphasis on the relationship between anatomical features and their cellular/biochemical functions. Dual listed with ENTO 4682. *Prerequisite:* ENTO 1000.

5684. Classification of Insects. 4. A study of insect orders, families and taxonomic treatises. Collection of adult insects representing 100 families, or equivalent museum project, is required for completion of course requirements. Dual listed with ENTO 4684. *Prerequisite:* ENTO 1000; ENTO 4670 is recommended.

5685. Insect-Plant Interactions. 2. Ecology of insect-plant interaction, including host finding/utilization and plant response to insect feeding. Aspects of chemical/physiological ecology, landscape ecology, and management of insects using biologically-based techniques will be addressed. Examples from various terrestrial systems, including cultivated lands, grasslands, and forest systems, will be used. Dual listed with ENTO 4685. *Prerequisite:* one year of basic biology; course work in entomology and botany recommended.

5686. Problems in Entomology. 1-3 (Max. 6). Individual library, laboratory or field study of insects. Dual listed with ENTO 4686. *Prerequisite:* 4 hours of biological science and 3 hours of entomology.

5687. Insect Evolution. 3. Examines major events of insect evolution including origins, fossils, wings and flight, metamorphosis, extinct orders, diversification patterns of modern orders, climate change, plate tectonics, coevolution with plants, parasitism, social behavior, and origin of modern faunas. Dual listed with ENTO 4687. *Prerequisite:* ENTO 4684/5684 required. Recommended: ENTO 4670/5670, ENTO 4682/5682.

5688. Contemporary and Classical Issues in the Life Sciences. 1-6 (Max. 6). A readings and discussion course centered on current and historical topics in biological sciences, related to social, cultural, theological and ethical issues. Topic of the course is democratically determined by the enrolled students of the previous semester and therefore changes with each offering. *Prerequisite:* 3 hours of life or social sciences or junior standing.

5689. Topics in Entomology. 1-4 (Max. 6). Current topics in entomology taught by entomology faculty, adjunct faculty or visiting faculty. Please check class schedule for current title.

5765. Medical Entomology. 3. Recognition and bionomics of insects of medical importance. Dual listed with ENTO 4765. *Prerequisite:* ENTO 1000.

5820. Principles of Systematics. 3. Examines principles of classification and phylogenetic relationships of organisms and practical methods of curation. *Prerequisite:* ENTO 1000 or 5684.

5850. Research in Entomology. 1-3 (Max. 8). Individual investigations of particular problems. *Prerequisite:* graduate standing

5852. Senior/Graduate Seminar. 1 (Max. 6). Discussion of important contributions to entomology. Dual listed with ENTO 4852. *Prerequisite:* graduate standing.

5882. Insect Population Biology. 3. Study of quantitative ecological processes as they relate to the ecology of pest populations, including pesticide resistance, pest outbreaks, biological control and integrated pest management. *Prerequisite:* ENTO 5683 or LIFE 2400.

5884. Insect Behavior. 3. Fundamentals of insect behavior and an analysis of behavioral patterns. Dual listed with ENTO4884. *Prerequisite:* one year of basic biology or equivalent; ENTO 5682 is recommended.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). esigned to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. Prerequisites: enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. Prerequisites: enrollment in a graduate level degree program.

Rangeland Ecology and Watershed Management (REWM)

5000. Range Resource Management. 3. Basic concepts and theories of rangeland resource management, trends in rangeland classification, grazing management and improvement practices. *Prerequisite:* graduate classification in agriculture or related natural resource subject matter areas.

5050. Range Forage Quality. 3. Effects of environments, grazing and management factors on preference and forage values of native range plants for domestic and wild grazing animals. *Prerequisite:* graduate or senior standing and REWM 2000 and ANSC 2020 or 3100.

5103. Range and Ranch Recreation. 3. Understanding of public demands for leisure use of and private rangelands; potential impacts on rangeland resources, ranch practices and families and other rangeland users. Preparation of public range or private ranch recreation operations plan. Graduate students assist in preparation and presentation of lecture. Dual listed with REWM 4103. *Prerequisites:* REWM 2000; GEOG 2550.

5150. Behavior Modification for Production of Grazing Herbivores. 3. Strategies for manipulation of behavior and management of the grazing herbivore are developed from scientific and practical information. Designed to equip the student to manage for animal and natural resource production. Dual listed with REWM 4150. *Prerequisite:* REWM 2000 and ANSC/ REWM 3020 or ANSC 3100.

5250. Water Resources Seminar. 1. Objective is to develop interaction among students from the various water resource disciplines to enhance their perspectives on how water problems are addressed within an interdisciplinary environment. *Prerequisite:* graduate status.

5280. Stream Habitat Management. 3. Trains students in planning, design, implementation and evaluation of stream rehabilitation measures. Includes principles of ecology, hydrology, and river processes as applied to mitigate adverse environmental impacts to watersheds and river systems.

5285. Wildland Hydrology. 3. Teaches essential and unique characteristics of hydrologic cycle as occurs on range and forest lands, concentrating on quantification of these processes and storages. Dual listed with REWM 4285. *Prerequisite:* graduate standing and University Studies QA.

5300. Grass Taxonomy. 3. Identification of grasses and their place in range management and world agriculture. Dual listed with REWM 4300. *Prerequisite:* LIFE 2020.

5510. Quantitative Methods of Range Anlysis. 3. Concepts and methods of designing and implementing analysis of animal, plant and environmental relationships. *Prerequisites:* BOT 4700 and basic training in statistics.

5520. Ecology and Management of Grasslands. 3. Ecological nature, management strategies, and management problems of North American and world grassland ecosystems. *Prerequisites:* REWM 4300, 5300 and BOT 4700.

5560. Range Plant Distribution. 3. Evolution and description of the worlds vegetation. Study of fossil record and shifting floras. *Prerequisite:* REWM 4300/5300.

5580. Rangeland Restoration Ecology. 3. Detailed analysis of various ecosystems unique to western rangelands. Primary emphasis on plant community restoration following degradation from edaphic, biotic, hydrologic, and topographic factors. Application of ecological principles to rehabilitate vegetation and restore ecosystem function. Strong emphasis on current research to formulate restoration strategies. *Prerequisites:* REWM 4850 or REWM 4200 and BOT 4700/5700.

5620. Graduate Seminar. 1-2 (Max. 6). Presentation and discussion of recent range management research. *Prerequisite:* graduate standing.

5640. Investigation. 1-4 (Max. 10). Research on specialized problems in range management. Investigations offered in the following areas of range management, habitat management, business management, range improvements and monitoring, watershed management, extension and international development. *Prerequisite:* graduate standing.

5710. Watershed Water Quality Management. 3. Studies watershed processes controlling water quality. Examines impacts of land use activities such as agriculture production, livestock grazing and mineral and natural gas extraction on surface water and ground water quality. Emphasis is placed on water quality modeling and management. Dual listed with REWM 4710. *Prerequisites:* CHEM 1030 and MATH 2200.

5750. Wildlife Habitat Restoration Ecology. 3. Emphasis on fundamental and applied aspects of restoration for terrestrial wildlife habitats following anthropogenic and natural disturbances. Although the course overviews theoretical concepts applicable to many systems, there is a focus on applications for wildlife habitats in western North America. Dual listed with REWM 4750. *Prerequisites:* REWM 4330 and 4850.

5830. Wildlife Habitat Ecology. 2. or students in animal ecology, wildlife science, or rangeland ecology emphasizing the relationships between wildlife populations and their habitats. Emphasis on concepts forming the basis of wildlife habitat ecology including habitat and niche, carrying capacity, habitat measurements, resource selection, habitat-relationships modeling, habitat management, and habitat restoration. *Prerequisites:* STAT 2050 (or equivalent) and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

Soil Science (SOIL)

5100. Soil Physics. 3. Examines the forms and interrelations of matter and energy in the soil environment. Fluxes and transformations of soil water and solutes are addressed primarily, as well as physical properties which influence soil productivity. Dual listed with SOIL 4100. *Prerequisite:* MATH 2310.

5105. Soil Physics Laboratory. 2. Students learn methodology and use of equipment to measure soil physical properties in the laboratory and field. Experiments include particle size analysis, soil surface area, soil-water measurement with neutron probe and TDR, field infiltration rate, soil-water retention curve, soil pore size distribution, saturated and unsaturated conductivity, soil water potential and solute breakthrough curve. Dual listed with SOIL 4105. *Prerequisite:* AECL 2010.

5110. Modeling Water and Chemical Transport in Vasoe Zone and Groundwater Systems. 4. Mathematical models will be formulated and applied to simulate water flow and chemical transport in soil and groundwater systems. Soil spatial variability and heterogeneity will be considered in the modeling processes. Using and comparing models, students will obtain the capability to transfer a physical problem to a mathematical model, to use numerical methods, such as the finite element method, to solve the mathematical problem, and to correctly interpret the numerical outputs. Students will develop and program numerical solutions for select problems and will utilize existing codes for modeling a variety of comprehensive problems. Cross listed with MATH 5110.

5120. Genesis, Morphology, and Classification of Soils. 4. Processes of soil development and methods of description, survey and classification. Includes field trips which examine soils in the Laramie Basin and surrounding mountains. Dual listed with SOIL 4120. *Prerequisite:* SOIL 2010.

5130. Chemistry of the Soil Environment. 3. Evaluation of the chemical and physical properties and reactions that occur in the soil environment. Fundamental principles of soil mineralogy, organic matter, and equilibrium chemistry as they relate to soil chemical reactions, plant nutrient availability, and pedogenetic processes will be emphasized. Dual listed with SOIL 4130. *Prerequisite:* MATH 1400, CHEM 1030 or CHEM 1060 and AECL 2010.

5135. Soil Chemistry Laboratory. 2. Laboratory techniques and methods of analysis are used to examine soils, sediments, and water chemical characteristics and reactions. Experiments include data analysis, computer models, nutrient and contaminant characteristics, mineral properties, soil/sediment oxidation-reduction reactions as well as others. Students are required to develop a soil chemistry experiment in their area of interest. Dual listed with SOIL 4135. *Prerequisite:* completion or concurrent enrollment in SOIL 4130/5130 or GEOL 4777/5777.

5140. Soil Microbiology. 4. Fundamental principles of soil microbiology and how they relate to microbial ecology, environmental contamination, agriculture and forestry. Dual listed with SOIL 4140. *Prerequisite:* SOIL/AECL 2010.

5150. Forest and Range Soils. 3. Characteristics and management of forest and range soils primarily in arid environments. Examines pedagogical units representative of forest and ranges and soil properties, such as nutrient availability and water relations, which influence plant growth. Dual listed with SOIL 4150. *Prerequisite:* SOIL 2010 and LIFE 2020.

5160. Soil Fertility and Fertilizers. 3. Physical, chemical and biological aspects of soils which impact fertilizer fate, uptake and plant growth. Dual listed with SOIL 4160. *Prerequisite:* AECL 2010.

5170. Analytical Methods for Ecosystems Research. 4. Introduction to methods for collecting, preparing and analyzing environment solid and solution samples. Instrumental methods, quality control/quality assurance and data analysis will be emphasized. Laboratory sessions will require student participation in analysis of different environmental samples. Dual listed with SOIL 4170. *Prerequisites:* CHEM 1030, CHEM 1060, and recommend CHEM 2230.

5180. Chemistry and Remediation of Environmental Contaminants. 3. Trains students in predicting the fate of environmental contaminants (e.g., cadmium, lead, selenium, arsenic and molybdenum) in coal mine spoils and coal combustion solid wastes. Emphasis is placed on chemical speciation, adsorption/desorption, and precipitation/dissolution processes. Mobility of contaminants is predicted using chemical models (MINTEQA2, GEOCHEM, WATEQFC). New approaches for remediation of environmental contaminants are presented. *Prerequisites:* CHEM 1020 and MATH 2200.

5430. Applied Geostatics. 3. Designed to provide general geostatistical analyses and their applications for spatial random variables and functions. Topics covered include variogram, cross validation, kriging, cokriging, sampling strategies, and both non-conditional and conditional simulations. Several geostatistics packages are used to analyze real field data and students are encouraged to use their own data for practicing geostatistical applications. Examples are taken from geohydrology, soil science, crop science, mining, and various environmental studies. Cross listed with GEOL/STAT 5430. *Prerequisite:* STAT 4020.

5510. Advanced Soil Genesis and Classification. 3. In-depth evaluation of the science of pedology, the philosophy and implementation of soil classification in the U.S. and world, and the formation of soils in different environments. *Prerequisite:* SOIL 5120 and graduate standing.

5535. Soil Biogeochemistry. 3. Focuses on fundamental considerations of organic substances, microbiological systems, and chemical processes in soils, sediments and waters. Examination of the nature and origin of organic matter and the role microorganisms in organic nutrient transformations, reactions, and interactions in different ecosystems. Dual listed with SOIL 4535. *Prerequisite:* SOIL 2010 and consent of instructor.

5565. Research in Soil Science. 1-4 (Max. 6). Library, laboratory, and/or greenhouse investigations on select research topics. Graduate students will be required to give a presentation to the soil science group on their final product/report. Dual listed with SOIL 4465. *Prerequisite:* Basic training in soil science research. SOIL 5565 reserved for graduate students.

5590. Special Topics in Soil Science. 1-3 (Max. 6). Special topics in soil science. Offered as an individual or small group basis as appropriate. Intended to accommodate various specialized subjects not offered on a regular basis. Students may enroll in more than one section of this course. Dual listed with SOIL 4590. *Prerequisite:* consent of instructor.

5720. Graduate Seminar. 1 (Max. 6). Review and discussion of recent soil research. *Prerequisite:* basic training in the field of problem selected and consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration:On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

Department of Veterinary Sciences

Wyoming State Veterinary Laboratory, 742-6638
FAX: (307) 721-2051
Web site: www.uwyo.edu/vetsci
Department Head: Don Montgomery

Professors:

E. LEE BELDEN, B.S. University of Wyoming 1960; M.S. 1962; Ph.D. University of California-Davis 1971; Professor of Veterinary Sciences and Microbiology 1982, 1962.

FRANCIS D. GALEY, B.S. Colorado State University 1981; D.V.M. 1983; Ph.D. University of Illinois, Urbana-Champaign 1988; Head of the Department of Veterinary Sciences and Director of the Wyoming State Veterinary Laboratory 1999; Dean, College of Agriculture, 2001.

KENNETH W. MILLS, B.S. Southern Colorado State College 1973; M.S. Colorado State University 1976; Ph.D. Kansas State University 1983; Assistant Director, Wyoming State Veterinary Laboratory 1986; Professor of Veterinary Sciences 1996, 1984.

DONALD L. MONTGOMERY, D.V.M. Texas A&M University 1976; Ph.D. 1981; Professor of Veterinary Sciences 2008, 2003.

DONAL O'TOOLE, M.V.B. Trinity College, Dublin, Ireland 1977; Ph.D. Colorado State University 1982; Professor of Veterinary Sciences 1998, 1990.

MERL F. RAISBECK, B.S. Colorado State University 1973; D.V.M. 1975; M.S. University of Missouri 1982; Ph.D. 1984; Professor of Veterinary Sciences 1995, 1988.

Associate Professors:

TODD E. CORNISH, B.S. University of California-Davis 1990; D.V.M. 1994; Ph.D. University of Georgia 1999; Associate Professor of Veterinary Sciences 2005, 1999.

JONATHAN H. FOX, B.Sc., B.VSc. University of Liverpool, UK 1993; Ph.D. Virginia Tech 2002; Associate Professor of Veterinary Sciences 2008.

Assistant Professors:

GERARD P. ANDREWS, M.S. University of New Hampshire 1983; Ph.D. Uniformed Services University of Health Science 1993; Assistant Professor of Veterinary Sciences 2004.

SHANNON L. SWIST, B.S. Kansas State University 1998; D.V.M./M.S. 2003; Assistant Professor of Veterinary Sciences 2007.

CHAOQUN YAO, M.D. Tongji Medical University, China 1986; Ph.D. University of Georgia 1995; Assistant Professor of Veterinary Sciences 2008.

Adjunct Professors:

BARBARA S. DROLET, B.S. University of Wyoming 1986; M.S. 1989; Ph.D. Oregon State University 1994; Adjunct Professor of Veterinary Sciences 2002.

ROBERT P. ELLIS, B.S. University of Wyoming 1966; M.S. Purdue University 1969; Ph.D. 1972; Adjunct Professor of Veterinary Sciences 2003.

GEOFFREY J. LETCHWORTH, B.S. Trinity College 1965; D.V.M. New York State College of Veterinary Medicine 1972; Ph.D. Cornell University 1980; Adjunct Professor of Veterinary Sciences 2001.

LESLIE W. WOODS, B.A. University of San Diego 1977; D.V.M. University of California-Davis 1982; Ph.D. University of California 1996; Adjunct Associate Professor of Veterinary Sciences 2007.

Adjunct Associate Professor:

MIKE MILLER, B.S. Colorado State University 1980; D.V.M. 1985; Ph.D. 1989; Adjunct Associate Professor of Veterinary Sciences 2005.

Adjunct Assistant Professor:

KRISTINE E. BENNETT, B.A. Kalamazoo College 1995; Ph.D. Colorado State University 2003; Adjunct Assistant Professor of Veterinary Sciences 2006.

WALTER E. COOK, B.S. California Polytechnic State University 1989; D.V.M. University of California 1994; Ph.D. University of Wyoming 1999; Adjunct Assistant Professor of Veterinary Sciences 2003.

R. SCOTT SEVILLE, B.S. San Diego State University 1981; M.S. University of Wyoming 1987; Ph.D. 1992; Adjunct Assistant Professor of Veterinary Sciences 1998.

CYNTHIA M. TATE, B.S. Virginia Polytechnic and State University 1995; D.V.M. Virginia-Maryland Regional College of Veterinary Medicine 2000; Ph.D. University of Georgia 2005; Adjunct Assistant Professor of Veterinary Sciences 2006.

The Department of Veterinary Sciences offers advanced study leading to the master of science and doctor of philosophy in animal and veterinary science. Areas of emphasis include: pathology, molecular diagnostics, bacteriology, virology, parasitology, epidemiology, immunology, and toxicology of wild and domestic animals.

Program Specific Admission Requirements

Open to students with a bachelor of science degree who meet the requirements set forth in this bulletin.

Recommended prerequisites include: chemistry, biochemistry, animal anatomy and physiology, biology, microbiology, and introductory statistics.

Program Specific Degree Requirements

Master of Science

Only offered as Plan A

A minimum of 30 credit hours including 4 thesis hours must be earned in 4000-5999 level courses.

Seminar (PATB 5515) and STAT (5050) or their equivalents are required.

The program of study is arranged with the student's graduate committee.

Doctoral Program

It is a 72 hour program.

Students must meet the university minimum requirements.

Pathobiology (PATB)

5110. Diseases of Food Animals and Horses. 3. Acquaints students with general principles of animal disease. Systematically discusses specific diseases of cattle, sheep, swine and horses. Dual listed with PATB 4110. *Prerequisite:* junior standing or graduate student.

5120. Topics in Pathobiology. 1-4 (Max. 8). Lectures in current pathobiology topics derived from the expertise of the lecturer. *Prerequisite:* 12 hours of biological sciences and consent of instructor.

5130. Mammalian Pathobiology. 3. Anatomical basis of disease in mammals. Emphasis on concepts of pathogenesis of disease, and the gross, microscopic and clinicopathological changes associated with lesions: cell injury and death; cellular degeneration; disturbances of growth and circulation; neoplasia; inflammation; and recognition of gross and microscopic tissue changes. Background in immunology will be beneficial. Dual listed with PATB 4130. *Prerequisites:* C or better in LIFE 2022.

5140. Principles of Toxicology. 3. Toxicology is the study of poisons, their mechanisms of action, and their effects on various organisms including man and domestic animals. Designed to provide students in the life and environmental sciences with an understanding of the principles of toxicology as they apply to animal and human health, food safety and environmental studies. Dual listed with PATB 4140. *Prerequisite:* 9 hrs. biological science (eg. physiology), 4 hrs. chemistry, 3 hrs. biochemistry.

5160. Degeneration and Regeneration in the Nervous System. 2. Important neurodegenerative diseases of man and animals are discussed in terms of: impact on society, clinical findings, pathology, disease mechanisms and potential preventive and treatment strategies. There will be lectures, class discussions and a written project. Cross listed with NEUR 5160. *Prerequisites:* graduate standing.

5170. Diseases of Wildlife. 3. Introduction to wildlife diseases of the Rocky Mountain region and North America. Emphasis on infectious, parasitic, traumatic, toxic, and other disease agents with coverage of mechanisms of disease, epidemiology, and disease impacts on wildlife populations and species. Significant discussion of zoonotic diseases and diseases at the wildlife/domestic animal interface. Dual listed with PATB 4170. *Prerequisites:* 12 hours of biological or zoological sciences.

5220. Molecular Mechanisms of Bacterial Pathogenesis. 3. Intended for students majoring in microbiology or a related field. The class consists of lectures and small group discussions. Student responsibilities will include note-taking and preparation for discussion by completion of reading assignments consisting of classic and/or recent journal articles addressing the weekly topic. Dual listed with PATB 4220; cross listed with MICR 5220. *Prerequisites:* PATB/MICR 2220 and statistics (or epidemiology).

5360. Medical Entomology/Parasitology. 4. Emphasis is on medically important arthropods, protozoa and worms; clinical effects of infection, epidemiology, avoidance/control and identification/diagnosis. Dual listed with PATB 4360. *Prerequisite:* 8 hours of biological science.

5400. Immunology. 4. Biology of the immune system; cellular and molecular mechanisms; host resistance to infectious agents; as well as hypersensitivities, autoimmunity, tumor and tissue rejection. Includes laboratory for immunological techniques. Students are required to complete a term paper and make a presentation. Dual listed with PATB 4400; cross listed with MOLB 5400. *Prerequisite:* MOLB 2220.

5500. Veterinary Parasitology. 3. Biology, importance, diagnosis and control of helminth and protozoan parasites of wild and domestic animals. Arthropod vectors and/or intermediate hosts of helminth & protozoan parasites are included. Diagnostic procedures and identificational familiarity with agents are emphasized in lab. *Prerequisite:* 8 hours of Biological Science.

5505. Investigations in Pathobiology. 1-4 (Max. 8). Research involvement in pathobiology to learn laboratory methods, scientific literature, research design and data analysis and presentation. *Prerequisite:* graduate standing and/or consent of instructor and 16 hours of biological sciences.

5510. Introductory Virology. 3. Prokaryotic and eukaryotic viruses as infectious agents and models for modern molecular biology. Examines concepts and principles of pathogenesis, host response and the regulation of virus-host interactions. Genome organization, structure and replication will be examined within the context of the co-evolution of virus and host. Cross listed with MOLB 4510. *Prerequisite:* MOLB 3610 or 4600 plus 4610.

5515. Advanced Seminar in Pathobiology. 1 (Max. 4). Preparation and presentation of research topics in pathogeology with participation in discussions. *Prerequisite:* graduate standing and/or consent of instructor and 16 hours of biological sciences.

5710. Medical Virology. 3. Human and animal viruses as biological entities. Methods of study, classification, replication strategies, diagnostic approaches, epidemiology and significance as disease agents. Dual listed with PATB 4710. *Prerequisite:* MOLB 2220.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

College of Arts and Sciences

Oliver Walter, Dean
113 Arts and Sciences Building
Phone: (307) 766-4106 FAX: (307) 766-2697
Web site: www.uwyo.edu/a&s

Aims and Objectives

Most departments in the college offer programs leading to graduate degrees, and there are also a number of interdepartmental graduate programs. The advanced degrees available in the college are the doctor of philosophy (Ph.D.), master of science (M.S.), master of arts (M.A.), master of arts in teaching (M.A.T.), master of science in teaching (M.S.T.), master of music (M.M.) master of music education (M.M.Ed.), master of planning (M.P.), master of fine arts (M.F.A.) and master of public administration (M.P.A.). The degrees and various options offered in the college are given below:

Master of Arts
- American studies
- Anthropology
- Communication
- English
- French
- Geography
- Geography/Water Resources
- German
- History
- International studies
- Mathematics
- Philosophy
- Political science
- Psychology
- Psychology/Early Childhood Development
- Sociology
- Spanish

Master of Science
- Botany
- Botany/Water Resources
- Chemistry
- Geology
- Geology/Water Resources
- Geophysics
- Mathematics
- Natural Science
- Physics
- Psychology
- Psychology/Early Childhood Development
- Statistics
- Zoology and Physiology
- Zoology and Physiology/Water Resources

Master of Arts in Teaching
- History
- Mathematics

Master of Fine Arts
- Creative writing

Master of Science in Teaching
- Chemistry
- Geography
- Mathematics
- Natural science
- Physics

Master of Music

Master of Music Education

Master of Planning
- Planning (community and regional)

Master of Public Administration

Doctor of Philosophy
- Anthropology
- Botany
- Chemistry
- Geology
- Geophysics
- Mathematics
- Neuroscience
- Physics
- Psychology
- Reproductive biology
- Statistics
- Zoology and physiology

Graduate Minors in Arts and Sciences
- American Indian Studies
- Statistics
- Women's studies

Arts and Sciences (AS)

Please see the General Bulletin for courses listed at the 4000-level

African American and Diaspora Studies

111 Ross Hall, 766-2481
Director: Gracie Lawson-Borders
Web site: www.uwyo.edu/AAST

Professor:
JACQUELYN BRIDGEMAN, B.A. Stanford University 1996; J.D. University of Chicago 1999; Professor of Law 2008, 2002.

Associate Professors:
GRACIE LAWSON-BORDERS, B.A. Michigan State University 1982; M.A. Northwestern University 1995; Ph.D. Wayne State University 2001; Associate Professor of Communication and Journalism 2006.
TRACEY OWENS PATTON, B.A. Colorado State University 1993; M.A. 1996; Ph.D. University of Utah 2000; Associate Professor of Communication and Journalism, and African American Studies 2006, 2003.

Assistant Professors:
ULRICH ADELT, M.A. University of Hamburg, Germany 2000; Ph.D. University of Iowa 2007. Assistant Professor of African American Studies 2009.
DEBORAH L. MCGRIFF, B.S. University of Nebraska-Lincoln 1976; M.S.W. University of Nebraska-Omaha 1981; Ph.D. University of Wyoming 1999; Assistant Professor of Counselor Education 2002.

Visiting Assistant Professor:
AIMEE GLOCKE, B.A. University of Wisconsin-LaCrosse 1999; M.A. University of California-Los Angeles 2001; Ph.D. Temple University 2008.

Lecturers:
KENDRA M. GAGE, B.A. University of Oklahoma 1998; M.S. 2001.
MARY GATUA, B.S. Ithaca College 2004; M.A. University of Wyoming 2007.
ROBERT W. INGRAM, B.A. University of Wyoming 2001; J.D. 2004.
GATUA WA MBUGWA,B.A. University of California Santa Cruz 1997; M.P.S. Cornell University 2001; M.S. 2003; Ph.D. University of Wyoming 2008.

At present, no program for graduate degrees in African American studies is offered; however, some courses may be counted at the graduate level.

African American Studies (AAST)

5160. African American Rhetoric. 3. African American discourse and its relationship to equality and participation. Using the struggle of African Americans as an instructive exemplar, it comes to terms with the philosophical concepts, political issues, moral complexities, and discursive characteristics of African American rhetoric. Dual listed with AAST 4160; cross listed with COJO 5160. *Prerequisite:* consent of instructor.

American Indian Studies

115 Ross Hall, 766-6521
Web site: www.uwyo.edu/AIST
Director: Judith A. Antell

Adjunct Faculty:
(See bulletin section following name for academic credentials.)

Adrian Bantjes, history
William Bauer, history
William Gribb, geography
Michael Harkin, anthropology
Jeanne E. Holland, English
Pamela Innes, anthropology
Angela Jaime, educational studies
Jeffrey Means, history
Caskey Russell, English

Senior Lecturer:
JUDITH A. ANTELL, B.S. Mankato State University 1970; M.A. University of California-Santa Barbara 1974; Ph.D. University of California-Berkeley 1989; Director of American Indian Studies 1993; Senior Lecturer in American Indian Studies 2000.

American Indian Studies (AIST) offers a graduate minor comprised of 12 hours with at least 6 hours at the 5000 level. It is expected that each graduate minor student and his/her graduate committee, at least one member of which will be from American Indian Studies, will determine the specific courses to be taken. It is recommended that one of the four classes selected be a 3 credit AIST 5000 Independent Study. This class will provide a research experience in the discipline of American Indian Studies that may support a master's thesis or doctoral dissertation. The research expectation in AIST can be satisfied by the 3 credit hour Independent Study and/or by the thesis or doctoral dissertation. Additional information about the graduate minor can be obtained from the American Indian Studies Web page.

American Indian Studies (AIST)

5000. Independent Study. 1-4 (Max. 4). Conference course to permit students opportunity for directed and independent study in American Indian issues. *Prerequisite:* graduate standing and consent of instructor.

5110. Foundations of American Indian Education. 3. Examines cultural, geographical, linguistic, spiritual, political, and societal factors before, during, and after colonization of the Americas. Definitions and day-to-day realities of terms like ethnocentrism, cultural relativism, assimilation, acculturation, and institutional racism. Development of insights into positive teacher-pupil-community relationships that honor culture and language differences and enhance achievement. Dual listed with AIST 4110; cross listed with EDCI 5110. *Prerequisite:* AIST 1001 and 15 credit hours of AIST or EDST.

5121. History and Philosophy of American Indian Education. 3. Addresses the history of Indian education in the U.S. and Canada and examines missionary initiatives, government programs, and tribal efforts. Review of documentary accounts of Native education, review autobiographical accounts of Native teachers and children. We will develop insight necessary for development of appropriate teaching methods and materials. Cross listed with EDCI 5121. *Prerequisite:* post-Baccalaureate status.

5130. Cultural Foundations of American Indian Education. 3. In-depth study and analysis of the educational experiences of American Indians, focusing on contemporary educational issues and experiences, examining the impacts of cultural orientations, stereotypes, bias, and other issues on the educational attainment of American Indian students. Critique instructional practices and programs developed addressing the needs of American Indian students. Cross Listed with EDCI 5130. *Prerequisite:* post-Baccalaureate status.

5141. Instructional Methods of American Indian Education. 3. Addresses culturally responsive methodologies for teaching American Indian students, reviews documentary accounts of Native education and autobiographical accounts of Native teachers and children, develops appreciation of the complexity and difficulties of Native education. We will acquire insight necessary for development of appropriate teaching methods and materials. Cross listed with EDCI 5141. *Prerequisite:* post-Baccalaureate status.

5360. American Indian Women. 3. Explores the lives of American Indian women in a variety of contexts through time. The complexity and diversity of Indian women's experiences throughout history are emphasized. Concerns Indian women's lives within the reality of European American colonization and its consequences for Indian peoples. Dual listed with AIST 4360; cross-listed with WMST/SOC 5360. *Prerequisite:* 6 hours of 2000-level AIST courses.

5462. American Indian History to 1783. 3. Surveys the history of American Indians from the period before contact to the end of the American Revolution. Examines the various contacts between American Indians and Europeans and considers what the American Revolution meant to the continent's Native peoples. Dual listed with AIST 4462; cross listed with HIST 5462. *Prerequisite:* HIST/AIST 2290.

5463. American Indian History to 1890. 3. Surveys the history of American Indians during the era of westward expansion. Examines the impact of American westward movement and also the manifold changes that accompanied Indians moving west. Dual listed with AIST 4463; cross listed with HIST 5463. *Prerequisite:* HIST/AIST 2290.

5464. American Indian History in the 20th Century. 3. Surveys the history of American Indians during the twentieth century. Examines the development of new cultural, social, and political forms that help create an American Indian identity. Dual listed with AIST 4464; cross listed with HIST 5464. *Prerequisites:* HIST/AIST 2290.

5466. American Indian Ethnohistory. 3. Surveys ethnohistorical methods and concepts and provides students concrete opportunities to use these methodologies in writing exercises. American Indian ethnohistory explores Native American experiences within their own cultural contexts. Dual listed with AIST 4466; cross listed with HIST 5466. *Prerequisite:* ANTH/AIST 2210 or HIST/AIST 2290.

5468. American Indians in the West. 3. One of the defining features of the North American West is the presence of American Indians. Through the discussion of varied readings and primary document research, the history of American Indians in the West is examined, with particular emphasis on the Great Plains and California. Dual listed with AIST 4468; cross listed with HIST 5468. *Prerequisites:* HIST/AIST 2290.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

American Studies

Cooper House, 766-3898
FAX: (307) 766-3700
Web site: www.uwyo.edu/ams
Director: Eric J. Sandeen

Professors:

JOHN D. DORST, B.A. Oberlin College 1974; M.A. University of California-Berkeley 1977; Ph.D. University of Pennsylvania 1983; Professor of American Studies 1996, 1989.

ERIC J. SANDEEN, B.A. University of Notre Dame 1970; M.A. University of Iowa 1976; Ph.D. 1977; Director of American Studies 1982; Professor of American Studies 1994, 1982.

Associate Professor:

FRIEDA E. KNOBLOCH, B.A. Cornell University 1985; Ph.D. University of Minnesota 1994; Associate Professor of American Studies 2003.

Adjunct Faculty:

(see Bulletin section following name for academic credentials)

R. McGreggor Cawley, political science
Barbara Chatton, library science
Lewis Dabney, English
Colleen Denney, art
William J. Gribb, geography
Michael Harkin, anthropology
Beth Loffreda, English
William H. Moore, history
Philip J. Roberts, history
David Romtvedt, English
Audrey Shalinsky, anthropology
Robert Torry, English

American Studies Council:

Barbara Chatton (education)
Beth Loffreda (English)
Philip Roberts (history)

The program offers an interdisciplinary course of study leading to the master of arts degree. The program also supports a historic preservation concentration that involves studio courses and field experience. Other specific paths through the American Studies curriculum are tailored to the needs of the students. Semester exchange programs reinforce an international perspective on American culture.

Program Specific Admission Requirements

A significant writing sample (usually a seminar paper or, for those coming from technical fields, a major report) that demonstrates potential for graduate study.

Peace Corps Fellows applicants should identify themselves at the beginning of the admissions process so that materials specific to this program for Returned Peace Corps Volunteers can be introduced into the application process.

Program Specific Degree Requirements

Degree requirements based on university minimum requirements.

American Studies (AMST)

5010. Independent Study. 1-6 (Max. 6). For graduate students in any graduate program who can benefit from independent research and writing in American Studies. Dual listed with AMST 4010. *Prerequisites:* 3 hours in American Studies and consent of instructor.

5020. American Follklife. 3. Introduces materials and methods of folklife research, examining both verbal and nonverbal expressions of traditional cultures in America. Topics include material culture, belief systems, traditional events and celebrations, and folk performances of many kinds. Dual listed with AMST 4020. *Prerequisites:* any six hours from among: AMST 2010, ENGL 2400, AIST 2340, AAST 2450, 2730, 3000 or 3010.

5030. Ecology of Knowledge. 3. Examines the development of "disciplines" and explores definitions, theories, methods and practices of interdisciplinary work. Dual listed with AMST 4030. *Prerequisite:* graduate status.

5200. Material Culture. 3. Designed to introduce advanced students to the theory, methods, and practice of material culture study. A significant portion of the course will be devoted to a studio exercise in which students collectively document and analyze a material culture form that has been designated by the instructors. *Prerequisite:* graduate standing or consent of instructor.

5300. American Culture and the Public Sector. 3. A survey of American culture studies in the public sector. Topics covered include the history and theory of public sector humanities and social sciences, types of public sector jobs and institutions where public humanists work, and public sector work in specific disciplines such as history, anthropology, folklore, archaeology, and art history. Dual listed with AMST 4300. *Prerequisite:* graduate status.

5400. American Built Environment. 3. Examination of America's built environment from pre-Colonial times to the present day. Factors affecting the architecture and built form of a given period are discussed together with what the material legacy says about the culture of the period. *Prerequisite:* ARE 3020.

5500. Topics in American Studies. 3. Selected problems in the theory, practice, and bibliography of American studies. Required of graduate majors in the program and is recommended for students with an interdisciplinary interest in American Culture. *Prerequisites:* survey knowledge of American literature and history; graduate standing or consent of instructor.

5510. Readings in American Studies. 3. Selected readings in the theory, practice, and bibliography of American Studies. Surveys scholarship in the field and is designed to help graduate students develop thesis topics. *Prerequisites:* graduate standing in American studies or related field; consent of instructor.

5550. Varieties of Literary Evidence. 3. Selected problems in the use of literary evidence for American studies scholarship. *Prerequisites:* graduate standing in American studies or a related field; consent of instructor.

5600. Conservation Principles. 3. Designed to acquaint students with the sources of deterioration and decay in building materials and systems and the mitigation of those effects. Current methods of evaluating and ameliorating building deterioration are developed in the laboratory component. Prerequisite: ARE 2200.

5800. Historic Preservation. 3. Review of the roots of historic preservation in Western culture with an emphasis on the historical and legal context of architectural conservation in America. Current issues in preservation are examined through case studies and guest presentations. Dual listed with AMST 4800. *Prerequisite:* ARE 3020 or AMST 5400.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Anthropology

106 Anthropology Building, 766-5136
FAX: (307) 766-2473
Web site: www.uwyo.edu/anthropology
Department Chair: Michael E. Harkin

Professors:
MICHAEL E. HARKIN, B.A. University of North Carolina 1980; A.M. University of Chicago 1984; Ph.D. 1988; Professor of Anthropology 2003, 1993.
ROBERT L. KELLY, B.A. Cornell University 1978; M.A. University of New Mexico 1980; Ph.D. University of Michigan 1985; Professor of Anthropology 1997.
MARCEL KORNFELD, B.A. University of New Mexico 1974; M.A. University of Wyoming 1982; Ph.D. University of Massachusetts-Amherst 1994; Professor of Anthropology 2008, 1996.
MARY LOU LARSON, B.A. University of Wyoming 1976; M.A. University of California-Santa Barbara 1982; Ph.D. 1990; Professor of Anthropology 2007, 1996.
LIN A. POYER, B.A. Bucknell University 1975; M.A. University of Michigan 1978; Ph.D. 1983; Professor of Anthropology 2003, 1997.
AUDREY C. SHALINSKY, B.A. University of Chicago 1973; M.A. Harvard University 1975; Ph.D. 1979; Professor of Anthropology 1991, 1980.

Associate Professors:
JAMES AHERN, B.A. Beloit College 1991; M.A. Northern Illinois University 1993; Ph.D. University of Michigan 1998; Associate Professor of Anthropology 2006, 2000.
PAMELA INNES, B.A. Bryn Mawr College 1986; M.A. University of Oklahoma 1992; Ph.D. 1997; Associate Professor of Anthropology 2007, 2001.
CHARLES A. REHER, B.A. University of Wyoming 1970; M.A. 1971; Ph.D. University of New Mexico 1978; Associate Professor of Anthropology 1985, 1978.
SARAH STRAUSS, A.B. Dartmouth College 1984; M.P.H. San Jose State University 1987; Ph.D. University of Pennsylvania 1997; Associate Professor of Anthropology 2004, 1997.

Assistant Professors:
ADAM HENNE, B.A. Drew University 1997; M.Sc. University of Georgia 2008; Ph.D. 2008; Assistant Professor of Anthropology 2008.
MELISSA MURPHY, B.A. Haverford College 1994; Ph.D. University of Pennsylvania 2004; Assistant Professor of Anthropology 2008.
TODD SUROVELL, B.S. University of Wisconsin-Madison 1995; M.A. University of Arizona 1998; Ph.D. 2003; Assistant Professor of Anthropology 2003.
NICOLE WAGUESPACK, B.A. Colorado State University 1996; M.A. University of Wyoming 1999; Ph.D. University of Arizona 2003; Assistant Professor of Anthropology 2003.

Adjunct Faculty:
Eckles, Francis, Gamst, Kunselman, Loendorf, Miller, Monaghan, Nelson, Pickering, Rogers, Shaul, Walker, Wingerd

Academic Professional Research Scientist:
Rick Weathermon

Professors Emeriti:
George C. Frison, George W. Gill

The department offers programs of study leading to Master of Arts and Doctor of Philosophy degrees in Anthropology.

Program Specific Admission Requirements

Master's Program

Master ofDeadline for application is March 1 for the following fall.

See graduate admission requirements.

Send letter of intent, resume, and copies of GRE scores and transcripts directly to department.

In the letter of intent, students should describe their interests, career goals, and how Wyoming's program will help them achieve these goals.

The Department of Anthropology requires that at least two of the recommendation letters be from academic supervisors or instructors; send directly to department.

Students must present evidence of a satisfactory background in anthropology, which generally would be the equivalent of an undergraduate major in anthropology. Students must have three semesters of a single foreign language or equivalent, and one semester of statistics. In those instances in which the undergraduate background of the student is deficient, the department reserves the right to prescribe course work that would correct such deficiencies.

The M.A. program is designed to be completed in two full years of graduate study. Appropriate allowance will be made for part-time students.

Doctoral Program

Deadline for application is January 15 for the following fall.

See graduate admission requirements.

Send letter of intent, resume, and copies of GRE scores and transcripts directly to department.

In the letter of intent, students should identify whom they would like as their faculty adviser and describe their interests, career goals, and how Wyoming's program will help them achieve these goals.

Note: Composite GRE score of 1100 is required (1200 preferred).

For admission to the Ph.D. program, students must have course work in the four sub-fields of anthropology, three semesters of a single foreign language, and statistical competency at either the B.A. or M.A. level. If these are not satisfied, the student's faculty adviser in coordination with the student's graduate committee assigns remedial work as appropriate.

Students with a master's degree may apply directly to the Ph.D. program.

Students with a bachelor's degree may apply to the Ph.D. program. If admitted, students are expected to complete the master's degree requirements following the Plan A or Plan B option before formal admission to the Ph.D. program. At the hearing for the Plan B paper, the student will receive a no pass, pass-terminate at the master's degree, or a pass-admit to the Ph.D. program.

Students admitted to the department's M.A. program are not guaranteed admission to the Ph.D. program.

Program Specific Graduate Assistantships

Doctoral students generally receive two years of assistantships. First semester, first year MA students are generally not awarded assistantships; however, the department occasionally does make exceptions. MA students are eligible to apply for assistantships beginning in the second semester.

Assistantships are awarded through a departmental application process. An application form, cover letter, and resume are required.

Information and deadlines may be obtained in the department office.

Failure to pass the M.A. oral exam in the third semester may mean the student is not eligible for an assistantship.

Program Specific Degree Requirements

Master's Program Plan A (thesis)

See university minimum requirements.

Completion, with a grade of "B" or better of a four core-course sequence. This sequence will consist of ANTH 5010, 20th Century Anthropological Thought; ANTH 5020, Biological Anthropology; ANTH 5015, Archaeological Theory and Method; and ANTH 5030, Linguistic Anthropology.

Successful completion of an hour-long oral exam early in the third semester (or after completion of the four core-course sequence). In the first semester the student will be given a list of questions pertaining to the four anthropology subfields. This list will constitute the bulk of discussion at the third semester meeting. While this list is not exhaustive, the ability to answer all of the questions on it is necessary preparation for the exam. First week of the third semester the student will hand in a three page statement that

integrates three of the four subfields in light of the student's research interests; these will be read by the faculty members participating in the oral exam. If the student does not receive a passing grade for the oral exam, it can be repeated once at the end of that semester.

If not completed prior to admission; three semesters of a single foreign language and one statistics course.

Plan B (non-thesis)

See university minimum requirements.

If not completed prior to admission; three semesters of a single foreign language and one statistics course.

Doctoral Program

See university minimum requirements.

A minimum of six content courses (18 hours) designed by the student's committee. These courses are normally completed in the first two years of the Ph.D. program. In addition to anthropology courses, the committee may also require 4000/5000 level courses in such areas as geography, geology, zoology, botany, statistics, and others.

Two additional courses in their first or second year: ANTH 5880, Professionalism in Anthropology and ANTH 5890, Teaching and Learning in Anthropology (6 hours).

Teaching experience, including stand-alone courses as well as teaching assistance to UW faculty members.

Participation in an approved internship experience (6-24 credit hours). Students pursue internships in state and federal agencies, museums, contract archaeology organizations, and other organizations that offer potential career experience.

Preliminary exams, which take place at the end of the second year. After the student passes the exams, s/he is admitted to candidacy.

Successful completion of a prospectus.

International experience is highly recommended but not required, e.g. pre-dissertation summer fieldwork.

Student maintains a portfolio which documents teaching, internship, and research experience.

Students are encouraged to present papers at professional conferences and submit articles for publication before beginning work on the dissertation. After admission to candidacy, the student is expected to research, write, and defend a thesis based on original research (up to 48 credit hours). Students may either submit a single thesis or a series of integrated publishable articles (30-40) pages each. The student's committee must approve this choice and decide on the number, length and content of the articles at the same time as the prospectus hearing.

Anthropology (ANTH)

5000. Special Problems. 1-4 (Max. 12). Conference course to allow graduate students opportunity for both guided and independent research. *Prerequisite:* graduate standing and consent of instructor.

5005. Graduate Seminar in Anthropology. 3. *Prerequisite:* graduate standing or consent of instructor.

5010. 20th Century Anthropology Theory. 3. Examines major thinkers and schools of thought in anthropology of the 20th century. Emphasis is on cultural theory within the context of the four-field approach. *Prerequisite:* graduate standing in anthropology.

5015. Archaeological Theory and Methods. 3. Introduces the students to past and present archaeological theories through a literature survey of most significant topics. Addresses questions, such as: How do archaeologists go about identifying and solving problems? What do they perceive to be problems? What is the logic of archaeological arguments? Dual listed with ANTH 4015. *Prerequisite:* ANTH 1200, 1300, 3310, and at least one 4000 regional course.

5020. Biological Anthropology. 3. Offers a graduate level overview of biological anthropology. Beginning with the history of relevant areas of human biology, provides extensive discussion of such areas as paleoanthropology, primatology, and human variation. Also includes detailed theoretical examinations of topics within hominid evolution, the concept of race and sociobiology. *Prerequisite:* first year anthropology graduate student standing.

5030. Linguistic Anthropology. 3. Demonstrates interrelationships between language, human biology, and culture. In particular, the relevance of the study of language to biological anthropology, archaeology, and cultural anthropology is emphasized. Examines classic approaches in anthropological linguistics and recent controversies such as the origin of language in human evolution.

5110. Zooarchaeology I. 3. An introductory level seminar in the archaeological analysis of faunal materials. Emphasis is on the identification and curation of bones from archaeological and Late Pleistocene paleontological contexts, including their use in the interpretation of prehistoric and historic human behavior, the investigation of paleoenvironmental conditions and paleoecological relationships and problem-oriented taphonomic research. Dual listed with ANTH 4110. *Prerequisite:* ANTH 1300.

5111. Zooarchaeology II. 3. An advanced level seminar in the archeological analysis of faunal materials. Emphasis is on the study of bones as an integrated component of basic archaeological research, including their use in the investigation of paleoenvironmental conditions and paleoecological relationships as well as problem-oriented taphonomic research, and the interpretation of human behavior. Dual listed ANTH 4111. *Prerequisite:* ANTH 4110/5110.

5115. Lithic Analysis. 3. An overview of the analysis of stone tools and waste flakes from archaeological sites. Emphasizes appropriate use of typology and methods of debitage analysis. Dual listed with ANTH 4115. *Prerequisite:* ANTH 1300 and 9 additional hours in anthropology.

5116. Advanced Lithic Analysis. 3. An in depth consideration of a single or limited range of topics in lithic analysis, or a group project focused on a case study. Dual listed with ANTH 4116. *Prerequisite:* ANTH 4115.

5120. North American Archaeology. 3. Studies North American prehistory from the earliest evidence to historical times. Dual listed with ANTH 4120. *Prerequisite:* ANTH 1300 or consent of instructor.

5125. Northwestern Plains Prehistory. 3. Covers the Northwestern Plains from the Paleo-Indian to historic contact, including relationships to surrounding areas. Dual listed with ANTH 4125. *Prerequisite:* ANTH 1100, 1200, 1300.

5130. Old World Archaeology. 3. Survey of the major archaeological sequences of the Old World. Dual listed with ANTH 4130. *Prerequisite:* ANTH 1300.

5135. Quantitative Methods in Anthropology. 3. A consideration of the use of quantitative methods in anthropological research, including descriptive and inferential statistics, pattern search, mathematical modeling and computer simulation. Dual listed with ANTH 4135. Prerequisites: STAT 2070 or comparable course.

5150. Seminar in Prehistory. 1-3 (Max 9). Covers the prehistory of a specified region or time period within that region. emphasizes learning prehistoric sequences, material culture, and research questions associated with the topic. Topics include, but are not limited to, Paleoindian, Arachaic, Siberian, Northern Plains, Great Basin, Rocky Mountain, or Southwestern Archaeology. Dual listed with ANTH 4150. *Prerequisite:* ANTH 1300.

5160. GIS in Anthropology. 1-4 (Max. 4). Introduction to how and why geographic information systems (GIS) are used in anthropology. Considers: 1) Background, definitions, and concepts of geographic data and GIS; 2) Anthropological and archaeological approaches to GIS; and 3) Hands-on experience with GIS applications in archaeology through demonstrations, lectures, and structured inquires. Dual listed with ANTH 4160. *Prerequisite:* ANTH 1200, 1300, 3310.

5165. Advance Archaeological Research. 3-6 (Max. 6). Intended for graduate students in archeology which will cover a wide range of topics in advanced research techniques. *Prerequisite:* graduate standing.

5170. Geoarchaeology. 3. Introduces students to theory and method in geoarchaeological research. Emphasis is placed upon geomorphological processes of archaelogical site formation and paleoenvironmental reconstruction. Dual listed with ANTH 4170. Prerequisite: ANTH 1300 or consent of instructor.

5180. Advanced Archaeological Field Studies. 6. Covers the entire archaeological process from project planning and budgeting to professional presentation of the results with an emphasis on field methods. Up to date field techniques with electronic data collection and analysis are introduced. Interdisciplinary philosophy is emphasized with lectures, demonstrations and hand-on experience. *Prerequisite:* graduate level students or upper level undergraduates with field school experience and consent of instructor.

5190. Public Archaeology. 3. A consideration of archaeological legislation, policies, and regulations; compliance, heritage, and avocational archaeology; cultural resource management; curation; and professional archaeological ethics. Dual listed with ANTH 4190. *Prerequisites:* ANTH 1300.

5210. Human Osteology. 3. Provides a detailed study of the human skeleton. Dual listed with ANTH 4210; cross listed with ZOO 5210. *Prerequisite:* ANTH 1100, LIFE 2020 and consent of instructor.

5215. Evolution and Hominid Fossils. 3. Surveys hominid fossil record in the context of evolutionary process, stressing structure-function and the dynamics of adaptive responses. Dual listed with ANTH 4215. *Prerequisite:* ANTH 1100, LIFE 2020.

5220. Human Variation. 3. Studies age and sex differences, as well as race as a biological phenomenon. Includes origin and distribution of human races and the adaptive significance of racial traits. Dual listed with ANTH 4220. *Prerequisite:* ANTH 1100.

5230. Forensic Anthropology. 3. Introduces methods and purposes of physical anthropology as applied in human identification for law enforcement agencies. Dual listed with ANTH 4230; cross listed with CRMJ 5230. *Prerequisite:* ANTH 1100.

5240. Forensic Anthr Laboratory. 2. Studies details of advanced osteometric procedures, particularly as applied to problems of human skeletal identification. Dual listed with ANTH 4240. *Prerequisite:* ANTH 4210.

5300. Anthropology of Religion. 3. Provides a comparative anthropological study of religious systems emphasizing analysis of symbolism, myth, and ritual. Dual listed with ANTH 4300. *Prerequisite:* ANTH 1200.

5310. Environmental Anthropology. 3. Addresses how human societies interact with their surroundings, emphasizing cultural understandings of the environment. Introduces variety of theoretical and methodological approaches to topics ranging from problems of the American West to global environmental change. Dual listed with ANTH 4310. *Prerequisite:* ANTH 1200.

5315. Human Behavioral Ecology. 3. Critically examines the evolutionary paradigm in anthropology, from the 19th century to current manifestations of neoevolutionism, with emphasis on behavioral ecology as it is applied to hunting and gathering societies. Dual listed with ANTH 4315. *Prerequisite:* ANTH 1100, 1200, and 1300.

5320. Political Anthropology. 3. Encompasses theories and descriptions of relationships between power and society in both less formal tribal contexts and more highly structured political institutions.

5325. Symbolic Anthropology. 3. Teaches several anthropological approaches to symbolic and cultural analysis, while reading ethnographic examples of how symbolic analysis can be used to understand different cultures. Coursework assumes a basic knowledge of social science concepts. Dual listed with ANTH 4325. *Prerequisite:* ANTH 1200 or SOC 1000.

5340. Culture Change. 3. Examines representative theories of change, factors involved, dynamics of modernization and applied anthropology. Dual listed with ANTH 4340. *Prerequisite:* ANTH 1200.

5350. Medical Anthropology. 3. Understandings of health and illness vary widely. Taking a comparative historical approach, this class examines how an individual's interactions with sociocultural and physical environments influence the experiences of health and illness. Topics include symbolic healing, biomedicine as a cultural system, disease and international development, and the global politics of AIDS and other pandemics. Dual listed with ANTH 4350. *Prerequisites:* ANTH 1200, SOC 1000.

5360. Psychological Anthropology. 3. Introduces methods and theories anthropologists use to analyze personality, socialization, mental illness and cognition in non-western societies. Dual listed with ANTH 4360. *Prerequisite:* ANTH 1200.

5380. Visual Anthropology. 3. Offers anthropological interpretation of visual representations and media, including analysis of the development of ethnographic films and their contemporary use. Visual representations of many cultures as well as mainstream United States examples are analyzed. Dual listed with ANTH 4380. *Prerequisite:* ANTH 1200.

5390. Field Methods in Cultural Anthropology. 3. Introduces the graduate student to the research techniques used by cultural anthropologists. Students will conduct their own projects using participant-observation and interviewing. In-class discussion will be drawn on U.S. and international ethnographic examples. *Prerequisite:* graduate standing.

5720. Advanced Linguistics. 3. Data are offered for analysis of morphological and syntactic materials from languages throughout the world. Attention is given to the limits within which these aspects of human language appear to vary. *Prerequisite:* ANTH 4750, ENGL 4750, LANG 4750.

5730. Field Techniques. 3. Students work directly with the speaker of an unwritten non-Indo-European language to learn techniques for eliciting the data requisite to begin a description of the language's structure. Identical to LANG 5310. *Prerequisite:* ANTH 5100 or LANG 5300.

5740. North American Language and Culture. 3. Demonstrates the interrelationship of language and culture in several Native American communities. Examines anthropological and linguistic theories regarding language spread and the peopling of North America, narrative performance, translation, and the connection between linguistic structures and cultural features. Dual listed with ANTH 4740 and AIST 4740. *Prerequisite:* ANTH 2000 or ANTH 4760.

5795. Language Change. 3. Considers how languages change over time, due to both internal and external forces. The effects of language contact, borrowing, and structural change will be discussed. The use of linguistic data for questions of migration and cultural contact also will be explored. Dual listed with ANTH 4795. *Prerequisites:* ANTH 2000 and ANTH/ENGL/LANG 3750/4750.

5875. Graduate Practicum. 1-4 (Max. 6). Affords graduate students the opportunity to extend research projects in field or lab locations and receive additional credit for their work. Students sign up for these hours only in conjunction with another course and with the instructor's consent. *Prerequisite:* graduate standing and consent of instructor.

5880. Professionalism. 3. Provides an opportunity for the integration of graduate training and career choice. Examines issues of professionalism in the discipline ranging from ethical conduct to the research process and publication. *Prerequisite:* admission to the doctoral program in anthropology.

5890. Teaching Anthropology. 3. Anthropology is increasingly relevant to many audiences. Provides practical insight and examination of controversial anthropological concepts - race, evolution, culture, etc., and how these may be taught to college or public audience. Also examines the teaching culture of anthropology as a discipline. *Prerequisite:* admission to the doctoral program in anthropology.

5900. Practicum in College Teaching. 1-3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies:. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.
5980. Dissertation Research. 1-12 (Max. 14). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.
5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Art

229 Fine Arts Building, 766-3269
FAX: (307) 766-5468
Web site: www.uwyo.edu/art
Department Head: Ricki Klages

Professors:
COLLEEN DENNEY, B.A. Louisiana State University 1981; M.A. 1983; Ph.D. University of Minnesota 1990; Professor of Art 2005, 1990.
MARK RITCHIE, B.F.A. University of Kansas 1986; M.F.A. Indiana University 1990; Professor of Art 2007, 1995.

Associate Professors:
LEAH HARDY, B.F.A. Kansas University 1987; M.F.A. Indiana University 1990; Associate Professor of Art 2009, 2002.
MARGARET HAYDON, B.F.A. Oberlin College 1977; M.F.A. San Francisco State University 1989; Associate Professor of Art 2002.
RICKI KLAGES, B.F.A. University of Arizona 1984; M.A. University of New Mexico 1991; M.F.A. 1993; Associate Professor of Art 2003, 1996.

Assistant Professors:
ASHLEY HOPE CARLISLE, B.F.A. University of South Mississippi 1997; M.F.A. University of Georgia 2002; Assistant Professor of Art 2003.
ELIZABETH HUNT, B.A. Rhodes College 1993; M.A. University of Missouri-Columbia 1996; Ph.D. 2004; Assistant Professor of Art 2006.
DOUG RUSSELL, B.F.A. Columbia College 1990; M.A. University of Iowa 1995; M.F.A. 1996; Assistant Professor of Art 2005.
JENNIFER VENN, B.F.A. Fort Hays State University 2004; M.F.A. 2007; Assistant Professor of Art 2007.

Academic Professional Lecturer:
PATRICK KIKUT, B.F.A. University of Colorado 1990; M.F.A. University of Montana 1994.

Professors Emeriti:
Deaderick, Edwards, Evans, Flach, Forrest, Reif, Russin (Distinguished Professor of Art), Schaefer

At present, no program for a graduate degree in art is offered; however, some courses at the 4000 level may be counted at the graduate level in other degree programs.

Art (ART)

5430. Lo-Tech Ceramics. 3. Exploration of elementary forming, decorating, firing processes developed by various pottery cultures. Examination of basic geology, clay prospecting, kiln design and construction. Includes historical overview and contemporary survey. Dual listed with ART 4430. *Prerequisite:* 12 hours of humanities/GED/USP.
5650. Art and Ideas. 3. Students in this seminar explore the literatures of art. Each seminar has a reading list and a thematic structure. Major critical papers are written during the course of the seminar. Required for M.A. and M.A.T. program Plan B option. *Prerequisite:* 30 hours in art.
5660. Investigations in Art. 1-5 (Max. 10). Research options in all the creative areas. The graduate student is expected to work independently and should provide demonstrated ability and background knowledge to carry out self-directed research or creative activity in the area to be studied. Arrangements regarding curricular obligations and meeting times must be contracted with the instructor in advance of enrollment. *Prerequisite:* completion of all 5000-level course work in the area of investigation.
5670. Term Creative Project. 1-5 (Max. 15). For M.F.A. candidates only; professional creative achievement in painting, drawing, printmaking, ceramics, or sculpture, leading to presentation of graduate exhibition. Typically, student will consult a single professor in major area for crediting this course. *Prerequisite:* admission to candidacy for M.F.A. degree and consent of instructor.
5710. Medieval Art. 3. Studies the unique qualities of art of this intriguing era of transition between classical and renaissance times. Dual listed with ART 4710. *Prerequisite:* Art 1010, 2010.
5740. 20th Century European Art. 3. Studies European art from 1900 to present. Dual listed with ART 4740. *Prerequisite:* ART 2010 and 2020, consent of instructor.
5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.
5990. Internship. 1 - 12. (Max 24). *Prerequisite:* graduate standing.

Botany

114 Aven Nelson Building, 766-2380
FAX: (307) 766-2851
Web site: www.uwyo.edu/botany
Department Head: Steven L. Miller

Professors:
GREGORY K. BROWN, B.S. Colorado State University 1973; M.S. Arizona State University 1978; Ph.D. 1980; Professor of Botany 1997, 1985; Associate Dean of the College of Arts and Sciences 2006.
RONALD L. HARTMAN, B.S. Western Illinois University 1967; M.S. University of Wyoming 1971; Ph.D. University of Texas 1976; Professor of Botany 1988, 1977.
STEPHEN T. JACKSON, B.A. Southern Illinois University at Carbondale 1977; M.S. 1978; Ph.D. Indiana University 1983; Professor of Botany 2001, 1995.
STEVEN L. MILLER, B.S. University of Wyoming 1979; M.S. Virginia Polytechnic Institute and State University 1982; Ph.D. 1985; Professor of Botany 2002, 1990.
WILLIAM A. REINERS, B.A. Knox College 1959; M.S. Rutgers 1962; Ph.D. 1964; Professor of Botany 1983.

Associate Professors:
STEPHEN K. HERBERT, B.S. Seattle Pacific University 1980; M.S. University of Washington 1984; Ph.D. 1988; Associate Professor of Botany 1999.
DAVID WILLIAMS, B.A. The University of Texas, Austin 1985; M.S. Texas A&M University 1988; Ph.D. Washington State University 1992; Associate Professor of Botany 2003.
CYNTHIA WEINIG, B.A. (Hons.) Brown University 1991; Ph.D. Indiana University; Associate Professor of Botany and Molecular Biology 2007.

Assistant Professors:
ALEX BUERKLE, B.A. University of Missouri 1990; Ph.D. Indiana University 1997; Assistant Professor of Botany 2004.
BRENT E. EWERS, B.S. Colorado State University 1995; M.S. Duke University 1997; Ph.D. 1999; Assistant Professor of Botany 2002.
KIONA OGLE, B.S. Northern Arizona State 1997; M.S. Duke University 2003; Ph.D. 2003; Assistant Professor of Botany 2006.
ELISE PENDALL, B.S. Cornell University 1983; M.S. University of California, Berkeley 1989; Ph.D. University of Arizona 1997; Assistant Professor of Botany 2002.
DANIEL B. TINKER, B.S. Ft. Lewis College 1993; M.S. University of Wyoming 1996; Ph.D. 1999; Assistant Professor of Botany 2005.
NAOMI WARD, B.Sc. (Hons.) University of Queensland 1993; Ph.D. University of Warwick 1997; Assistant Professor of Molecular Biology and Botany 2007.

Assistant Lecturers:
KENNETH L. DRIESE, B.S. University of Virginia 1981; M.S. University of Wyoming 1992; Ph.D. 2004; Research Scientist/Assistant Lecturer in Botany 2002.
MARK E. LYFORD, B.A. St. Olaf College 1993; M.S. University of Wyoming 1995; Ph.D. 2001; Assistant Lecturer of Botany 2005; Director of Biology Program.

Professors Emeriti:
Martha Christensen, Dennis H. Knight

The Department of Botany offers graduate programs leading to the master of science and the doctor of philosophy degrees in botany and the master of science degree in botany/water resources.

Program Specific Admission Requirements

Admission based on the university minimum requirements.

Program Specific Degree Requirements

Regardless of field of specialization, all candidates will be held responsible for basic information in the following areas: genetics, physiology, morphology, and evolutionary and environmental botany. A knowledge of chemistry (including organic and elementary biochemistry), physics, calculus, and statistics may be required.

A minimum GPA of 3.0 must be maintained. Any course in which a C (or below) or U is obtained cannot be counted toward the degree requirement.

Participation in seminars will be required of all candidates during their residence at the University of Wyoming.

Master's Program

Requirements for this degree are 26 semester hours of courses approved by the student's committee plus four hours of BOT 5960, Thesis Research.

Doctoral Program

In addition to the minimum requirements set forth in this Bulletin, the Department of Botany may require that a student demonstrate skills in two peripheral areas. This decision is made for individual cases by the major professor and graduate committee. These could include foreign languages, statistics, or computer science. In some cases, additional skills may be required.

Students without a master's degree in a biological science are admitted at the master's level with the provision that the student's status can be reviewed during the first year of studies by the faculty of the department to determine if the student should be allowed to change the academic program to the Ph.D. level.

Botany (BOT)

5000. Graduate Seminar. 1-3 (Max. 6). Selected topics on current research in the botanical sciences. Offered satisfactory/unsatisfactory only. *Prerequisite:* 15 hours of botany or biology.
5111. Remote Sensing. 4. Introduces students to the fundamentals of remote sensing with a strong emphasis on vegetation, land cover and environmental applications. Students learn to use digital spectral data to distinguish characteristics of the terrestrial biosphere important for ecological and land management applications. Dual listed with BOT 4111; cross listed with GEOG 4111/5111. *Prerequisites:* QA and one science course with laboratory.
5130. Applied Remote Sensing for Agricultural Management. 3. Addresses specific applications of remote sensing to cropland and rangeland management. Covers an overview of remote sensing, specific applications or remote sensing for crops and specific applications of remote sensing to range management. The foundation is agriculture-specific remote sensing of green plants. Dual listed with BOT 4130; cross listed with RNEW 5130. *Prerequisites:* QA course and 9 credit hours in student's major field and junior/senior standing.
5150. Research in Remote Sensing. 1-6 (Max. 6). Independent research into problems on the remote sensing of vegetation using satellite technology. *Prerequisite:* graduate standing and consent of instructor.
5211. Advanced Remote Sensing of the Environment. 4. Includes lecture and laboratory. Specific topics include a review of remote sensing fundamentals and methods for using high spatial resolution data, hyperspectral data, active remote sensing, advanced image processing, advanced classification techniques and statistical techniques specific to exploring remotely sensed data. Dual listed with BOT 4211; cross listed with GEOG 5211. *Prerequisite:* BOT/GEOL/GEOG 4111/5111.
5320. Research in Mycology. 1-3 (Max. 6). *Prerequisite:* graduate standing or consent of instructor.
5370. Advanced Fungal Taxonomy and Systematics. 3. Designed to familiarize advanced students with techniques of collecting, identifying and curating higher fungi, and modern systematic methods used to evaluate relationships between taxa. A comparative organismal approach is taken with emphasis on saprophytic and ectomycorrhizal basidiomycetes and ascomycetes. *Prerequisite:* graduate standing, BOT 4300 or equivalent.
5380. Bayesian Data Analysis. 3. Bayesian statistical methods for analyzing data, with emphasis on ecological and biological data. Includes Bayes rule, basic Bayesian formulation (Priors, posteriors, likelihoods), single and multiple-parapmeter models, hierarchicial models, generalized linear models, multivariate models, misture models, models for missing data, merging statisical and process models, and introduction to computation methods. Cross listed with STAT/ECOL 5380. *Prerequisites:* at least 2 semesters of calculus and one semester of statistics.
5390. Fungal Physioogy and Ecology. 3. A comprehensive lecture-seminar-discussion course designed to familiarize advanced students with physiological processes underlying fungal ecology, and modern methods used to study those processes. A comparative organismal approach is taken, involving both symbiotic and saprophytic fungi, with emphasis on ectomycorrhizal and decomposer modes of nutrition in forest ecosystems. Dual listed with BOT 4390. *Prerequisites:* BOT 4300 and one course in plant physiology or ecology.
5400. Plant Physiology. 4. Provides a basic understanding of plant growth and development. Covers water relations, general metabolism, nutrition, and hormonal and environmental controls. Dual listed with BOT 4400. *Prerequisite:* LIFE 2023, CHEM 1010, or 2300, or equivalents.
5420. Research in Physiology. 1-6 (Max. 6). *Prerequisite:* graduate standing and consent of instructor.
5440. Seminar in Plant Biochemistry. 2 (Max. 6). *Prerequisites:* BOT 4400/5400 and MOLB 4210 or equivalents.

5460. Plant Growth and Differentiation. 3. A course designed to provide advanced students specialized study in the hormonal and environmental regulation of plant growth and differentiation, and to provide experience in evaluating original research in this area. *Prerequisite:* BOT 4400 or equivalent.

5480. Spatial Information Sciences Seminar. 1. There are many earth science technologies, remote sensing, GIS and GPS. Synergism among these technologies increase the range of solutions for research and management. This course is a forum for presentation of these solutions or questions requiring solutions. Cross listed with GEOL 5480. *Prerequisite:* a course in remote sensing, GIS, GPS, and graduate standing.

5550. Computational Biology. 4. Introduces concepts and skills that are generally applicable to computational analysis of biological questions. Content is motivated by applied projects that require basic computer programming for analysis. Two computer languages are introduced and utilized. *Prerequisites:* MATH 2200 or STAT 2050 or equivalent; LIFE 1010 or equivalent.

5610. Research in the Taxonomy of Vascular Plants. 1-6 (Max. 6). The University of Wyoming is especially well equipped for research on the classification of native plants. The Rocky Mountain Herbarium offers an abundance of material for study and the library is especially rich in taxonomic literature. Monographic work may be done on an assigned genus or on the plants of a limited area. Cytological, anatomical, and biochemical techniques may be employed in the solution of certain problems. *Prerequisite:* graduate standing and consent of instructor.

5620. Research in Biochemical Systematics. 1-6 (Max. 6). *Prerequisite:* graduate standing and consent of instructor.

5630. Plant Biosystematies. 2. Deals with the taxonomic assessment of the processes, mechanisms, and causes of natural variation in plants and the measurement of natural variation. *Prerequisite:* BOT 4630 and LIFE 3050.

5650. Readings in Plant Systematics. 1 (Max. 6). Centered on readings involving selected topics in the current plant systematics literature. *Prerequisite:* BOT 4630.

5660. Plant Evolution. 2. Designed to acquaint graduate students with theories concerning the processes of plant evolution. *Prerequisite:* LIFE 3050.

5664. Topics: Evolution. 1-4 (Max. 12). Advanced topics in evolutionary geology are engaged by studying primary research and topical syntheses in the current literature. Dual listed with BOT 4664. *Prerequisite:* LIFE 3500 or equivalent.

5665. Research Evolution. 1-6 (Max. 6). *Prerequisites:* graduate standing and consent of instructor.

5670. Phylogeny of Flowering Plants. 2. Covers trends in the evolution of flowering plants. *Prerequisite:* BOT 4630.

5680. Plant Taxonomy. 4. Detailed work in the principles of classification, rules of nomenclature, and literature of systematic botany. The plants of the Rocky Mountain region are used primarily as examples, but the course gives a comprehensive view of the characteristics and relationships of the principal families of vascular plants. Dual listed with BOT 4680. *Prerequisite:* LIFE 2023.

5690. Special Topics in Systematics. 1-4 (Max. 12). Designed to acquaint students with various topics not covered in regular courses. Emphasis is placed on recent developments in the journal literature. *Prerequisite:* BOT 4680 or 5680 or equivalent.

5700. Vegetation Ecology. 4. The ecology of major vegetation types, with emphasis on patterns of vegetation distribution, vegetation-environment relationships, succession, the effect of fire and management decisions, and methods of vegetation analysis. Dual listed with BOT 4700. *Prerequisite:* LIFE 3400.

5710. Research in Ecology. 1-6 (Max. 6). *Prerequisite:* graduate standing and consent of instructor.

5720. Research in Physiological Ecology. 1-6 (Max. 6). *Prerequisite:* graduate standing and consent of instructor.

5730. Plant Physiological Ecology. 4. Acquaints advanced students with environmental factors which affect the establishment and growth of plants. Emphasizes adaptive mechanisms. Lecture with inclusive hands-on laboratory. Dual listed with BOT 4730; cross listed with RNEW 5730. *Prerequisite:* one course in ecology and one in physiology.

5745. Terrestrial Ecosystem Ecology. 3. Advanced course examines fundamental ecosystem functions and their relationship to ecosystem structure using a systems approach. Study cycles of carbon, water and nutrients through ecosystem components with an emphasis on interactions among plants, soil, and the atmosphere. Current readings focus on responses of terrestrial ecosystems to global climate change an human disturbance. Dual listed with BOT 4745. *Prerequisite:* one course in ecology.

5750. Seminar in Ecophysiology. 1-3 (Max. 8). *Prerequisite:* 1 course in physiology and 1 course in ecology.

5756. Ecolological Systems Modeling. 4. Design, implementation, analysis, and interpretation of ecological models. Includes model development, sensitivity analyses, parameterization, uncertainty, and validation. Emphasizes empirical (data-driven) and mechanistic models that encompass a hierarchy of scales and processes. Primary ecological focus is terrestrial systems, including models that span leaf to ecosystem processes. *Prerequisites:* one course each in calculus, statistics and ecology.

5760. Biophysical Ecology. 3. A combination lecture and student seminar course dealing with the biophysical interactions of plants and animals with the environment, including energy balance, temperature and water relations. *Prerequisite:* one course in physiology and one course in ecology.

5775. Forest Ecology. 4. Integrative study of the structure, function, and ecological diversity of forested ecosystems, and the physical factors that influence this diversity, including emergent properties of energy flow and nutrient cycling. Special emphasis is given to understanding forest disturbances and succession, and implications for impacts of management and sustainability are discussed throughout. Dual listed with BOT 4775; cross listed with ECOL/RNEW 5775. P*rerequisites:* LIFE 3400.

5780. Biogeochemistry. 4. A comprehensive treatment of biogeochemistry with emphasis on biogenic elements and biological processes. Reviews occurrence of elements, their behavior in the biosphere, and how their cycles are affected by humans. Dual listed with BOT 4780. *Prerequisites:* a course in organic chemistry.

5790. Special Topics in Ecology. 1-3 (Max. 6). Designed to acquaint advanced students with various topics not covered in other courses. Emphasis is placed on recent developments appearing in the journal literature. Dual listed with BOT 4790. *Prerequisite:* two courses in ecology.

5900. Practicum in College Teaching. 1 - 3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). Provides undergraduate students with academic credit for approved work experiences in the fields of botany and biology. Must be arranged in consultation with a botany faculty member and the work supervisor. Dual listed with BOT 4970. *Prerequisite:* junior or senior standing, 3.0 GPA, declared major in botany or biology, and approval by a botany faculty member and work supervisor.

Chemistry

403 Physical Sciences Building, 766-4363
FAX: (307) 766-2807
Web site: www.uwyo.edu/chemistry
Department Head: Edward Clennan

Professors:
EDWARD L. CLENNAN, B.S. University of Wisconsin-River Falls 1973; Ph.D. University of Wisconsin-Madison 1977; Professor of Chemistry 1989, 1979.
BRUCE A. PARKINSON, B.S. Iowa State University 1972; Ph.D. Carlifornia Institute of Technology 1977; Professor of Chemistry 2008.
DEAN M. RODDICK, B.S. University of California-Berkeley 1979; Ph.D. California Institute of Technology 1984; Professor of Chemistry 1997, 1986.

Associate Professors:
DAVID T. ANDERSON, B.S. George Washington University 1987; Ph.D. Dartmouth College 1993; Associate Professor of Chemistry 2006, 2000.
ROBERT C. CORCORAN, B.S. University of Chicago 1978; Ph.D. Columbia University 1983; Associate Professor of Chemistry 1992.
JOHN O. HOBERG, B.A. Jamestown College 1984; Ph.D. Montana State University 1990; Associate Professor of Chemistry 2004.

Assistant Professors:
MILAN BALAZ, M.S. Comenius University 1999; Ph.D. Université Louis Pasteur 2003; Assistant Professor of Chemistry 2008.
FRANCO BASILE, B.S. University of Wisconsin-Eau Claire 1986; Ph.D. Purdue University 1992; Assistant Professor of Chemistry 2003.
DEBASHIS DUTTA, B. Tech Indian Institute of Technology 1998; Ph.D. University of Notre Dame 2003; Assistant Professor of Chemistry 2006.
JAN KUBELKA, M.S. Charles University of Prague 1996; Ph.D. University of Illinois at Chicago 2002; Assistant Professor of Chemistry 2005.
TERESA LEHMANN DELLA VOLPE, B.S. Universidad Central de Venezuela 1987; Ph.D. University of Minnesota 1997; Assistant Professor of Chemistry 2008.
MARK P. MEHN, B.S. University of Wisconsin - Stevens Point 1997; Ph.D. University of Minnesota 2003; Assistant Professor of Chemistry 2006.
JING ZHOU, B.S. Xiamen University 1997; Ph.D. University of South Carolina 2004; Assistant Professor of Chemistry 2007.

Research Faculty:
NAVAMONEY ARULSAMY, B.Sc. Madurai-Kamaraj University, India 1982; M.Sc. 1986; Ph.D. University of Hyderabad, India 1991; Associate Research Scientist 2008, 2005.
KEITH T. CARRON, B.A. Washington University 1980; M.S. Northwestern University 1981; Ph.D. 1983; Professor of Chemistry 1998, 1988.

Adjunct Professors:
JOHN F. ACKERMAN, B.S. University of Wyoming 1974; Ph.D. Brown University 1976; Adjunct Professor of Chemistry 1996.
YURI DAHNOVSKI, Ph.D. Institute of Chemical Physics, Moscow 1983; Adjunct Professor of Chemistry 2001.
ERIC KURT DOLENCE, B.S. University of Wyoming 1983; Ph.D. University of Kentucky 1987; Adjunct Assistant Professor of Chemistry 2004.

Assistant Lecturer:
CARLA DEE BECKETT, B.S. University of Wyoming 1991; M.S. 2007; Assistant Lecturer of Chemistry 2008.

Senior Lecturer:
PATRICIA A. GOODSON, B.S. University of Alabama 1983; M.S. University of Wisconsin-Madison 1986; Ph.D. University of Wyoming 1990; Senior Lecturer of Chemistry 2008, 1999.

Associate Lecturer:
MICHAEL S. SOMMER, B.A. Queens College, CUNY 1984; M.A. 1985; A.M. Harvard University 1987; Ph.D. 1996; Associate Lecturer of Chemistry 2006, 2001.

Professors Emeritus:
Vernon Archer, R. Owen Asplund, Daniel A. Buttry, Geoffrey Coates, Clyde Edmiston, Anthony Guzzo, Suzanne Harris, Robert Hurtubise, John Maurer, E.G. Meyer, David A. Nelson, Lewis Noe, David Jaeger

The Department of Chemistry offers programs leading to the degrees of master of science and doctor of philosophy chemistry. The master's degree is offered mainly under Plan A with Plan B reserved for special circumstances.

The department also participates in the preparation of students for the degrees of master of science in natural science and master of science in teaching (M.S.T.), which are designed to improve the competence of those engaged in science teaching.

Program Specific Admission Requirements

In addition to the minimum requirements set forth in this Bulletin, the Department of Chemistry requires that a student have taken the following undergraduate courses: one year of general chemistry; one semester/quarter of quantitative analysis; one year of organic chemistry plus laboratory; one year of physical chemistry plus laboratory; one year of physics; and mathematics through multivariable calculus. As appropriate, one or more of these course requirements may be waived at the discretion of the department.

Program Specific Degree Requirements

Master's Program Plan A (thesis)

In addition to fulfilling the minimum university requirements, a student must take one 3 hour course in each of three of the four areas (inorganic, analytical, organic, and physical), excluding special topics and research courses. These courses must be graduate courses, 5000 and above.

A student may also take 9 credits of any combination of CHEM 5190, 5290, 5390, 5590, or 5790.

One departmental seminar is required to be presented on the thesis research.

Doctoral Program

In addition to fulfilling the minimum university requirements, a student must take one 3 hour graduate course (5000 and above) in each of the four areas (inorganic, analytical, organic, and physical), excluding special topics, tool courses 5130, 5320, 5760, and research courses.

A student may also take 12 credits of any combination of CHEM 5190, 5290, 5390, 5590, or 5790.

In the area selected as a major, the student will take the following as a minimum:

1. Analytical - 5250 plus 9 hours of graduate level analytical courses;
2. Inorganic - 12 hours of graduate level inorganic courses;
3. Organic - 5320, 5330, 5340 and 5350;
4. Physical - any three graduate level physical chemistry courses;

Students must obtain satisfactory performance on a series of written major field cumulative examinations, including special topics.

Students must obtain satisfactory performance on a preliminary examination, part written and part oral.

Students must present a seminar based on the dissertation research. Students must also obtain one additional credit of 5000 by presenting a divisional or departmental seminar or an oral presentation at a regional or national research meeting. In addition, students must make one presentation at the annual University of Wyoming Graduate Symposium.

Chemistry (CHEM)

The following courses are offered for S/U credit only: CHEM 5000, CHEM 5150, CHEM 5190, CHEM 5290, CHEM 5310, CHEM 5390, CHEM 5501, CHEM 5590, CHEM 5790, CHEM 5900, CHEM 5920, CHEM 5940, CHEM 5960, CHEM 5980, and special sections of CHEM 5100, CHEM 5200, CHEM 5300, and CHEM 5500 offered during Summer Session.

5000. Seminar in Chemistry. 1 (Max. 3). All graduate students attend weekly departmental seminars. One credit given each semester a presentation is made, to a limit of 3 credits for M.S. candidate, 6 for Ph.D. candidates. The seminar will normally be based upon articles in the current chemical literature but with the last presentation being over the student's research project. Offered satisfactory/unsatisfactory only. *Prerequisite:* graduate standing in chemistry or biochemistry.

5100. Special Topics in Advanced Inorganice. 1-9 (Max. 12). A course designed for students with an interest in contemporary inorganic chemistry. Recent problems in the literature and techniques for their solution will be addressed.

5110. Inorganice Chemistry. 3. A basic course on theoretical and descriptive inorganic chemistry. Dual listed with CHEM 4110. *Prerequisite:* CHEM 2320 or CHEM 2420, and physical chemistry.

5115. Descriptive Inorganic Chemistry. 3. Advanced survey of inorganic chemistry, emphasizing the synthesis, structural, and reactivity properties of inorganic compounds. Emphasis will be placed on the application of bonding theory and periodic principles to the chemistry of main-group, d-block, and f-block elements. *Prerequisite:* CHEM 5110.

5120. Chemical Applications of Symmertry Group Theory. 3. The essential principles of group theory as used by practicing chemists. Fundamentals of symmetry and the theory of groups. Applications to problems of spectroscopy, structure and bonding. *Prerequisite:* CHEM 4110 and either CHEM 4508 or 5530.

5130. Physical Methods of Inorganic Chemistry. 1-3 (Max. 3). A course to survey the spectroscopic methods (electronic, vibrational, rotational, magnetic resonance, quadrupole resonance, Mossbauer, mass) which are used to elucidate the structure and bonding in inorganic and organometallic compounds. *Prerequisite:* CHEM 4507 or 4110/5110.

5140. Organometallic Chemistry. 3. A survey of bonding and synthetic reactions of transition metal organometallic chemistry. *Prerequisite:* CHEM 4110/5110.

5150. Inorganic Group Seminar. 1 (Max. 9). Course designed for students with an interest in contemporary inorganic chemistry. Recent problems in the literature and techniques for their solution are addressed.

5160. Bioinorganic Chemistry. 3. Biological chemistry of metals and non-metals will be used to illustrate the fundamental role that they play in all aspects of life. Recent examples and problems in the current literature will be used to illustrate how chemically imposed restrictions and limitations are surmounted in living systems. *Prerequisite:* CHEM 4110/5110.

5190. Research in Inorganic Chemistry. 1-3 (Max. 12). Offered satisfactory/unsatifactory only. *Prerequisite:* CHEM 4110/5110.

5200. Special Topics in Analytical Chemistry. 1-6 (Max. 12). Material selected from chromatography, electroanalytical chemistry, ion exchange, chemical separations, optical methods of analysis, polarography and other areas. *Prerequisite:* CHEM 4230, 4507, and 5210.

5210. Advanced Survey of Chemical Analysis. 3. A basic course to provide a background in many aspects of quantitative analysis taught at an advanced graduate-level. *Prerequisite:* CHEM 2230 and 4507.

5220. Modern Electroanalytical Methods. 3. An advanced survey of electroanalytical chemistry including ion selective potentiometry, electrolysis, coulometry, polarography and voltammetry. *Prerequisite:* CHEM 5210.

5240. Optical Methods of Chemical Analysis. 3. An advanced survey of the theory, instrumentation and applications of optical methods of chemical analysis. *Prerequisite:* CHEM 4230, 4507, 5210.

5250. Advanced Chemical Instrumentation. 3. Introduces chemistry students to the basic elements of electronics. Specific topics include networks, passive and active filters, digital electronics, logic gates, counters, flip-flops, and converters. Second half of course introduces students to experimental design, pattern recognition, factorial analysis, and multivariate statistical methods. *Prerequisite:* CHEM 4230 or its equivalent.

5260. Separation Methods. 3. A detailed survey of the theoretical and practical aspects of modern separation methods with emphasis on chromatography. *Prerequisite:* CHEM 2230, CHEM 2440, and CHEM 4508.

5290. Research in Analytical Chemistry. 1-3 (Max. 12). Satisfactory/unsatisfactory only. *Prerequisite:* CHEM 2230, 4507.

5300. Special Topics Synthetic. 1-6 (Max. 9). Material will be selected from one of the following areas: heterocycles, organometallics, natural products, physical and chemical methods of structure elucidation, organic photochemistry, and other special areas of organic chemistry. *Prerequisite:* CHEM 5330.

5310. Organic Group Seminar. 1 (Max. 9). Designed for students with an interest in organic reaction mechanisms. A problem solving approach using electron pushing techniques will be emphasized. *Prerequisite:* CHEM 5340.

5320. Spectroscopic Methods of Structure Determination. 3. Provides theoretical and practical treatment of spectroscopic methods for application in research. Topics include ultraviolet, infrared, and nuclear magnetic resonance spectroscopy and mass spectrometry. *Prerequisite:* CHEM 2440, 4507.

5330. Advanced Organic Chemistry. 3. Treatment of organic chemistry from the viewpoints of structure and mechanism with emphasis on structural theory of bonding, stereochemistry and the general classes of organic reactions. *Prerequisite:* CHEM 2440 and 4507.

5340. Synthetic Methods in Organic Chemistry. 3. Surveys and applies the important synthetic methods of organic chemistry with particular attention to recent developments. *Prerequisite:* CHEM 5330.

5350. Advanced Organic Chemistry II. 3. Second semester of a two semester sequence with a focus on the detailed mechanisms of the major classes of reactions of importance in organic chemistry. *Prerequisite:* CHEM 5330.

5390. Research in Organic Chemistry. 1-3 (Max. 12). *Prerequisite:* CHEM 5320.

5500. Special Topics in Physical Chemistry. 1-6 (Max. 9). Material will be selected from one of the following fields: electrochemistry, surface chemistry, catalysis, colloids, photochemistry, and other special fields of physical chemistry. *Prerequisite:* CHEM 4507 and 5510.

5501. Physical Group Seminar. 1-9 (Max. 9). Designed for students with an interest in theoretical and experimental physical chemistry. Students are required to give presentations on current literature and research topics. *Prerequisite:* graduate standing.

5515. App-Math P-Chem I. 3. Designed to introduce the necessary mathematical background and essential computer programming tools for students of physical and theoretical chemistry. Includes an introduction into linear algebra, multivariate calculus, differential equations, analysis and modeling of experimental data, use of Matlab software, and mathematical analysis of physical chemistry problems. Dual listed with CHEM 4515. *Prerequisites:* MATH 2200 and 2205, 1 yr. CHEM 1020/1030 or 1050/1060.

5516. Applied Mathematics in Physical Chemistry. 3. Covers the advanced mathematical techniques in physical and theoretical chemistry. This includes an introduction into probability and stochastic processes, infinite series, vector and tensor calculus, Fourier transforms and partial differential equations. Includes practical numerical problem solutions using Matlab software and applications of the mathematical analysis to specific physical chemistry problems. Dual listed with CHEM 4516. *Prerequisites:* CHEM 4515/5515.

5520. Advanced Chemical Thermodynamics and Thermostatics. 3. A rigorous presentation of classical chemical thermodynamics followed by an introduction to statistical mechanics with the application to real systems. *Prerequisite:* CHEM 4508 and 4507.

5530. Quantum Chemistry. 3. The quantum mechanical description of time-dependent and independent processes, including discussions of the Schrodinger equation, wave packets, approximate methods, and interaction of matter with radiation. *Prerequisite:* two semesters of undergraduate physical chemistry.

5540. Molecular Spectroscopy. 3. Introduction to the relationships among quantum mechanical formulations, experimentally determinable quantities obtained via spectroscopic methods, and physical parameters related to the structure of molecular systems. *Prerequisite:* CHEM 5530.

5550. Chemical Kinetics and Reaction Dynamics. 3. Emphasizes the rates and mechanisms of chemical reactions and reaction dynamics which reviews the kinetic theory of gases, conventional transition state theory, Arrhenius theory, applications of Laplace transforms, thermodynamics of the transition state, reactions in solution and on surfaces, and other current topics as time permits. *Prerequisite:* CHEM 4507.

5560. Molecular Modeling - Compustational Chemistry. 3. A course that emphasizes training in computational, electronic and vibrational structure, calculations ranging from molecular mechanics to semi-empirical to abinitio methods. Dual listed with CHEM 4560. *Prerequisite:* CHEM 4507.

5570. Statistical Mechanics. 3. Course content will include Maxwell-Boltzmann statistics, ensembles, partition functions, transition state theory, thermodynamic pertubation techniques, quantum statistics, and time-correlation formalism. *Prerequisites:* CHEM 4508 and 4507 and MATH 2205.

5590. Research in Physical Chemistry. 1-3 (Max. 12). *Prerequisite:* CHEM 4507.

5760. Polymer Chemistry. 3. A course covering the principles of polymer synthesis and characterization. *Prerequisite:* CHEM 2230, 2340, 4507.

5790. Research in Biological Chemistry. 1-3 (Max. 12). *Prerequisite:* consent of instructor.

5820. Advanced Problems in Chemistry. 1-3 (Max. 3). A graduate level course for students desiring to probe more deeply into a special area of chemistry. Taken under the supervision of a faculty member in the field of investigation. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisites:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Chicano Studies

106 Ross Hall, 766-4127
Web site: uwyo.edu/ChicanoStudies
Director: Ed A. Muñoz

Professor:

FRANCISCO RIOS, B.A. Carroll College 1978; M.A. University of Wisconsin 1981; Ph.D. 1991; Professor of Educational Studies.

Associate Professors:

ADRIAN BANTJES, B.A. University Leiden, The Netherlands 1980; M.A. University of Texas at Austin 1991; Associate Professor of History 1997.

PATRICIA HAMEL, B.A. Pennsylvania State University 1964; M.A. 1968; Ph.D. University of Kansas 1985; Associate Professor of Spanish 1995, 1989.

ED A. MUÑOZ, B.A. University of Nebraska -Lincoln 1990; M.A. 1992; Ph.D. 1996; Associate Professor of Criminal Justice 2008, 2003; Director of Chicano Studies Program 2003.

MARGARET M. ZAMUDIO, B.A. University of California, Los Angeles 1989; M.A. 1991; Ph.D. 1996; Associate Professor of Sociology 2008, 2003.

Assistant Professors:

CECILIA J. ARAGON, B.S. McMurry University Texas; M.A. University of New Mexico; Ph.D. Arizona State University; Assistant Professor of Theatre and Dance 2005.

CARMELITA CASTANEDA, B.A. California State University Sacramento; M.A. Virginia Polytechnic and State University 1992; Ed.D. University of Massachusetts Amherst 2002; Assistant Professor of Educational Studies.

At present, no program for graduate degrees in Chicano Studies is offered; however, courses may be counted at the graduate level.

Communication and Journalism

428 Ross Hall, 766-3122/6277
FAX: (307) 766-5293
Web site: www.uwyo.edu/COJO
Department Chair: Ken Smith

Professors:

MICHAEL R. BROWN, B.A. Wayne State College 1974; M.A. University of Wyoming 1984; Ph.D. University of Utah 1994; Professor of Communication and Journalism 2007, 1994.

GEORGE A. GLADNEY, B.A. Waynesburg College 1969; B.J. University of Missouri 1971; M.S. University of Oregon 1988; Ph.D. University of Illinois Champaign-Urbana 1991; Professor of Communication and Journalism 2005, 1995.

FRANK E. MILLAR, B.A. Wabash College 1966; M.A. Michigan State University 1971; Ph.D. 1973; Professor of Communication and Journalism 1989, 1985.

CONRAD SMITH, B.S. Ohio State University 1969; M.A. 1971; Ph.D. Temple University 1981; Professor of Communication and Journalism 1996.

KENNETH L. SMITH, B.S. Iowa State University 1970; M.S. 1973; Ph.D. University of Utah 1991; Professor of Communication and Journalism 2005, 1991.

Associate Professor:

GRACIE LAWSON-BORDERS, B.A. Michigan State University 1982; M.A. Northwestern University 1995; Ph.D. Wayne State University 2001; Associate Professor of Communication and Journalism, African American Studies 2006.

TRACEY OWENS PATTON, B.A. Colorado State University 1993; M.A. 1996; Ph.D. University of Utah 2000; Associate Professor of Communication and Journalism 2008, 2003.

CINDY J. PRICE, B.A. University of Sioux Falls 1989; M.S. South Dakota State University 1992; Ph.D. Southern Illinois University 2000; Associate Professor of Communication and Journalism 2008, 1999.

Assistant Professors:

EILEEN S. GILCHRIST, B.A. University of Houston 1990; M.S. 1997; Ph.D. University of Oklahoma 2008; Assistant Professor of Communication and Journalism 2007.

CHIA FANG HSU, B.A. Chinese Culture University 1995; M.A. Washington State University 1997; Ph.D. Washington State University 2002; Assistant Professor of Communication and Journalism 2003.

Senior Lecturers:
REBECCA ROBERTS, B.S. University of Wyoming 1993; M.A. 1995; Senior Lecturer of Communication and Journalism 2005, 1999.
MATTHEW J. STANNARD, B.S. Brigham Young University 1993; M.S. California State University, Long Beach 2000; Senior Lecturer of Communication and Journalism 2005, 1999.
CAROL L. TARANTOLA, B.A. University of Wyoming 1972; M.A. 1974; Senior Lecturer of Communication and Journalism 1996, 1990.
ERIC WILTSE, B.A. State University College at Buffalo 1974; M.A. University of Montana 1983; Ph.D. University of Wyoming 2000. Publisher of *Laramie Online*; Senior Lecturer of Communication and Journalism 2001, 1990.

Assistant Lecturers:
BEAU BINGHAM, B.S. Idaho State University 2000; M.A. New Mexico State University 2002; Assistant Lecturer of Communication and Journalism 2007.

Visiting Lecturers:
Bob Beck, Mike McElreath, Justin Stewart, Shalee Turner

Emeriti:
B. Wayne Callaway, William C. Donaghy, John W. Ravage

The Department of Communication and Journalism offers graduate work leading to the master of arts degree in communication (either Plan A or Plan B) with emphasis on human communication or mass communication.

The graduate curriculum addresses six major areas of inquiry in human communication: 1) the structure and function of contemporary epistemological, ontological, theoretical, and methodological paradigms in the communication discipline; 2) theories of language and nonverbal symbolic interactions; 3) communication processes in small group and organizational settings; 4) communication as an agent of stability and change in diverse social systems; 5) the role assumed by communication processes in the formation, development, and coordination of intimate human relationships; and 6) the nature and function of argumentative discourse in democratic societies.

The master's program in the mass media addresses media issues and problems from a theoretical perspective. The program is designed to be flexible such that students can examine questions that relate to their specific interests in the media. Areas of interest include but are not limited to print media, broadcasting, advertising, public relations, visual communication, media law and regulation, media management, media effects, mass media and society, media history, or media ethics.

Program Specific Admission Requirements

A cumulative minimum grade point average of 3.0 (A=4.0) on previous coursework is required for full admission.

Composite score minimum of 900 on the verbal and quantitative sections of the Graduate Record Examination (GRE).

For international students the university requires a minimum total score of 540 on the written exam or 76 on the Internet-based exam. The university will also accept a minimum score of 6.0 on the IELTS exam or certification of level 112 ELS completion in lieu of the TOEFL requirement.

Program Specific Degree Requirements

Administered by the Director of Graduate Studies, the programs are structured to facilitate completion of requirements for the M.A. degree in two years. Deficiency makeups may be required.

Master of Arts Plan A (thesis)

31 hour program.

Students must complete an accepted master's thesis approved by the student's thesis committee.

Students must complete a minimum of 27 credit hours and 4 hours of thesis. A minimum of 21 hours must be within the department, with a maximum of 3 hours of independent study and 3 hours of 4000-level coursework. A student also must take 3 hours of a 5000-level statistics course approved by the department's director of graduate studies.

For courses taken outside the department, a student may be credited with no more than 3 hours of 4000-level coursework and 3 hours of independent study.

Students must complete COJO 5070, 5080, and 5800 as well as one of the following theory courses, COJO 5310, 5540 or 5061.

Plan B (non-thesis)

Students must complete an accepted Plan B paper(s) (or project(s) if something other than an actual paper, e.g., film script, film documentary), and this must be developed as part of a 3 hour independent study approved by the student's Plan B adviser and the department's director of graduate studies.

The non-thesis degree requires a minimum of 33 credit hours, of which a minimum of 21 hours must be within the department. The non-thesis student is limited to 6 4000-level credit hours and a maximum of 6 credit hours of independent study or internship.

Students must complete COJO 5070, 5080, and 5800 as well as one of the following theory courses, COJO 5310, 5540 or 5061.

Communication and Journalism (COJO)

5000. News-making Process. 3. Study of the processes underlying the production of news in the mass media with special emphasis on how those processes affect the news and have an impact on society. Course examines the functions of news, values, and objectivity in the news, outside influences, and news as entertainment. Dual listed with COJO 4000. *Prerequisite:* graduate standing.

5010. Texts of Mass Media. 3. Intensive critical examination of the history, theory, social responsibility and empirical research in the production and consumption of mediated messages. *Prerequisite:* graduate standing.

5030. Seminar in Interpersonal Communication. 3. Intensive examination of contemporary theoretical perspectives and empirical research on interpersonal communication, including the role of communication in self-concept formation, social relationship development, and the structure and function of ordinary discourse in human interaction. Dual listed with COJO 4030. *Prerequisite:* graduate standing.

5061. Rhetorical Theory and Criticism. 3. An investigation into how rhetorical theory, spanning from its ancient roots in Aristotelian thinking to its current postmodern components, operates in society. Explores how various critical methods can be utilized to gain a stronger understanding of public communication texts, including newspapers, speeches, music and film. Cross listed with ENGL 5061; dual listed with COJO 4061. *Prerequisites:* COJO 1040 and 3040 or ENGL 2035.

5070. Research in Communication I. 3. Principles and problems of experimental research in human communication. Attention primarily on experimental design within laboratory and field settings. *Prerequisite:* graduate standing.

5080. Research in Communication II. 3. Principles and problems in quasi-experimental and naturalistic research in human communication. Attention primarily on the observation and systematic investigation of naturally occurring communicative events. *Prerequisite:* graduate standing.

5140. Nonverbal Communication Studies. 3. Critical analysis of current studies in the areas of nonverbal communication. Students are required to complete an independent study of some aspects of nonverbal communication relevant to interests. Dual listed with COJO 4140. *Prerequisites:* COJO 2110 and junior standing.

5160. African American Rhetoric. 3. African American discourse and its relationship to equality and participation. Using the struggle of African Americans as an instructive exemplar, it comes to terms with the philosophical concepts, political issues, moral complexities, and discursive characteristics of African American rhetoric. Dual listed with COJO 4160; cross listed with AAST 4160/5160. Prerequisite: consent of instructor.

5210. Special Topics in Communication. 1-3 (Max. 6). Intensive examination of current theoretical issues in communication. Course content varies. Graduate students are expected to follow a rigorous reading schedule and submit a major paper or research project. Dual listed with COJO 4210. *Prerequisite:* graduate standing.

5230. Special Topics in Mass Media. 1-3 (Max. 6). IIntensive study of problems and topics specific to the mass media, including print, broadcast, advertising, public relations and the internet. Course content varies and may include historical, legal, ethical, political, sociocultural, economic and theoretical perspectives. May dual list with COJO 4230. Graduate students are expected to follow a rigorous reading schedule and submit a major paper or research project. *Prerequisite:* graduate standing.

5250. Seminar In Organizational Communication. 3. Intensive examination of the historical and contemporary theoretical approaches and empirical research in organizational dynamics. Attention primarily focuses on how the institutionalized collective affects and is affected by other social systems. Dual listed with COJO 4250. *Prerequisite:* graduate standing.

5310. Seminar in Mass Communications. 3. The study of contemporary, historical, critical and behavioral theories of mass communication processes. Attention primarily on the social functions performed by mediated messages. *Prerequisite:* graduate standing.

5540. Seminar in Communication Theory. 3. An intensive examination of various metatheoretical assumptions and theoretical models used in the study of communicative dynamics. *Prerequisite:* graduate standing.

5590. Seminar in Persuasion. 3. Participants in this seminar engage in dialog directed toward both 1) understanding the issues raised in contemporary persuasion research and 2) exploring potential solutions and ideas for future research. This should prompt the participants to begin their own research ventures designed to contribute to the study of communication and social influence. Dual listed with COJO 4590. *Prerequisite:* COJO 2090 and 3070.

5600. Mass Media Ethics. 3. The study of ethical theory with special emphasis on how that theory can be applied to problem solving in the media. Examines major ethical perspectives and requires the application of those perspectives to actual case studies. Graduate students are expected to follow a rigorous project. Dual listed with COJO 4600. *Prerequisite:* graduate standing.

5620. Seminar: Small Group Communication. 3. An intensive examination of the historical and contemporary theoretical approaches and empirical research in small group dynamics. Attention primarily focused on the rules of decision-making and the leader-follower relationship in groups with and without a history. *Prerequisite:* graduate standing.

5630. Ethics in Personal Relationships. 3. Examines personal relationships and the ethical issues participants in these relationships encounter. Personal relationships are those unique relationships in which the participants cannot be replaced without altering the very nature of the relationship. Personal relationships are originated, developed, maintained, and dissolved through communication between the participants. Dual listed with COJO 4630. *Prerequisite:* COJO 4030.

5800. Foundations of Communication and Journalism. 1. Examines current issues and trends in the various areas of communication and journalism that are represented within the department. Students analyze the historical roots of these issues and trends as a way of understanding the present context and future evolution of communication and journalism scholarship. *Prerequisites:* first year of graduate study and acceptance into the COJO graduate program.

5890. Problems: Communication. 1-4 (Max. 6). *Prerequisite:* 18 hours at the 5000 level in the department.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Cont Reg: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Cont Reg: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5961. Graduate Projects. 1-4 (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. *Prerequisites:* enrollment in Plan B program and departmental approval.

5985. Rhetoric and Social Justice. 3. Analyzes concepts of ableism, anti-Semitism, heterosexism, racism, sexism, and socioeconomic class through a critical/social construction framework. Attempts to develop a "working" definition of these concepts by analyzing historical and current conceptualizations and identifying marginalization and disenfranchisement as it is woven in the fabric of American society. Dual listed with COJO 4985. *Prerequisite:* graduate standing.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Criminal Justice

223 Arts and Sciences Building, 766-2988
FAX: (307) 766-3913
Web site: www.uwyo.edu/cj
Department Head: K. Gary Sherman

Professors:

MARGARET M. MURDOCK, B.A. Creighton University 1970; M.A. Tufts University 1975; Ph.D. 1978; Professor of Political Science and Criminal Justice – Casper 1993, 1975.

NARINA N. NUNEZ, B.A. State University of New York-Cortland 1980; M.S. 1984; Ph.D. Cornell University 1987; Professor of Psychology and Criminal Justice 2000, 1987.

Associate Professors:

ADRIENNE B. FRENG, B.A. Black Hills State University 1995; M.A. University of Nebraska 1997; Ph.D. 2001; Associate Professor of Criminal Justice 2007, 2001.

ED A. MUÑOZ, A.A. Western Nebraska Community College 1987; B.A. University of Nebraska Lincoln 1990; M.A. 1992; Ph.D. 1996; Associate Professor of Criminal Justice 2007, 2003.

Assistant Professors:

SCOTT E. CULHANE, B.A. University of Tennessee 1998; M.S. University of Tennessee at Chattanooga 2000; Ph.D. University of Texas at El Paso 2005; Assistant Professor of Criminal Justice 2005.

CARY HECK, B.S. Pittsburg State University 1989; M.A. San Jose University 1994; Ph.D. Washington State University 1998; Assistant Professor of Criminal Justice 2004.

ERIC J. WODAHL, A.A. Eastern Wyoming College 1992; B.A. Chadron State College 1994; M.P.A. University of Wyoming 2003; Assistant-Professor of Criminal Justice 2008.

Senior Lecturers:
CHERYL C. BURNETT, B.A. University of Wyoming 1975; J.D. 1981; Senior Lecturer of Criminal Justice 2008, 2000.
K. GARY SHERMAN, B.S. University of Missouri 1972; M.S. Southwest Missouri University 1975.

Assistant Lecturer:
ERNEST L. JOHNSON, A.A.S. Law Enforcement 1975; B.S. University of Wyoming 1992; M.P.A. 1997; Assistant Lecturer for Criminal Justice 2001.

Adjunct Professors:
(See bulletin section following name for academic credentials.)
George Blau, psychology
George W. Gill, anthropology
William H. Moore, history

At present, no program for graduate degrees in criminal justice is offered; however, some courses may be counted at the graduate level.

Criminal Justice (CRMJ)

5965. Research Hours in Criminal Justice. 1-6 (Max. 6). Provides students with an opportunity to assist in conducting various aspects of research under the supervision of criminal justice faculty. Specific research activities and requirements will be determined in consultation with the sponsoring faculty person. Credit is only available for research corresponding to enrollment in this course. Dual listed with CRMJ 4965. *Prerequisites:* upper division standing and consent of instrutor required in advance.

English

201 Hoyt Hall, 766-6452
FAX: (307) 766-3189
Web site: www.uwyo.edu/english
Department Chair: Peter Parolin
Assistant Department Chair: Sandra Clark

Professors:
SUSAN ARONSTEIN, B.A. Seattle Pacific University 1980; M.Sc. Edinburgh University 1984; Ph.D. Stanford University 1987; Professor of English 2006, 1987.
SUSAN C. FRYE, B.S. Smith College 1974; M.A. University of New Mexico 1981; Ph.D. Stanford University 1986; Professor of English 2001, 1986.
ALYSON HAGY, B.A. Williams College 1982; M.F.A. University of Michigan 1985; Professor of English 2008, 1996.
HARVEY HIX, B.A. Belmont College 1982; M.A. University of Texas, Austin 1985; Ph.D. 1987; Professor of English 2005.
CAROLINE McCRACKEN-FLESHER, M.A. University of Edinburgh 1980; M.A. Brown University 1986; Ph.D. 1989; Professor of English 2004, 1995, 1989.
CEDRIC D. REVERAND, II, B.A. Yale University 1963; M.A. Columbia University 1964; Ph.D. Cornell University 1972; Professor of English 1982, 1971.
DAVID ROMTVEDT, B.A. Reed College 1972; M.F.A. University of Iowa 1975; Associate Professor of English 2008, 1995.
ROBERT TORRY, B.A. Hiram College 1972; Ph.D. State University of New York-Buffalo 1988; Professor of English 2009, 1983.

Associate Professors:
CAROLYN ANDERSON, B.A. Auckland University 1981; M.A. 1984; Ph.D. Stanford University 1992; Associate Professor of English 2001, 1993.
DUNCAN S. HARRIS, A.B. Stanford University 1965; M.A. Boston University 1966; Ph.D. Brandeis University 1973; Associate Professor of English 1977, 1970.
JEANNE E. HOLLAND, B.A. Auburn University 1978; M.A. 1981; Ph.D. State University of New York-Buffalo 1989; Associate Professor of English 1995, 1989.
BETH LOFFREDA, B.A. University of Virginia; M.A. Rutgers University; Ph.D. 1997; Associate Professor of English 2004, 1998.
MICHAEL KNIEVEL, B.A. Creighton University 1995; M.A. Creighton University 1997; Ph.D. Texas Tech University 2002; Associate Professor of English 2009, 2002.
CLIFFORD J. MARKS, A.B. University of Michigan-Ann Arbor 1983; M.A. State University of New York-Buffalo 1988; Ph.D. 1992; Associate Professor of English 2000, 1993.
KATE NORTHROP, B.A. University of Pennsylvania 1991; MFA University of Iowa 1995; Associate Professor of English 2009.
ERIC W. NYE, B.A. St. Olaf College 1974; M.A. University of Chicago 1976; Ph.D. 1983; Associate Professor of English 1989, 1983.
PETER PAROLIN, B.A. University of British Columbia 1988; M.A. University of Pennsylvania 1991; Ph.D. 1997; Associate Professor of English 2003, 1997.
MARY SHERIDAN-RABIDEAU, B.A. University of Notre Dame; M.A. University of Illinois, Chicago 1994; Ph.D. University of Illinois, Urbana-Champagne 2000; Associate Professor of English 2007.

Assistant Professors:
CRAIG A. ARNOLD, B.A. Yale University 1990; Ph.D. University of Utah 2001; Assistant Professor of English 2004.
NICOLE QUAKENBUSH, B.A. Kalamazoo College 1996; MFA University of Arizona 2000; Ph.D. 2008; Assistant Professor of English 2009.
CASKEY RUSSELL, B.A. Western Washington University 1993; M.A. 1993; Ph.D. University of Oregon 2001; Assistant Professor of English 2004.
JASON THOMPSON, B.A. Pacific Lutheran University 1996; MFA University of Arizona 2000; Ph.D. 2008; Assistant Professor of English 2009.
BRAD WATSON, B.A. Mississippi State University 1978; MFA University of Alabama 1985. Assistant Professor of English 2005.

Senior Lecturers:
SANDRA L. CLARK, B.A. University of Wyoming 1988; M.A. 1990; Senior Lecturer in English 2003, 1997.
MARGARET G. GARNER, B.A. University of Wyoming 1969; M.A. University of Utah 1972; Senior Lecturer in English 2005, 1998, 1986.
COLIN K. KEENEY, B.A. University of Wyoming 1982; M.A. 1988; Senior Lecturer in English 2003, 1997.
BRUCE A. RICHARDSON, B.A. University of California at Los Angeles 1972; M.A. 1978; Ph.D. 1983; Senior Lecturer in English 2004, 1993, 1984.
CHRISTINE STEBBINS, B.A. University of Wyoming 1992; M.A. 1993; Senior Lecturer in English 2008, 2000.

Associate Lecturer:
JULIANNE COUCH, B.S., B.F.A. Emporia State University 1982; M.A. 1984; Associate Lecturer in English 2008.

Assistant Lecturers:
PAUL BERGSTRAESSER, B.A. Oberlin College 1989; M.A. Northern Michigan University 2000; Ph.D. University of Illinois, Chicago 2007; Assistant Lecturer in English 2007.
APRIL HEANEY, B.A. University of Wyoming 1998; M.A. 2000. Assistant Lecturer in English 2005.
SHELLY NORRIS, B.A. University of Wyoming 1992; M.F.A. University of Alaska, Fairbanks 1995; Assistant Lecturer in English 2007.
JOYCE STEWART, B.A. Felician College 1994; M.A. Creighton University 1998; Assistant Lecturer in English 2009.
MARGARET VAN BAALEN-WOOD, B.A. University of Wyoming 1983; M.A. 2003. Assistant Lecturer in English 2004.

The graduate program in English offers two concentrations leading to the master of arts degree: Literary Studies, and Composition and Rhetoric. The department also offers a master of fine arts in creative writing: a 40 hour studio degree in poetry, fiction, or creative non-fiction.

Program Specific Admission Requirements

Master of Arts in English

In addition to the minimum requirements set forth in this bulletin, the Department of English requires that students demonstrate by means of an official transcript that they have a solid undergraduate record with course work in English. That said, the department welcomes degrees in English or other disciplines from four-year colleges or universities.

Depending on their undergraduate preparation, some successful applicants may be required to take additional or specific courses toward the English master's degree.

Students must show knowledge of one foreign language, ordinarily ancient or modern European. Students may complete a language requirement concurrently with their program.

Candidates must submit GRE general test scores, a writing sample, and a 500-word statement of purpose.

Students should consult the Web site or contact the department for specific admission information and deadlines.

Master of Fine Arts in Creative Writing

In addition to the minimum requirements set forth in this bulletin, the Creative Writing M.F.A. Program requires that students demonstrate by means of an official transcript that they have a solid undergraduate record. The M.F.A. program welcomes degrees in any discipline from four-year colleges or universities. Candidates must submit GRE general test scores, three letters of recommendation, a writing sample consisting of no more than 25 pages of prose or 10 pages of poetry, and a 500-word statement of purpose. Students should consult the M.F.A. web site or contact the department for specific admission information and deadlines.

Program Specific Graduate Assistantships

Teaching assistantships are available to qualified applicants. Full assistantships carry an annual stipend and a remission of full-time tuition and fees, and require the teaching of freshman English - currently one section per term. (Sections meet three hours each week and are composed of a maximum of 23 students.)

Each fall the department conducts a week long orientation for new teaching assistants and subsequent series of colloquia for all graduate assistants. Each assistant is assigned an experienced teacher in the department as a mentor, to be available throughout the semester for consultation on teaching and grading techniques.

Program Specific Degree Requirements

Master of Arts in English Plan A (thesis)

The Department of English offers two concentrations within the master of arts degree. A concentration consists of three courses chosen from among those designated by the department as belonging to that concentration, together with other courses to total 26 hours. The concentration insures coherence in each student's graduate program; breadth is insured by a distribution of courses. Much of each student's program is taken in courses outside the concentration. Seminars will usually include students from all concentrations.

Literary Studies. Working from a variety of perspectives, this concentration focuses on the study of literature and of other culturally significant texts and materials, including, for example, film, oral materials, or political documents.

Rhetoric and Composition. Founded in the reflective practice of different kinds of writing, this concentration emphasizes the theory, research, and scholarship bearing on the production of discourse; it offers training for writing and for teaching that can include teaching of ESL, composition, and creative writing.

26 hours of coursework and a thesis for 4 additional hours (ENGL 5960).

A 1 credit course in bibliography and research methods.

A course in contemporary theory.

Courses in at least three different periods, genres, major figures, or approaches.

A reading exam and final oral examination covering coursework as well as the thesis.

With approval of the graduate adviser, a student may take a maximum of 3 hours credit outside the department.

Students take most of their courses at the 5000 level; a student may take no more than two 4000-level courses toward the M.A. degree.

Master of Fine Arts in Creative Writing Plan A (thesis)

The Creative Writing M.F.A. Program offers three areas of concentration: poetry, fiction, and creative non-fiction. A concentration consists of three workshops, a minimum of 10-12 semester hours, in the appropriate area. (An additional workshop outside the student's main genre is also required.)

M.F.A. students follow the guidelines for Plan A. The M.F.A. degree requires 34-36 hours of courses and a thesis for 6 additional hours of thesis research as ENGL 5960 for a total of 40-42 hours.

Only those courses in which a B or better has been earned may be applied to the graduate program of study.

All courses must be taken for a grade unless offered for S/U only. No graduate credit is allowed for grades S and U.

The cumulative GPA must be at least 3.0 to receive a degree. Courses below 4000 will not count toward the degree nor will they be figured in the GPA, although they will appear on the transcript.

Four workshops, normally 4 credit hours each, 14-16 hours (one workshop must be outside the student's main genre).

Two courses in Literary Studies, 4000 or 5000 level, 6 to 8 hours min.

3 elective courses, 9 hours min.

Thesis, at least 6 hours (may be taken incrementally).

Professional internship, 3 hours.

English (ENGL)

5000. Studies In:. 1 - 8 (Max. 8). Provides an opportunity for specialized seminar approaches to subjects in literature. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5010. Practical Teaching in English Writing and Literature. 1 - 4 (Max. 4). Practical and theoretical teaching methods and approaches for teachers of composition and literature courses. Prerequisite: graduate status or 12 hours of 4000-level work.

5030. English as a Second Language: Theory and Method. 4. Theoretical and practical explorations of the problems of teaching English as a second language. *Prerequisite:* graduate status.

5061. Rhetorical Theory and Criticism. 3. An investigation into how rhetorical theory, spanning from its ancient roots in Aristotelian thinking to its current postmodern components, operates in society. Explores how various critical methods can be utilized to gain a stronger understanding of public communication texts, including newspapers, speeches, music and film. Cross listed with COJO 5061; dual listed with ENGL 4061. *Prerequisites:* COJO 1040 and 3040 or ENGL 2035.

5080. Graduate Apprenticship. 1. The graduate apprenticeship furthers a graduate student's professional development by allowing him/her to teach in a course other than Freshman Composition and to engage in a close working relationship with a faculty member. Apprentices will engage in a full range of teaching activities, such as grading, constructing assignments and exams, lecturing, leading discussion, and so on. Does not apply to hour requirement for the degree. *Prerequisites:* graduate standing and permission of the English department chair.

5090. Research Methods. 1. An introduction to research methods and resources necessary for the advanced study of literature, rhetoric and composition, and creative writing. Satisfactory/Unsatisfactory only. *Prerequisite:* graduate standing in English.

5220. Studies in Medieval Literature. 1-4 (Max. 8). A seminar course in selected genres, figures, and themes in Medieval English literature. *Prerequisite:* graduate status or 12 hours or 4000-level work.

5230. Studies in English Renaissance Literature. 1-4 (Max. 8). A seminar in selected genres, figures, and themes of the sixteenth and early seventeenth centuries. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5250. Studies in Shakespeare. 1-4 (Max. 8). To provide advanced students with the opportunity to study problems of text, sources, staging, theatrical history, and/or critical theory with reference to the works of William Shakespeare. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5270. Studies in 18c English Literature. 1-4 (Max. 8). A seminar in selected genres, figures, and themes of restoration and eighteenth century English literature. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5280. Studies in 19c English Literature. 1-4 (Max. 4). A seminar in selected genres, figures, and themes of the romantic and Victorian periods. *Prerequisite:* graduate status or 12 hours or 4000-level work.

5290. Studies in 20c English Literature. 1-4 (Max. 8). A seminar in significant writers of poetry, drama, fiction, and biography from the end of the nineteenth century to the present. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5310. Early American Literature. 4. Seminar designed to acquaint graduate students with selected texts from the colonial period to 1800, relevant secondary works, and scholarly methods. *Prerequisite:* graduate status or 12 hours of 3000-4000 level work.

5320. Studies in 19c American Literture. 1-4 (Max. 8). A seminar designed to acquaint graduate students with selected principal works of American literature, relevant secondary works, and scholarly method. *Prerequisite:* graduate status or 12 hours or 4000-level work.

5330. Studies in 20c American Literature. 1-4 (Max. 8). A seminar in selected significant writers of poetry, drama, and prose from the end of the nineteenth century to the present. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5340. Intellectual Currents in Modern American Literature. 1-4 (Max. 4). Devoted to the study of writers such as Marx and Freud and more recent American writers. *Prerequisite:* graduate status or 12 hours or 4000-level work.

5360. Studies in Ethnic Literature. 1-4 (Max. 8). A study of literature and culture of selected ethnic minorities. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5520. History of Literacy Criticism: Enlightenment and 19th Century. 4. Historical survey of the mainstream of European literary criticism, including the critics of antiquity and the Renaissance. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5530. Modern Critical Theory and Practice. 1-4 (Max. 4). Major trends in modern poetics and practical criticism. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5540. Seminar in Creative Writing. 4. Meets the theory requirement for graduate English majors concentrating in Creative Writing. Students review important texts about writing, review literary magazines, publishing procedures, and produce an independent writing project. *Prerequisite:* creative writing-4000 level and permission of instructor.

5550. Independent Study in Creative Writing. 1-3 (Max. 6). Guided independent writing of poetry or imaginative prose at an advanced level. Limited enrollment. No more than 9 hours of ENGL 4050 and ENGL 5550 combined may be counted toward the M.A. in English. *Prerequisite:* consent of instructor and graduate status or 6 hours of ENGL 4050.

5560. Graduate Writing Workshop. 1-4 (Max. 28). Graduate level workshop that emphasizes reading as well as writing in a specific genre (poetry, nonfiction, fiction) or in relation to a theme that combines genres, at the discretion of the instructor. *Prerequisite:* 12 hours of 4000-level creative writing or graduate status.

5830. Victorian Women's Lives. 3. An interdisciplinary approach to the study of women's issues in art, using literary, cultural and sociological texts to enlarge the art historical basis. Topics include "domestic goddess," class issues, racial questions, working women, prostitution, education, marriage and divorce. Dual listed with ENGL 4830; cross listed with WMST 5830. *Prerequisites:* ART 2020, WMST 1080, ENGL 1080.

5870. Women's Studies. 1-4. (Max 8). A seminar in women writers and feminist criticism. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5880. Studies in Modern Fiction. 4. A study of modern fiction, examining theory and practice, and covering works of English, European, and American origin. *Prerequisite:* graduate status or 12 hours of 4000-level work.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5910. English Communication Skills for International Teaching Assistants. 3. Offered satisfactory/unsatisfactory only. Three credit hours for fee purposes. *Prerequisite:* graduate standing.

5915. Tutorial. 1. Graduate standing or consent of instructor. One credit hour for fee purposes.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5975. Independent Studies. 1-4 (Max. 6). Independent study and research experience in a given topic, person, or movement in literature at an advanced level. *Prerequisite:* permission of chair; graduate standing.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Geography

207 Arts and Sciences Building, 766-3311
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Web site: www.uwyo.edu/geog
Department Chair: Gerald R. Webster

Professors:

WILLIAM L. BAKER, B.S. Oregon State University 1977; M.S. University of North Carolina 1980; Ph.D. University of Wisconsin 1987; Professor of Geography 1998, 1990.

THOMAS BUCHANAN, B.S. State University New York College-Cortland 1973; M.S. University of Wyoming 1975; Ph.D. University of Illinois 1979; Professor of Geography 1989, 1979; University of Wyoming President 2005.

GERALD R. WEBSTER, B.A. University of Colorado - Denver 1975; M.S. Western Washington University 1980; Ph.D. University of Kentucky 1984; Professor of Geography 2007.

Associate Professors:

WILLIAM J. GRIBB, B.S. Wayne State University 1973; M.A. University of Colorado 1975; Ph.D. Michigan State University 1982; Associate Professor of Geography 1993, 1988.

DEBORAH D. PAULSON, B.A. College of St. Benedict/St. John's University 1975; M.S. Northern Arizona University 1981; Ph.D. University of Hawaii 1992; Associate Professor of Geography 1998, 1990.

Assistant Professors:

CARL J. LEGLEITER, B.S. Montana State University 2002; M.A. University of California Santa Barbara 2004; Ph.D. 2008; Assistant Professor of Geography 2009.

STEVEN D. PRAGER, B.S. University of North Carolina-Charlotte 1992; M.A. 1995; Ph.D. Simon Fraser University 2002; Assistant Professor of Geography 2004.

JACQUELINE J. SHINKER, B.S. University of Arizona 1996; M.A. University of Oregon 1999; Ph.D. 2003; Assistant Professor of Geography 2005.

Visiting Assistant Professor:

JOHN PATRICK HARTY, B.S. Montana State University 1995; M.S. University of Utah 2000; Ph.D. Kansas State University 2007; Visiting Assistant Professor of Geography 2008.

Research Scientist:

JEFFREY D. HAMERLINCK, B.S. University of North Dakota 1988; M.P. University of Wyoming 1992; Director, Wyoming Geographic Information Sciences Center (WyGISC) 2004.

Assistant Research Scientist:

JAMES R. OAKLEAF, B.S. University of Wyoming 1991; M.P. 1995.

ZONGBO SHANG, B.S. Shenyang Agricultural University 1995; M.S. 1998; Ph.D. Chinese Academy of Sciences 2001.

Adjunct Faculty:
J. Michael Daniels, Ken Orvis

Professor Emeritus:
John L. Allen, Ronald E. Beiswenger, Lawrence M. Ostresh, Jr., Richard G. Reider

The Department of Geography offers programs leading to the master of arts, master of science in teaching, and master of planning degrees. Areas include: physical geography; natural resource management; spatial analysis, information, and display, and human geography. Areas in planning include: land use planning, natural resource planning, and small town and rural area planning.

Program Specific Admission Requirements

In addition to the minimum requirements set forth in this Bulletin, applicants must submit a statement of academic and professional goals. All applicants are evaluated on an individual basis. Undergraduate deficiencies, identified by the candidate and adviser, can be remedied during the degree program.

Program Specific Graduate Assistantships

Graduate assistantships are available as both teaching and research assistantships. Applicants for graduate assistantships must submit their completed materials to the graduate coordinator of the department by February 7 prior to the fall semester for which they are seeking the assistantship. Students already in the program as well as new applicants for admission may apply for graduate assistantships. Assistantship duties will be determined following the award and acceptance of the student.

Program Specific Degree Requirements

Incoming students must have a minimum undergraduate background equivalent to 15 semester hours in college-level geography courses to include 3 hours each in maps and mapping, human geography, and physical geography. Planning students may use undergraduate course work in planning, analytic tools, regional science, or other relevant subject matter to meet the undergraduate requirement. Deficiency courses prescribed by the faculty adviser do not count toward graduate program requirements, and must be taken for credit and for a grade (not S/U).

Master's Programs

Plan A (thesis)

GEOG 5000 Research Perspectives

Any two of the following methods courses (6-8 cr) or suitable alternatives approved by the student's committee:

- GEOG 4000. Terrain Analysis.
- GEOG 4150. Cartography and Digital Map Design.
- GEOG 4200. Intro to GIS
- GEOG 5111/5112. Remote Sensing of the Environment/Lab.
- GEOG 5210. Advanced Geographic Information Systems.
- GEOG 5220. Spatial Modeling.
- GEOG 5790. Research Methods

All students must complete a thesis which shall be an original contribution to knowledge. All students must prepare a thesis proposal for submission to their committee and have committee approval to initiate research on their theses and must successfully complete an oral defense of their theses. The student's committee may also require a written examination.

Plan B (non-thesis)

GEOG 5000. Research Perspectives.

Any two of the following methods courses (6-8 cr) or suitable alternatives approved by the student's committee:

- GEOG 4000. Terrain Analysis.
- GEOG 4150. Cartography and Digital Map Design.
- GEOG 4200. Intro to GIS
- GEOG 5111/5112. Remote Sensing of the Environment/Lab.
- GEOG 5210. Advanced Geographic Information Systems.
- GEOG 5220. Spatial Modeling.
- GEOG 5790. Research Methods.

All students must have committee approval to initiate research on their professional papers and must successfully complete an oral defense of their professional papers. The student's committee may also require a written examination.

Master of Arts in Geography

Students must fulfill all requirements listed under Master's Programs heading. This is a specialized and directed multidisciplinary program designed by the student in consultation with their advisor and thesis committee. Students interested in obtaining a Geography/Water Resources degree should contact appropriate Water Resource Faculty representatives within the Geography department prior to the application process.

Master of Science in Teaching

Students must fulfill all requirements above, plus requirements developed in conjunction with faculty adviser in the College of Education, not to be less than 12 credit hours of courses in education and/or geography education.

Master of Planning

Core courses (12 hours)

- GEOG 4310. Planning Theory.
- POLS 5510. Public Policy and Program Management.
- GEOG 5325. Legal Aspects of Planning.
- GEOG 5330. Land Use Planning.

Analysis courses: (three courses - 9 hours; 1 course Statistics, 2 courses Techniques)

- Statistics: (one course - 3 hours)
- Techniques: (two courses - 6 hours)

Students completing the Plan A option are required to complete a minimum of 4 hours of thesis research.

Students completing the Plan B are required to complete two papers from the areas of planning: land use, natural resource, or small town and rural area.

Elective courses

- 15 hours of elective course work in planning areas: land use, natural resource, or small town and rural area approved by faculty adviser.

Students completing the Plan A option are required to complete a minimum of 4 hours of thesis research. Students completing the Plan B are required to complete two papers from the areas of planning: land use, natural resources, or small town and rural area.

Master of Arts in Geography/Water Resources

GEOG 4080. Management of Major River Basins.

REWM 4700. Wildland Watershed Management. or REWM 4285. Wildland Hydrology.

GEOG 5450 .Fluvial Geomorphology.

In completing core methods requirements students may also choose GEOL 5800. Advanced Remote Sensing. and Technical Mapping or GEOG 5111. Remote Sensing of the Environment .

Technical Hydrology Course Requirement (at least one of the following):

- CE 4800. Hydrology.
- CE 4820. Groundwater and Drainage Engineering.
- CE 5810. Groundwater Hydrology.
- GEOL 5444. Geohydrology.
- GEOL 5550. Numerical Methods in Ground Water Geology I.
- GEOL 5570. Advanced Geohydrology.
- REWM 4285. Wildland Hydrology.
- REWM 5280. Stream Habitat Management.
- MATH 5110. Modeling Flow Transport in Soil and Groundwater Systems.

Water Resource Economics and/or Water Law Course Requirement

- AGEC 4710. Natural Resource Law and Policy.

Geography (GEOG)

5000. Research Perspectives. 3. Focuses upon the historical development, heritage and topical breadth of geography. Special emphasis is given to the changing approaches and philosophies for conducting research in geography. *Prerequisite:* graduate student admitted to our program, or, any other student with 15 hours of geography courses.

5013. Political Geography. 3. Geographic space is subdivided into political units to aid human interaction and to facilitate political processes. Examines the spatial organization of political space and its effects upon political processes at varying geographic scales ranging from the local to international. Cross listed with POLS 5013 and dual listed with GEOG 4013. *Prerequisite:* GEOG 1000 or 1020, or 9 hours of social science.

5060. Landscape Ecology. 3. A study of structure, function, and change in the biosphere on the scale of kilometers. Includes a consideration of the effects of human land uses, natural disturbances, and other processes on landscapes. *Prerequisite:* GEOG 4460 or LIFE 3400 or BOT 4700.

5111. Remote Sensing of the Environment. 4. Combined lecture and laboratory course introduces students to the fundamentals of remote sensing with a strong emphasis on vegetation, land cover and environmental applications. Students learn to use digital spectral data to distinguish characteristics of the terrestrial biosphere important for ecological and land management applications. Dual listed with GEOG 4111; cross listed with BOT 5111. *Prerequisites:* QA and one science course with lab.

5113. Geological Remote Sensing. 4. Acquaints students with aircraft and spacecraft remote sensing of the environment, emphasizing geologic application to earth and other planetary bodies. Includes visible, infrared, ultraviolet, radio and radar sensing. The laboratory exercises are applications related to tectonics, geomorphology, paleoclimate, structure, statigraphy, environmental geology and geologic hazards. Dual listed with GEOG 4113; cross listed with GEOL 5113. *Prerequisites:* GEOL 1005 or 1100 or 1200 or GEOG 1010 and MATH 1400/1405 or MATH 1450.

5210. Advanced Geographic Information Systems. 4. Advanced study of programs, data structures, and techniques for spatial data display and analysis. Dual listed with GEOG 4210. *Prerequisites:* GEOG 4200.

5211. Advanced Remote Sensing of the Environment. 4. Includes lecture and laboratory. Specific topics include a review of remote sensing fundamentals and methods for using high spatial resolution data, hyperspectral data, active remote sensing, advanced image processing, advanced classification techniques and statistical techniques specific to exploring remotely sensed data. Dual listed with GEOG 4211; cross listed with BOT 5211. *Prerequisite:* BOT/GEOG/GEOL 4111/5111.

5220. Spatial Modeling and Geocomputation. 4. Examines the theory and development of models of spatial patterns and process. Modeling these systems often requires techniques not readily available in GIS environment. Examines GIS and geocomputational methods to solve these problems as well as issues related to error, representation, and scale. Dual listed with GEOG 4220. *Prerequisite:* GEOG 4200/4210.

5240. GIScience for Business and Industry. 3. Examines a variety of roles that GIScience plays in the modern day business landscape. Through a combination of lectures and hands-on work with some of the same tools employed by industry, students become acquainted with the roles and applications of GIScience in a business context. Dual listed with GEOG 4240. *Prerequisites:* junior standing, QB.

5300. GPS for Natural Resource Management. 3. Introduction to the basic concepts of the global positioning system, project planning and development, integration into a GIS, and its applications to natural resource management. Dual listed with GEOG 4300. *Prerequisite:* senior or graduate status and GEOG 2150.

5310. Foundations of Sustainable Planning. 3. Description and analysis of planning that involves a citizen involvement process to determine the future direction of a community or region. Sustainability concepts are described to provide a framework for social equity, environmental protection, and economic longevity, the fundamental elements of a community or regional comprehensive plan. *Prerequisite:* junior standing.

5325. Legal Aspects of Planning. 3. Review of the U.S. Constitution, federal and state laws and statues, and pertinent court cases that directly relate to planning policy at the federal, state and local level. Examination of the legal system to provide services and protect the health, safety, and welfare of citizens with regard to private property rights. Dual listed with GEOG 4325. *Prerequisites:* junior standing, USP V course.

5330. Land Use Planning. 3. Advanced study of processes expressed as a specific activity on the land. An examination and analysis of the interacting environmental, economic, and social factors that produce the land activity. Dual listed with GEOG 4330. *Prerequisite:* graduate standing in GEOG.

5370. Environmental Planning. 3. A planning-oriented approach to ecosystems theory based on the federal/legal regulatory foundation. An examination of scientific and alternative perspectives on the comparative dynamics of natural and human-oriented ecosystems and implementing strategies. Dual listed with GEOG 4370. *Prerequisite:* GEOG 4330/5330.

5390. Rural and Small Town Planning. 3. A single community planning problem is assigned. Student teams play the role of community planning staff. Teams experience defining community goals; communicating with others about these goals and problem perceptions; accomplishing necessary research; perceived; selecting from among these solutions, and formulating a single, integrated, comprehensive plan, and documenting the plan and rationale behind it. Dual listed with GEOG 4390. *Prerequisite:* work at the 4000-level in one or more of the four substantive areas, and/or consent of the instructor.

5450. Fluvial Geomorphology. 3. Examines rivers and river related landforms. Investigates the physical processes by which water transports and deposits sediment to generate landforms ranging in scale from hillslope rills to continental drainage systems. Emphasizes surface water hydrology, erosion, sedimentation, channel morphology, and the influences of climate change and human activities on fluvial systems. Dual listed with GEOG 4450. *Prerequisite:* GEOG 3010 or GEOL 2100 or 2150.

5470. Fire Ecology. 3. Natural and human-caused fires are an important phenomenon affecting ecosystems and human communities throughout the world. Explores the geography, ecology, and management of fires. Dual listed with GEOG 4470. *Prerequisite:* GEOG 4460, BOT 4700, LIFE 3400 or graduate standing.

5540. Topics in Cultural Ecology. 3 (Max. 6). Examination of a selected topic of human-environment interaction from a cultural ecological perspective. May be repeated for a maximum of 6 credits under a different course topic. Dual listed with GEOG 4540. *Prerequisites:* junior standing and 4 credits of biological or earth science and 6 credits of social science.

5750. Public Land Management. 3. Management of the federal and public lands of the United States. Includes consideration of management issues, agencies and organization, and management approaches for public lands and associated natural resources. Dual listed with GEOG 4750. *Prerequisite:* 6 hours in geography or ENR.

5790. Research Methods. 1-3 (Max. 9). Introduction to the methodology of empirical research in related fields for advanced students. *Prerequisites:* 12 hours in the major and consent of instructor.

5870. Internship/Practicum. 1-12 (Max. 12). Experience in applying student skills and training in an agency, organization, or business. Dual listed with GEOG 4870. *Prerequisite:* for majors only, junior standing.

5875. Independent Study. 1-6 (Max. 6). Considers current research topics in consultation with faculty member. Dual listed with GEOG 4875. *Prerequisite:* 9 hours in subject area of topic of current research.

5880. Current Topics. 1-9 (Max. 9). Special course on a topic of current interest. Dual listed with GEOG 4880. *Prerequisite:* junior standing.

5885. Seminar. 1-3 (Max. 6). Faculty-student discussion, reading, and study focused on a selected topic of interest. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Geology and Geophysics

122 Geology Building, 766-3386
FAX: (307) 766-6679
Web site: www.uwyo.edu/geology
Department Head: Arthur W. Snoke

Professors:

CARRICK M. EGGLESTON, A.B. Dartmouth College 1983; Ph.D. Stanford University 1991; Professor of Geology 2006, 1995.

B. RONALD FROST, B.A. University of Virginia 1969; M.S. University of Washington 1971; Ph.D. 1973; Professor of Geology 1989, 1978.

CAROL D. FROST, A.B. Dartmouth College 1979; Ph.D. Cambridge University 1984; Professor of Geology 1995, 1983.

PAUL L. HELLER, B.S. State University of New York 1974; M.S. Western Washington University 1978; Ph.D. University of Arizona 1983; Professor of Geology 1994, 1983.

W. STEVEN HOLBROOK, B.S. Pennsylvania State University 1982; M.S. Stanford University 1985; Ph.D. 1989; Professor of Geophysics 2003, 1997.

NEIL F. HUMPHREY, B.S. University of British Columbia 1978; M.S. University of Washington 1983; Ph.D. 1987; Professor of Geology 2002, 1990.

BARBARA E. JOHN, B.A. University of California-Berkeley 1978; Ph.D. University of California-Santa Barbara 1987; Professor of Geology 2002, 1992.

SUBHASHIS MALLICK, B.S. Indian Institute of Technology 1976; M.S. 1978; Ph.D. University of Hawaii 1987; Professor of Geology and Geophysics and the School of Energy Resources 2008.

JAMES D. MYERS, B.S. University of Rhode Island 1973; M.A. The Johns Hopkins University 1977; Ph.D. 1979; Professor of Geology 1993, 1981.

ARTHUR W. SNOKE, A.B. Franklin and Marshall College 1967; Ph.D. Stanford University 1972; Professor of Geology 1984.

MAUREEN B. STEINER, B.S. Southern Methodist University 1966; M.S. 1967; Ph.D. University of Texas-Dallas 1975; Professor of Geology 1994, 1976.

Associate Professors:

MICHAEL J. CHEADLE, B.A. Oxford University 1981; M.S. Cornell University 1984; Ph.D. Cambridge University 1989; Associate Professor of Geology and Geophysics 2001.

KENNETH G. DUEKER, B.A. Whitman College 1984; Ph.D. University of Oregon 1994; Associate Professor of Geophysics 2006, 2000.

ROBERT R. HOWELL, B.S. University of Michigan 1974; Ph.D. University of Arizona 1980; Associate Professor of Geology and Geophysics 1992, 1986.

JOHN KASZUBA, B.S. Beloit Collge 1982; M.S. Virginia Polytechnic Institute & State University 1986; Ph.D. Colorado School of Mines 1997; Associate Professor of Geology and the School of Energy Resources 2008.

Assistant Professor:

BARBARA CARRAPA, M.S. University of Pavia, Italy 1998; Ph.D. Vrije University, Amsterdam, The Netherlands 2002; Assistant Professor of Geology 2007.

PO CHEN, B.S. Beijing University 2000; Ph.D. University of Southern California 2005; Assistant Professor of Geology and Geophysics and the School of Energy Resources 2008.

MARK T. CLEMENTZ, B.S. University of Missouri, Columbia 1996; Ph.D. University of California, Santa Cruz 2002; Assistant Professor of Geology 2005.

CLIFFORD S. REIBE, B.S.E. University of Michigan 1992; Ph.D. University of California-Berkeley 2000; Assistant Professor of Geology 2008.

BRYAN N SHUMAN, B.A. Colorado College 1994; M.S. Brown University 1997; Ph.D. 2001; Assistant Professor of Geology 2007.

YE ZHANG, B.S. Nanjing University (PR China) 1998; M.S. University of Minnesota 2004; Ph.D. Indiana University 2005; Assistant Professor of Geology 2007.

Lecturers:

ERIN CAMPBELL-STONE, B.A. Occidental College 1992; Ph.D. University of Wyoming 1997; Associate Lecturer 2005, 2001.

RANDI S. MARTINSEN, B.S. S.U.N.Y. Stony Brook 1971; M.S. Northern Arizona University 1975; Senior Lecturer 1995.

Research Scientists:

STEVEN BOESE, B.A. University of Minnesota 1972; Ph.D. University of Wyoming 1978; Senior Research Scientist 1989, 1975.

KEVIN R. CHAMBERLAIN, B.A. Colgate University 1979; Ph.D. Washington University 1990; Research Professor 2004, 1990.

SUSAN SWAPP, B.A. Indiana University 1977; M.S. Yale University 1978; Ph.D. 1982; Senior Research Scientist 1994.

Adjunct Professors:

Eric Erslev, Warren B. Hamilton, Peter H. Hennings, David A. Stephenson

Professors Emeriti:

Donald W. Boyd, James I. Drever, William E. Frerichs, Jason A. Lillegraven, Ronald W. Marrs, James E. McClurg, Brainerd Mears, Jr., Peter Shive, Scott B. Smithson, James R. Steidtmann, Ronald C. Surdam

The department offers instruction and research programs leading to master of science and doctor of philosophy degrees in both geology and geophysics and to the master of science in geology/water resources.

Program Specific Admission Requirements

All applicants must complete a departmental application form with statement of intent. Forms are available from the Department of Geology and Geophysics Web site at home.gg.uwyo.edu.

Application deadline is January 15 of each year.

All applicants should have completed undergraduate coursework including mathematics through calculus, one year of chemistry, basic training in geology, and for most areas, one year of calculus-based physics.

Applicants to the geophysics graduate program should have an undergraduate degree in geophysics, geology, mathematics, physics, or engineering.

Applicants to the Ph.D. program, without a M.S. degree, must have attained an exceptional undergraduate record.

Formal approval of application by the departmental admissions committee.

Formal acceptance by an adviser.

Formal notice of admission by the university.

Program Specific Graduate Assistantships

All applicants to the geology and geophysics graduate program are considered for assistantships. Applicants are NOT required to complete the graduate assistant application form.

Program Specific Degree Requirements

Master of Science in Geology Plan A (thesis) (26 hours of coursework and 4 hours of thesis)

Preliminary and initial advising shall take place upon acceptance to the graduate program to identify background deficiencies and develop a list of required deficiency coursework to be taken. Deficiency coursework must be completed with a grade of B or better early in the student's graduate residence.

All candidates for advanced degrees are required to enroll in the Field Course GEOL 4717 or have had equivalent training before undertaking research problems involving field studies.

GEOL 5020 Fundamentals of Research is required of ALL graduate students during the first semester of residence.

All graduate students in geology must complete two semesters of GEOL 5200. Distinguished Lecture Series in the first two semesters of residence.

All M.S. students in the Department of Geology and Geophysics will be required to complete a qualifying exam by the end of the second term in residence. Specific department examination requirements are available from the department office. Failure of this exam may result in dismissal from the graduate program.

The candidate's committee shall evaluate the thesis and conduct the final examination. The final exam is an oral presentation of the thesis, oral defense of thesis, and oral responses to questions relating to ancillary topics. Failure of this exam can result in dismissal. Retaking of the exam is subject to the discretion of the candidate's graduate committee. Exams will not be scheduled during the summer months.

Master of Science in Geophysics Plan A (thesis) (26 hours of coursework and 4 hours of thesis)

Preliminary and initial advising shall take place upon acceptance to the graduate program to identify background deficiencies and develop a list of required deficiency coursework to be taken. Deficiency coursework must be completed with a grade of B or better early in the student's graduate residence.

All candidates for advanced degrees are required to enroll in the Field Course GEOL 4717 or have had equivalent training before undertaking research problems involving field studies.

GEOL 5020 Fundamentals of Research is required of ALL graduate students during the first semester of residence.

All graduate students in geophysics must complete two semesters of GEOL 5210. Distinguished Lecture Series in the first two semesters of residence.

All M.S. students in the Department of Geology and Geophysics will be required to complete a qualifying exam by the end of the second term in residence. Specific department examination requirements are available from the department office. Failure of this exam may result in dismissal from the graduate program.

The candidate's committee shall evaluate the thesis and conduct the final examination. The final exam is an oral presentation of the thesis, oral defense of thesis, and oral responses to questions relating to ancillary topics. Failure of this exam can result in dismissal. Retaking of the exam is subject to the discretion of the candidate's graduate committee. Exams will not be scheduled during the summer months.

M.S. candidates in geophysics must complete 6 hours of mathematics and three hours of physics or engineering courses at the graduate level.

M.S. candidates must take at least 12 hours of 4000- and 5000-level courses in geophysics. Recommended graduate level mathematics courses include differential equations, numerical analysis, and real and complex variables; in physics and engineering they include classical mechanics, continuum mechanics, elasticity, electricity and magnetism. Substitutions for graduate-level geophysics courses may be made with the permission of the candidate's adviser. Remaining graduate-level course requirements may be made up from courses in physics, engineering, mathematics, and geology.

Doctor of Philosophy in Geology (72 hour program)

Preliminary and initial advising will identify background deficiencies and develop a list of required deficiency coursework. Deficiency coursework must be completed with a grade of B or better early in the student's graduate residence.

All candidates for advanced degrees are required to enroll in the Field Course GEOL 4717 or have had equivalent training before undertaking research problems involving field studies.

Completion of GEOL 5020 Fundamentals of Research is required during the first semester of residence.

All graduate students in Geology must complete two semesters of GEOL 5200. Distinguished Lecture Series in the first two semesters of residence.

All Ph.D. students in the Department of Geology and Geophysics will be required to complete a qualifying exam by the end of the second term in residence. Specific department examination requirements are available from the department office. Failure to complete the exam by the end of the second semester in residence without an approved extension will result in suspension of the student's financial support, irrespective of the source of funding. Ph.D. students who fail the exam will be asked to withdraw from the graduate program or to enroll in the M.S. program.

The preliminary examination is administered following completion of 30 hours of 4000-level or higher coursework, not including independent study or research credits. Failure of this exam may, at the discretion of the thesis committee, lead to a re-examination during the following semester in residence, remedial work, or expulsion from the program.

The Ph.D. dissertation and its defense are described in the regulations section of this Bulletin. Specific department examination requirements are available from the department office. The candidate's committee is responsible for monitoring progress of the research, refereeing the written work, and administering the final examination.

Doctor of Philosophy in Geophysics (72 hour program)

Preliminary and initial advising will identify background deficiencies and develop a list of required deficiency coursework. Deficiency coursework must be completed with a grade of B or better early in the student's graduate residence.

All candidates for advanced degrees are required to enroll in the Field Course GEOL 4717 or have had equivalent training before undertaking research problems involving field studies.

All graduate students in geophysics must complte two semesters of GEOL 5210. Distinguished Lecture Series in the first two semesters of residence.

Completion of GEOL 5020 Fundamentals of Research is required during the first semester of residence.

Ph.D. candidates in geophysics must complete at least 6 additional hours of graduate-level coursework: 3 in mathematics and 3 in physics or engineering. Recommended graduate-level mathematics courses include differential equations, numerical analysis, and real and complex variables; in physics and engineering, they include classical mechanics, continuum mechanics, elasticity, electricity and magnetism. Ph.D. candidates are required to take at least 12 hours of 5000-level geophysics courses exclusive of GEOL 5854. Substitutions for graduate-level geophysics courses may be made with the permission of the candidate's adviser. Remaining graduate-level course requirements may be made up from courses in physics, engineering, mathematics, and geology.

All Ph.D. students in the Department of Geology and Geophysics will be required to complete a qualifying exam by the end of the second term in residence. Specific department examination requirements are available from the department office. Failure to complete the exam by the end of the second semester in residence without an approved extension will result in suspension of

the student's financial support, irrespective of the source of funding. Ph.D. students who fail the exam will be asked to withdraw from the graduate program or to enroll in the M.S. program.

The preliminary examination is administered following completion of 30 hours of 4000-level or higher coursework, not including independent study or research credits. Failure of this exam may, at the discretion of the thesis committee, lead to a re-examination during the following semester in residence, remedial work, or expulsion from the program.

The Ph.D. dissertation and its defense are described in the regulations section of this Bulletin. Specific department examination requirements are available from the department office. The candidate's committee is responsible for monitoring progress of the research, refereeing the written work, and administering the final examination.

Master of Science in Geology/Water Resources and Master of Science in Geophysics/Water Resources

Please refer to the Water Resources section of the bulletin for degree requirements.

Geology and Geophysics (GEOL)

5000. Paleomagnetism in Geology/Geophysics. 3. Studies paleomagnetic solutions in geoscience topics. Includes plate reconstructions; sea-floor formation; structural geology; dating of structural/tectonic events; western North American tectonics; global geomagnetic polarity reversals and time scale; magneto-stratigraphic correlation; stratigraphic dating; dating diagenetic events; characteristics of core and mantle; extraterrestrial impacts and geologic phenomena; environmental and climate change applications. Field trip and laboratory project required. Dual listed with GEOL 4000. *Prerequisite:* GEOL 1000 or 1100, GEOL 1200 desirable.

5020. Fundamentals of Research. 2. Lectures, discussion and projects centered on three fundamental aspects of research: development of research tools, understanding the scientific method, learning how to write a grant, read the literature and present a talk. Class is designed for all incoming graduate students in the department. *Prerequisite:* graduate standing.

5030. Groundwater Flow and Solute Transport Modeling. 3. Movement of groundwater and the dissolved solute is responsible for a variety of environmental, engineering, and geological processes of interest. Presents an overview of the analyses of groundwater flow and solute transport using numerical modeling. The principles of the Finite Difference Method are introduced. *Prerequisites:* MATH 2205, GEOL 5444.

5050. Introduction to Isotope Geology. 3. Understanding of atomic structure, radioactive decay, mass spectrometry, dating techniques and petrologic uses of isotropic systems. Emphasis will be placed on evaluating dating methods in relation to particular geologic problems and possible sources of error. The use of isotopes in defining magmatic sources and crustal contamination are discussed. *Prerequisites:* CHEM 1020, CHEM 1110, MATH 2200, MATH 2205.

5113. Geological Remote Sensing. 4. Acquaint students with aircraft and spacecraft remote sensing of the environment, emphasizing geological application to earth and other planetary bodies. Includes visible, infrared, ultraviolet, radio and radar sensing. The laboratory exercises are applications related to tectonics, geomorphology, paleoclimate, structure, statigraphy, environmental geology and geologic hazards. Dual listed with GEOL 4113 and cross listed with GEOG 4113/5113. *Prerequisites:* GEOL 1005 or 1100 or 1200 or GEOG 1010 and MATH 1400/1405 OR MATH 1450.

5120. Tectonic Evolution of the North American Cordillers. 4. Phanerozoic tectonic evolution of western North America viewed through the paradigm of plate tectonics. Course involves intensive literature review, guest speakers, a possible field trip, and an in-depth regional tectonic analysis to be done by each student. *Prerequisite:* GEOL 2020, GEOL 2100, and GEOL 4610.

5140. Advanced Igneous Petrology. 4. Review of the classification of igneous rocks, physical characteristics of magmas and processes of magmatic differentiation. Using this knowledge, the course examines the major type of global magmatism. Topics considered include mid-ocean ridges, subduction zones, layered complexes and continental volcanism. *Prerequisite:* GEOL 2020.

5150. Metamorphic Petrology. 4. Lectures on field occurrence, macroscopic and microscopic characteristics of igneous rocks, followed by lectures on application of physical chemistry to genetic study of igneous rocks. Laboratory devoted to the study of suites of igneous rocks from classical areas. *Prerequisite:* GEOL 2020 and 4490; graduate standing.

5160. Regional Tectonics. 4. The study of orogenic belts worldwide including both external and internal zones. Cross-section preparation is emphasized as well as geometric analysis. Includes lectures, readings, and a cross-section project. *Prerequisite:* GEOL 4610.

5180. Reflection Seismology. 3. Lectures treating seismic methods applied to the study of earth structures ranging from exploration to crustal structure. Topics covered include wave propagation recording techniques, processing, modeling, resolution and interpretation. Laboratory exercises give practical experience on lecture topics and emphasize use of instruments and data analysis. Computer processing introduced. *Prerequisite:* GEOL 1200, one year of calculus and one year of physics.

5190. Petroleum Geology. 3. Principles governing the exploration for hydrocarbons; characteristics of reservoirs and traps; origin, migration and accumulation of hydrocarbons; subsurface evaluation techniques. Dual listed with GEOL 4190. *Prerequisites:* GEOL 2100, 4610.

5191. Methods in Petroleum Geology. 3. Lectures and laboratory exercises are designed to give the student experience in working with various kinds of geoscientific data in relation to the exploration for and production of hydrocarbons. Most exercises utilize real data and real situations. Topics include recognition of hydrocarbons, interpretation of sample, mud and geophysical logs, geologic utilization of drill stem tests; subsurface correlation and mapping techniques; prospect generation. *Prerequisite:* GEOL 5190.

5200. Topics in Geology. 1-3 (Max. 9). Provides a detailed study at a graduate level of a particular topic in geology. *Prerequisite:* graduate standing in geology and geophysics and permission of the instructor.

5210. Topics in Geophysics. 1-3 (Max. 9). Provides a detailed study at a graduate level of a particular topic in geophysics. *Prerequisite:* graduate standing in geology and geophysics and permission of instructor.

5211. Seminar in Structural Geology and Tectonics. 1 (Max. 6). Selected topics in structural geology and tectonics. On-going research among undergraduate and graduate students is emphasized. Prerequisite: GEOL 4610 or equivalent course.

5212. Sedimentary Seminar. 1 (Max. 3). Seminar in selected topics in sedimentary geology. Designed to bring, and keep, graduate students up to date with the current literature and new, unpublished ideas. Visiting lecturers and presentations of student and faculty research. *Prerequisite:* graduate standing.

5215. Inverse Theory. 3. Inverse theory is about learning the techniques to invert data for an acceptable model. The simplest example is least-squares fitting of a line. Covers inversion of both over and under-determined inverse problems, regularization techniques, bayesian theroy, along with probabilistic viewpoints. Prerequisites: graduate standing in geology and geophysics; linear algebra, MATLAB programming.

5216. Global Seismology. 3. Introductory class in theoretical seismology with emphasis on wave propagation. Topics include elastic wave theory for body and surface waves, normal modes, anisotropic wave propagation, source processes, derivation of the wave equation, the ray theoretical approximation, representation theorems, stress/strain constitutive relations,

normal modes, surface waves, and attenuation operators. *Prerequisites:* graduate standing in geology or geophysics and permission of the instructor.

5217. Geodynamics. 3. Examines the fundamental physical processes necessary for the understanding of plate tectonics and a variety of other geological phenomena. Provides a solid grounding for future study and research covering plate tectonics, stress & strain, elasticity, isostasy & the flexural strength of the lithosphere, gravity, and thermal processes. *Prerequisites:* GEOL 1100, one year of college-level Physics and MATH 2210.

5220. Vertebrate Morphology and Evolution. 2. Course for paleontology majors and vertebrate anatomists involving advanced concepts, recent literature, and research training in the areas of morphology and evolution of fossil vertebrates. Cross listed with ZOO 5220. Prerequisite: GEOL/ZOO 4150 or GEOL/ZOO 4160, or GEOL/ZOO 4170 or ZOO 4000.

5230. Vertebrate Paleobiogeography. 2. Lectures and discussions devoted to use of data from the fossil record of vertebrates in interpreting ancient distributions of landmasses and seaways, recognizing paleoclimatic changes, and documenting the evolution of zoogeographic provinces. *Prerequisite:* GEOL/ZOO 4150, or GEOL/ZOO 4160 or GEOL/ZOO 4170.

5240. Vertebrate Biostratigraphy. 2. Lectures, discussion, and exercises devoted to use of the fossil record of vertebrates (with emphasis on mammalian assemblages) in recognizing contemporaneous physical and/or biological events within and between geographic areas. Field trip. *Prerequisite:* GEOL/ZOO 4150 or GEOL/ZOO 4160 or GEOL/ZOO 4170.

5300. Sedimentary Basins. 4. Sedimentary basin evolution are examined from the view point of plate tectonics, thermal histories, and lithospheric processes. Quantitative basin modeling techniques are applied to understanding subsidence histories, sea level changes, and the primary controls on the formation of stratigraphic sequences. *Prerequisite:* 1 year of calculus.

5310. Marine Depositional Systems. 3. Papers, readings, and discussions concerning processes and sediments in modern depositional environments and the recognition of ancient sedimentary environments. Prerequisite: GEOL 4420.

5320. Non-Marine Depositional Systems. 3. Papers, readings and discussions concerning process and sediments in modern nonmarine depositional systems. Emphasis will be on fluvial and eolian environments and their recognition in the rock record. *Prerequisite:* GEOL 4420.

5340. Advanced Tectonics and Sedimentation. 3. Lectures, seminars, and field observations on the relations between tectonism and the sedimentary record. Topics include a review of plate tectonic theory, characteristics of major types of sedimentary basins, techniques for evaluating tectonic activity from evidence in the sedimentary record and large-scale tectonosedimentary elements. *Prerequisites:* graduate standing, GEOL 2100, and GEOL 4610.

5350. Diagenesis of Clastic Sedimentary Rocks. 5. The study of diagenesis of clastic sedimentary rocks utilizing all available observational, experimental and theoretical data. Particular attention will be given to the relationship between diagenesis and porosity (mass transfer). The objective of the course is to understand diagenetic processes and ultimately to make porosity predictions in a variety of geological terrains. Laboratories consist of examining suites of thin sections and rocks from a variety of classical techniques used in studying diagenetic problems. The first semester emphasizes the observation aspects of clastic diagenesis. *Prerequisite:* consent of instructor.

5410. Geochemical Analytical Methods. 4. Lectures and laboratories in analytical methods used in geochemical studies. Particular emphasis given to sampling and sample preparation, inductively coupled argon plasma emission, atomic absorption analysis. Other analytical methods are also treated. *Prerequisite:* GEOL 4490.

5420. Surfaces and Interfaces. 3. Examines the role of surfaces and solid-solution interfaces in regulating the chemistry of the Earth's surface. Subjects to be covered includes surface tension, capillarity, and the thermodynamics of surfaces; the equilibrium and kinetic chemistry of absorption-desorption; dissolution-precipitation kinetics and controlling factors; surface catalysis; and surface oxidation-reduction reactions. Presented in the context of geochemically and environmentally important processes such as chemical weathering, partitioning of solutes between water and surfaces, and the transport and degradation of pollutants. *Prerequisite:* one of the following: GEOL 4490, 4777, 5777, or CHEM 3500, 4505.

5430. Applied Geostatistics. 3. Designed to provide general geostatistical analyses and their applications for spatial random variables and functions. Topics covered include variogram, cross validation, kirging, cokirging, sampling strategies, and both non-conditional and conditional simulations. Several geostatistics packages are used to analyze real field data and students are encouraged to use their own data for practicing geostatistical applications. Examples are taken from geohydrology, soil science, crop science, mining, and various environmental studies. *Prerequisite:* STAT 4010.

5444. Geohydrology. 3. Discusses principles governing occurrence, movement and extraction of water in subsurface geologic environment. Once required weekend field trip in September. Dual listed with GEOL 4444. *Prerequisite:* MATH 2205.

5446. Introduction to Geostatistics. 3. The development of the basic principles of geostatistics and its practical applications in the geosciences will be presented. Main topics include: sptaial analysis, kriging, cokriging, geostatistical simulations (unconditional, conditional). If time permits additional topics include: simple kriging, indicator kriging and block kriging. *Prerequisites:* MATH 2200, 2205, 2250 and STAT 2000.

5450. Water Quality Modeling. 3. Development and application of analytical techniques to model movement of dissolved chemical species in groundwater and surface water. Lumped parameter models and error-function solutions to differential equations describing transport are emphasized. *Prerequisite:* GEOL 4444 or CE 5444, MATH 2210.

5480. Spatial Information Sciences Seminar. 1. There are many earth science technologies, remote sensing, GIS and GPS. Synergism among these technologies increase the range of solutions for research and management. A forum for presentation of these solutions or questions requiring solutions. *Prerequisites:* a course in remote sensing, GIS, GPS, and graduate standing.

5550. Numerical Methods in Ground Water Geology I. 3. Numerical solution of ground water flow equations with emphasis on steady state and elementary time dependent finite difference techniques. *Prerequisites:* GEOL 4444 or 5444, competence in FORTRAN programming.

5560. Numerical Methods in Ground Water Geology II. 3. Time dependent digital simulation models designed to forecast impacts of ground water developments. *Prerequisite:* GEOL 5550.

5570. Advanced Geohydrology. 3. Aquifer performance and testing, ground water basin development and management, conjunctive use of ground and surface water, and regional water resource investigations. *Prerequisite:* GEOL 4444 or 5444.

5600. Theoretical Petrology. 3. Graphic and analytical techniques used to evaluate the genesis of igneous and metamorphic rocks. Principles of thermodynamics, activity-composition relations, and G-X diagrams will be reviewed. Igneous topics include: use of phase diagrams, heat and

mass transfer, magma generation. Fluid rock equilibra and Schreinemakers' analysis will be used to evaluate the origin of metamorphic rocks. *Prerequisites:* GEOL 4490.

5610. Geological Thermodynamics I. 4. Laws of thermodynamics, conditions which constitute chemical equilibrium, and multiple component systems as applied in geologic problems. *Prerequisites:* MATH 2200, MATH 2205, CHEM 1030, consent of instructor.

5630. Electronic Microprobe. 3. Lectures cover the theory of X-ray emission analysis, microprobe instrumentation, and data reduction procedures. Labs cover various uses of mocroprobe in solving geological problems. *Prerequisites:* consent of instructor.

5640. Advanced Igneous Petrology Seminar. 1-3 (Max. 9). Advanced training in igneous petrology emphasizing applications of chemical principles to the study of ingneous rocks. Each year a different aspect of igneous petrology are covered in detail. *Prerequisites:* GEOL 4490, 5050.

5650. Advanced Metamorphic Petrology. 3. Review of the literature and study of the advanced concepts in metamorphic petrology. *Prerequisite:* GEOL 5150.

5660. Microstructural Analysis of Deformed Rocks. 4. The use of microscope in the interpretation of natural strain in rocks is emphasized. Lectures and extensive laboratory exercises are the principle components of the course. Microfabric analysis using the universal stage is introduced. *Prerequisites:* GEOL 4610 required, GEOL 5150 recommended.

5666. Plate Tectonics. 3. The theory of plate tectonics including a quantitative assessment of the observations which lead to its acceptance and limitations. Topics include: geometry of plate tectonics, plate boundaries and plate motions at present and in the past, evolution of plates including sea floor spreading and subduction processes, and driving mechanisms. Two lectures, one laboratory/discussion per week. Dual listed with GEOL 4666. *Prerequisites:* GEOL 4610, geology/geophysics math requirements.

5670. Earth Rheology. 3. Processes of deformation and flow in the earth. Topics include stress, strain, elasticity, mechanical behavior of rocks, mechanics of faulting, microphysics of flow, stress and rheology of earth. *Prerequisites:* GEOL 2020, GEOL 4610, MATH 2210 or PHYS 2310.

5700. Seminar in Structure and Development of the Earth's Crust. 3. Seminar in structure and development of the Earth's crust. Topics include structure and geochemistry of the Precambrian plate tectonics in the Precambrian early history of the Earth, seismic refraction crustal models, seismic reflection crustal models, and crustal genesis. *Prerequisites:* admission is by consent of instructor, GEOL 4610 and one semester of geophysics.

5720. Ore Deposits. 4. Teaches principles of economic geology of ore minerals. Lectures cover geochemistry of ore minerals and environments in which various ore minerals are found. Labs include identification of ore minerals in hand sample and under microscope and methodology of economic geology. Dual listed with GEOL 4720. *Prerequisite:* GEOL 2010.

5730. Seismic Data Processing. 3. Fundamentals of seismic reflection data processing: processing of field tapes, cross-correlation, velocity analysis, stacking, deconvolution. Statistics correct, migration, coherency filtering. *Prerequisites:* GEOL 5180, MATH 4430, MATH 4440.

5740. Seismic Reflection Interpretation. 3. Seminar in processing and interpretation of seismic reflection data including deep crustal data. *Prerequisites:* GEOL 4610, GEOL 5180, and consent of instructor.

5777. Geochemistry of Natural Waters. 3. Physical chemistry of solutions applied to natural waters. Chemistry of rock weathering, controls on major, minor, and trace element contents of natural waters. Problems of introduced pollutants. Dual listed with GEOL 4777. *Prerequisites:* GEOL 2010, CHEM 1060.

5800. Advanced Remote Sensing and Technical Mapping. 2-5 (Max. 5). Application of computer methods to spectral analysis, image processing, geometric correction, data transformation, global positioning, digital photogrammetry, and automated interpretation. Integration of spectral data, image interpretation, field mapping, photogrammetric analysis, and map/image analysis will be emphasized. *Prerequisite:* consent of instructor.

5810. Remote Sensing Seminar. 1. A two-semester sequence of seminars on selected topics in remote sensing. Designed to familiarize the student with recent developments in remote sensing hardware, data processing, and applications. *Prerequisites:* GEOL 4111 or 5111 and consent of instructor.

5820. Advanced Geomorphology. 1-3 (Max. 6). Graduate reading and discussion seminar on current topics in surficial processes. An in-depth analysis of the literature and work, with the subject matter determined by student interest. May include lectures. *Prerequisite:* senior or graduate standing in geology.

5835. Applied/Exploration Geophysics. 3. Discusses the fundamentals of Applied or Exploration Geophysics, encompassing lecture, laboratory classes and discussion of case histories. Covers the Seismic Refraction, Seismic Reflection, Gravity, and Magnetics methods. Provides a solid grounding about the exploration of the Earth's subsurface for mineral and hydrocarbon resources and environmental issues. Dual listed with GEOL 4835. *Prerequisite:* graduate standing in geology.

5850. Economic Geology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5851. Environmental Geology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5852. Geochemistry. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5853. Geomorphology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5854. Geophysics. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5855. Ground Water Hydrology. 1-6 (Max. 7). *Prerequisite:* graduate standing in geology.

5856. Mathematical and Statistical Geology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5858. Paleontology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5859. Petrology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5860. Sedimentology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5861. Stratigraphy. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5862. Structural Geology. 1-6 (Max. 6). *Prerequisite:* graduate standing in geology.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). Prerequisite: advanced degree candidacy.

5940. Cont Reg:Off Campus. 1 - 2. (Max 16). Prerequisite: advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12. (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 14). *Prerequisite:* graduate standing.

History

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Professors:
RONALD D. SCHULTZ, B.A. California State University—Long Beach 1971; M.A. University of California—Los Angeles 1976; Ph.D. 1985; Professor of History 1996, 1985.

Associate Professors:
ADRIAN A. BANTJES, B.A. University of Leiden, The Netherlands 1980; M.A. 1983; Ph.D. University of Texas at Austin 1991; Associate Professor of History 1997, 1991.
MICHAEL C. BROSE, B.S. Seattle Pacific University 1978; M.Sc. University of British Columbia 1985; M.A. University of Washington 1991; Ph.D. University of Pennsylvania 2000; Associate Professor of History 2006, 2000.
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PHILIP J. ROBERTS, B.A. University of Wyoming 1973; J.D. 1977; Ph.D. University of Washington 1990; Associate Professor of History 2000, 1990.
CHERYL A. WELLS, B.A. Queen's University, Kingston, Ontario, Canada 1995; M.A. University of South Carolina 1998; Ph.D. 2002; Associate Professor of History 2007, 2002.

Assistant Professors:
WILLIAM J. BAUER, B.A. University of Notre Dame 1998; M.A. University of Oklahoma 2000; Ph.D. 2003; Assistant Professor of History 2003.
JEFFREY D. MEANS, B.A. Grand Canyon University 1995; M.A. University of Montana 2001; Ph.D. University of Oklahoma 2007; Assistant Professor of History 2007.
DAVID MESSENGER, B.A. McGill University 1993; M.A. University of Toronto 1994; Ph.D. 2000; Assistant Professor of History 2006.

Adjunct Professors:
Campbell, Elliot, Flesher, Hosmer, Simpson

Professors Emeriti:
Cook, Dieterich, Gruenfelder, Hardy, Kohler, Moore, Williams

The Department of History offers graduate programs leading to master of arts and master of arts in teaching degrees.

Program Specific Admission Requirements

Admission to the master's degree program is open to students with a bachelor's degree in history or comparable preparation who provide a completed application and meet the university minimum requirements. Applicants must also submit the following documents directly to the university by the first Monday in February.

Univer5sity application form.

GRE scores for the verbal and quantitative portions with a minimum combined score of 900, with neither score below 350. The history department reserves the right to consider the analytical score as well.

Three letters of recommendation that assess the student's academic and research abilities. Recommendation forms are available from the Graduate Student Resources Web site.

Transcripts from all undergraduate institutions and graduate programs.

A writing sample of 10-20 pages, typically either a portion of a senior thesis or an upper-level seminar paper.

A statement of purpose of 250-500 words, explaining the applicant's preparation, interests, and plans.

Admission is competitive; please note only complete applications will be considered.

Students may be considered for admission after the February deadline for fall admission or for spring admission, on a space available basis, but they will not receive consideration for financial aid.

Program Specific Graduate Assistantships

Graduate assistantships are limited and are competitive; please note only complete applications received on or before the first Monday in February will be considered.

Program Specific Degree Requirements

Master's Programs
Plan A (thesis)

Candidates for the M.A. in history are required to complete a minimum of 30 hours with a minimum 3.3 GPA average, including:

HIST 5880, normally in the fall semester of the first year,

9 hours of course work in a major historical field of study,

6 hours of course work in a second field of historical inquiry or in a cognate discipline,

4 hours of thesis credit.

A thesis must be prepared in accordance with university regulations and History style requirements.

The topic will be selected with the consultation and approval of the advisor.

A thesis is an extended exercise in writing history and shall include primary sources, secondary sources, and a historiographical component.

The student must defend the thesis in an oral examination(s) conducted by the student's committee.

The thesis must be defended in time to comply with the university deadlines.

Students must demonstrate a reading knowledge of a foreign language appropriate to their research.

Plan B (non-thesis)

Candidates for the plan-B M.A. in history are required to complete a minimum of 30 hours with a minimum 3.3 average, including:

HIST 5880, normally in the fall semester of the first year,

9 hours of course work in a major historical field of study,

6 hours of course work in a second field of historical inquiry or in a cognate discipline,

The student will write two (2) substantial papers, one each in the major and minor history fields. They may be an expanded version of papers written for classes used to fulfill course requirements. The committee will approve the written work.

Students will defend their written work in an oral examination conducted by the student's committee.

The written work must be defended in time to comply with university deadlines.

Masters of Arts for Teachers (M.A.T) in History

Plan B (non-thesis)

The M.A.T. program at Wyoming has been established by the Trustees of the University in accord with the standards recommended by the National Council for the Certification of Teacher Education. The integration of Education credit hours into the program is explicitly disallowed. Candidates for the M.A.T. in history must submit documentary evidence of state teaching certification with their application papers. The M.A.T. is a content based degree designed to enhance the teaching of history and related disciplines by applicants who have already completed their certification and pedagogy courses.

The M.A.T. is a terminal degree. It provides content preparation for secondary and middle school teachers, and should not be regarded as pre-doctoral training. The M.A.T. is designed to provide breadth of preparation rather than specialization. Consequently, a student will take courses in more than one academic department. There is no foreign language requirement for the M.A.T. degree.

The M.A.T. degree in history requires a total of 30 semester hours of course work of which at least 15 must be in history. Of those 15 hours, at least 6 must be earned in 5000 level courses. The student must take a minimum of 9 hours of work in an additional field or fields. All courses taken which are to fulfill the 30 hour requirement must be at the 4000 level or above. No more than 6 hours may be transferred from another institution.

All M.A.T. students must prepare a rigorous paper of publishable article-length quality.

The student, the student's adviser and the department chair, in cooperation with the Office of the Registrar, will establish a committee of at least three individuals. This committee will accept or reject the student's M.A.T. paper and will conduct the student's final examination.

The final examination will involve an oral examination conducted by the committee over the student's program of study and M.A.T. paper. The committee, by majority vote, may pass or fail the candidate or may direct the student to repeat the examination at a later date.

History (HIST)

USP Codes are listed in brackets by the 1991 USP code followed by the 2003 USP code (e.g. [M2⧫QB]).

5000. Indians of Wyoming. 3. Examines Native American culture in Wyoming from prehistory to the 21st century. Analyzes social, political, and economic developments of Native peoples of Wyoming before, during, and after contact with Europeans. Discusses interaction between these diverse societies and explores the changing relationships between Indians and Euro-Americans through the periods after contact. Dual listed with HIST 4000; cross listed with AIST 4000. *Prerequisite:* 6 hours of HIST or AIST.

5055. Archival Research Methods. 3. Students master advanced research strategies with interdisciplinary applications. Focuses on primary document research and the development of advanced skills in information literacy, critical analysis of sources, verification of evidence, techniques for researching underdocumented populations, and interpretation of historical evidence. Advanced writing and oral presentation skills are emphasized. *Prerequisite:* HIST 2050.

5070. History of Books. 3. A chronological survey traces written communication from the ancient world to the present. Within this historical framework, various topics that cross-cut tie periods and countries are explained. A substantial part of the class includes hands-on experience with rare books at the American Heritage Center. *Prerequisites:* 6 hours of history and junior standing.

5075. Book History: Manuscripts. 3. Books in handwritten form are studied within their historical contexts: Mesopotamian and Indus Valley tablets; Egyptian, Greek, Roman, Jewish, Chinese, and Japanese scrolls; Early Christian, Medieval, Renaissance, Jewish, Islamic, Mayan, and Aztec codex manuscripts. Taught at the Rare Books Library, American Heritage Center, with manuscript facsimiles used as visual aids. *Prerequisites:* junior standing and 6 hours of history.

5076. Book History: Printed. 3. Printed books from their original start in China, through Gutenberg's printing revolution in Europe, and on up to the present are studied within their historical contexts. All class sessions will utilize original books from the fifteenth through twenty-first centuries held at the University's Rare Books Library, American Heritage Center. *Prerequisites:* junior standing and 6 hours of history.

5077. Book History: Topics. 3. An in-depth, hands on study of books within their historical contexts. The topic varies each time, and focuses on a particular theme, time period, place, or culture. Taught at the Rare Books Library, American Heritage Center, using original books or facsimiles. May be repeated once for credit. *Prerequisites:* junior standing, or 6 hours of history (preferably with at least one of the other Book History courses).

5100. Early Medieval Europe. 3. The study of the development of European civilization from the decline of Rome to the twelfth century. Dual listed with HIST 4100. *Prerequisite:* HIST 1110 or 2100.

5110. The High Middle Ages. 3. Studies history of European civilization between the 12th and 15th centuries. Dual listed with HIST 4100. *Prerequisite:* HIST 1110 or 2100.

5112. History of the Medieval City. 3. After the fall of the Western Roman Empire, cities virtually disappeared from Western Europe. Around 1000, Europe began its rise to world prominence, and the birth of the cities contributed to that rise. This course examines the development of cities in medieval Europe and explores life within those cities. Dual listed with HIST 4112. *Prerequisite:* HIST 1110, 2100, 4100, or 4110.

5113. Medieval Religious Dissent. 3. Religious dissent in the Middle Ages included what we would call heresy, but also encompasses such marginal groups as Jews and witches. This course examines development of orthodoxy and the persecution of religious diversity between the 11th and 16th centuries. It also studies the historical context of the times. Dual listed with HIST 4113; cross listed with RELI 4113. *Prerequisite:* HIST 1110, 4100, or 4110.

5170. Europe in the 19th Century. 3. An intensive study of European history from the beginning of the nineteenth century through to the origins of the First World War in 1914. Dual listed with HIST 4170. *Prerequisite:* HIST 1120 or 2110.

5180. Europe in the 20th Century. 3. An intensive treatment of European history from 1890 to 1930. Dual listed with HIST 4180. *Prerequisite:* HIST 1120 or 2110.

5190. Contemporary Europe Since 1945. 3. An intensive study of European history since the Second World War. Dual listed with HIST 4190. *Prerequisite:* HIST 1120 or 2110.

5195. European Economic History. 3. The history of European economies from the Renaissance through the Industrial Revolution of the nineteenth century. Focuses on the diverging paths of different economies in Europe, the role of agriculture in economic development, and the causes and nature of the Industrial Revolution. Dual listed with HIST 4195. *Prerequisite:* HIST 1110 or 2110.

5270. France: Old Regime and Revolution. 3. The social, political and cultural history of early modern France (1598-1789), from the rise of the Absolutist state under Louis XIV to the outbreak of the Revolution. Explores the cultural and intellectual shifts from court culture at Versailles, to the Enlightenment, to the rise of revolutionary ideologies. *Prerequisite:* HIST 1110 or HIST 2110.

5280. France Since 1814. 3. History of the political, social, economic, intellectual, ecclesiastical, and military conflicts which shaped modern France. Dual listed with HIST 4280. *Prerequisite:* HIST 1120, or HIST 1210.

5290. History of the Soviet Union. 3. Russia under Communism, including particularly the development of totalitarian dictatorship in its political, economic, social, and cultural manifestations. Dual listed with HIST 4290. *Prerequisite:* HIST 1110 and 1120 or HIST 2100 and 2110.

5310. World War II in Europe. 3. Covers the origins, course, and consequences of one of this century's defining global developments. World War II in Europe was a transnational development which shaped the world as we know it today. Dual listed with HIST 4310. *Prerequisites:* HIST 1110 and 1120 and/or 2100 and 2110.

5315. Central Europe and the Holocaust. 3. Offers students the opportunity to learn about the history of the Holocaust as they visit various sites in Central Europe where the events themselves occurred, such as Berlin, Warsaw, Krakow and Auschwitz-Birkenau. Dual listed with HIST 4315. *Prerequisite:* HIST 1120 or 2110.

5320. Memory and National Identity in 20th Century Europe. 3. Europe in the twentieth century saw a century of unprecedented violence. Examines the public representation of such historical trauma through the concept of "collective memory" and focuses in particular on how memory has become a contested part of defining national identity in modern-day Europe. *Prerequisite:* HIST 1120 or 2110.

5325. Sites of Memory: Berlin and Budapest. 1. Europe in the twentieth century saw a century of unprecedented violence. This class travels to Berlin, German and Budapest, Hungary over Spring Break to examine how these events have been remembered in museums and memorials. Recommended for students enrolled in HIST 4320. "Memory and National Identity in Twentieth Century Europe". Additional costs for travel and accommodations. *Prerequisites:* consent of instructor.

5330. European Gender History. 3. The experiences of women and the history of gender from the Renaissance through the nineteenth century. Focuses on the changing notions of the masculine and the feminine through such historical episodes as the Reformation, the Enlightenment, the French Revolution and the Industrial Revolution. Dual listed with HIST 4530; cross listed with WMST 5330. *Prerequisite:* HIST 1110 or 2110.

5335. Women and Islam. 3. Examines women's lives in Islamic societies from the seventh century to the present in the Middle East and throughout the world. Themes include women's position in Islamic law, society and culture, Western images of Muslim women, veiling and Islamist movements, theoretical readings on power, gender and agency. Dual listed with HIST 4335; cross listed with WMST 4335/5335. *Prerequisite:* 6 hours in women's studies, international studies, religious studies, or history.

5340. The Social History of American Women. 3. Explores the everyday life experiences of American women from the seventeenth century to the present with a focus on the complex influence of gender, race, and class in shaping those experiences. The course then turns to an analysis of the ways in which woman's dissatisfaction with the position in society formed American feminism and lead to the formation or an organized women's movement. Dual listed with HIST 4340. *Prerequisites:* ENGL/WMST/SOC 1080, HIST 1210/1211, 1220/1221.

5381. Seminar in Recent United States History. 3 (Max. 12).

5405. American Encounters to 1859. 3. The history of America as a history of continuous encounters. Examines the history of the American people by focusing on a series of critical encounters between Native American, European, African, and Asian people from pre-contact to the mid-19th century. *Prerequisite:* HIST 1210/1211.

5406. American Encounters from 1850. 3. The history of America as a history of continuous encounters. Examines the history of the American people by focusing on a series of critical encounters between Native American, European, African, and Asian people from the mid-19th century to the present. Dual listed with HIST 4406. *Prerequisite:* HIST 1210/1211.

5410. New Worlds: The Age of Discovery and Its Consequences. 3. Explores the mutual encounters between Europeans and Native Americans from the last fifteenth to the mid-eighteenth centuries and the colonial worlds they created through the process of cross-cultural interchange. Dual listed with HIST 4410. *Prerequisite:* HIST 1210/1211.

5440. The Sectional Conflict. 3. Topically examines differences, north and south, which had crystallized by 1850 into competing institutions and ideologies. Includes Jacksonian party ethos, the world of slavery, the divisive aspects of territorial expansion and social and economic tensions which attended America's burgeoning free-market system. Dual listed with HIST 4440. *Prerequisite:* HIST 1210.

5450. The Civil War and Reconstruction. 3. A study of the crisis of the Union, 1861-1877. Examination of the experiences of both the North and the South during the Civil War and restoration of the Union after the war. Dual listed with HIST 4450. *Prerequisite:* HIST 1210 and 1220/1221.

5460. Post-Civil War America: The Guilded Age. 3. An intensive study in the economic, cultural, and political developments which marked the U.S. in post-Civil War era, the rise of industry, the emergence of a distinctive national culture and the party struggles that shaped America's Gilded Age. Dual listed with HIST 4460. *Prerequisite:* HIST 1210 and 1220.

5462. American Indian History to 1783. 3. Surveys the history of American Indians from the period before contact to the end of the American Revolution. Examines the various contacts between American Indians and Europeans and considers what the American revolution meant to the continent's Native peoples. Dual listed with HIST 4462; cross listed with AIST 5462. *Prerequisites:* HIST/AIST 2290.

5463. American Indian History to 1890. 3. Surveys the history of American Indians during the era of westward expansion. Examines the impact of American westward movement and also the manifold changes that accompanied Indians moving west. Dual listed with HIST 4463; cross listed with AIST 5463. *Prerequisite:* HIST/AIST 2290.

5464. American Indians in the 20th Century. 3. Surveys the history of American Indians during the twentieth century. Examines the development of new cultural, social and political forms that help create an American Indian identity. Dual listed with HIST 4464; cross listed with AIST 5464. *Prerequisite:* HIST/AIST 2290.

5465. Topics in American Indian History. 3. Provides topical approach to American Indian history. Through extensive readings and thorough class discussion, students build upon previous course work in the field. The best recent studies on American Indians in the 19th and 20th centuries are featured. Limited enrollment. Dual listed with HIST 4465. *Prerequisite:* HIST 2290.

5466. American Indian Ethnohistory. 3. Surveys ethnohistorical methods and concepts and provides students concrete opportunities to use these methodologies in writing exercises. American Indian ethnohistory explores Native American experiences within their own cultural contexts. Dual listed with HIST 4466; cross listed with AIST 5466. *Prerequisite:* ANTH/AIST 2210 or HIST/AIST 2210.

5468. American Indians in the North American West. 3. One of the defining features of the North American West is the presence of American Indians. Through the discussion of varied readings and primary document research, this course examines the history of American Indians in the West, with particular emphasis on the Great Plains and California. Dual listed with HIST 4468; cross listed with AIST 4468/5468. *Prerequisite:* HIST/AIST 2290.

5470. The Birth of Modern America, 1890-1929. 3. Studies political and diplomatic developments in the U.S. in the wake of industrialization and massive immigration. Some attention to cultural and social themes. Emphasizes shifting nature of reform between the depression of the 1890s and that of the 1930s. Dual listed with HIST 4470. *Prerequisites:* HIST 1210/1211 and 1220/1221.

5475. American Environmental History. 3. History of American attitudes and actions toward the land and natural resources. Dual listed with HIST 4475. *Prerequisite:* 6 hours of history.

5480. Growth of Modern America, 1929-1960. 3. A political and diplomatic overview of the United States in Depression, World War II and early Cold War periods. Some attention to cultural and social themes. Emphasis on economic crisis, growth of government, reform traditions, anti-communism, and civil rights. Dual listed with HIST 4480. *Prerequisites:* HIST 1210 and 1220.

5490. Modern America, 1960 to Present. 3. A political and diplomatic overview of the United States since 1960 with emphasis on impact of Cold War social and political tensions at home, civil rights, and government policies. Dual listed with HIST 4490. *Prerequisites:* HIST 1210 and 1220.

5492. Indians Cultures of Latin America, 15th Century to Present. 3. An ethnohistorical overview of Mesoamerican and Andean Indian cultures from the 15th Century to the present. Course focuses on Native American responses to colonialism, capitalism, nationalism, and globalization. Covers recent developments, for example, the new Indian rights movement and the Chiapas rebellion in Mexico. Dual listed with HIST 4492. *Prerequisite:* 3 hours of relevant course work in HIST (e.g., 2290, 2380, 4495, 4496) or AIST (e.g., 2210, 2290, 4100, 4465) or ANTH (e.g., 2210).

5495. Colonial Mexico/Borderlands. 3. Examines the cultural, socioeconomic and political structures of colonial Mexico (1500-1850), in particular of the borderlands, today the U.S. Southwest. Key issues include ethnic relations, dependency and colonialism. Dual listed with HIST 4495.

5496. History of Mexico. 3. Intensive course in Mexican development. Emphasizes the 20th century especially the Mexican Revolution of 1910, showing how this nation transformed itself, into a modern nation state. Includes diplomatic relations with the U.S., incorporation of Indians, church-state relations, uses of land and other an natural resources, role of the military and growth of Mexican nationalism. Dual listed with HIST 4496; cross listed with CHST 4496. *Prerequisite:* HIST 2380.

5500. Readings in Women's Studies. 3. An interdisciplinary course at the graduate level focusing on feminist criticism and theory, which draws on current debates in feminist analysis from the general areas of history, literature, and social science, to inform students of reformulations of research and unresolved issues. Dual listed with WMST 5500. *Prerequisites:* graduate status, 12 hours of 4000-level work.

5505. The Old South, 1820-1861. 3. The history of the South from the emergence of southern identity to the Civil War, with emphasis on southern society and culture. Dual listed with HIST 4505. *Prerequisite:* HIST 1210.

5510. Modern Far East: China, Japan, and India. 3. The primary purpose is to acquaint students with efforts to modernize China, Japan, and India since the late 19th century. Emphasizes interaction of these civilizations with the Western world and explains ways in which such forces as imperialism, nationalism, and communism have shaped their domestic and foreign policies in the 20th century. Dual listed with HIST 4510. *Prerequisite:* 6 hours of history.

5515. American Legal History. 3. An intensive study in the history of American law, the judicial system, the legal profession, and legal administration from colonial times to the present. Dual listed with HIST 4515. *Prerequisite:* HIST 1210, 1220 and/or consent of instructor.

5525. American Southwest. 3. Explores the Southwest as a location of cultural encounters and conflicts. Focuses on the cross-cultural interchange between American Indians, Mexican Indians and Anglo Americans from the fifteenth century to the present. Dual listed with HIST 4525. *Prerequisites:* HIST1210/1211, 1220/1221.

5530. 19th Century American West. 3. A study of the westward movement with emphasis on the trans-Mississippi West. Dual listed with HIST 4530. *Prerequisite:* HIST 1210 and 1220.

5535. History of Oil. 3. An intensive study in the history of oil development throughout the world. Emphasizes comparative studies of the industry as it developed in various parts of the world and during various time periods, from pre-historic times to the present. The Wyoming oil/energy mineral history will be an important component of the course. Dual listed with HIST 4535. *Prerequisite:* 6 hours in history.

5540. 20th Century American West. 3. A study of the modern American West, with consideration of social, economic and political continuity and change. Dual listed with HIST 4540. *Prerequisites:* HIST 1210 and 1220.

5545. The Multicultural West. 3. Explores the American West as a meeting ground of diverse peoples and their diverse cultures. Focuses on the sustained cross-cultural interchange between Native Americans, Euro-Americans, African Americans, Latin Americans, and Asian Americans from trans-Appalachia to the Pacific Coast from the eighteenth century to the present. Dual listed with HIST 4545.

5560. American Social History in the 20th Century. 3. History of social mobility and conflict in the 20th century. Special emphasis on impact of industrialization, rapid urbanization, massive immigration, ethnic minorities, race, religion, women and the family, painting, and architecture. Dual listed with HIST 4560. *Prerequisites:* HIST 1210 and 1220.

5582. 20th Century U.S. Foreign Relations. 3. Studies Twentieth Century United States foreign relations with a focus on the Cold War period. Examines economic sources of policy decisions, elites and mass public opinion, as well as cultural, religious, ethnic racial and gender issues. Dual listed with HIST 4582; cross listed with INST 5582. *Prerequisite:* HIST 1221.

5585. Conference on U.S. History. 1-3 (Max. 6). A reading and writing course designed to allow advanced students to investigate shifting ideas about important topics in 20th century American history. Primary focus varies from semester to semester, but will be designated in the class schedule. Dual listed with HIST 4585. *Prerequisite:* 6 hours of American history.

5600. Graduate Readings. 1-6 (Max. 12). Fulfills two purposes in our graduate program in history. It allows students to do independent directed reading in preparation for their graduate examination in history and provides students with a flexible alternative to their programs to meet and complete requirements. *Prerequisite:* 15 semester hours of history.

5605. Conference on Wyoming and thee West. 1-4 (Max. 9). *Prerequisite:* consent of instructor.

5612. Archive III. 3 (Max. 6). Designed as an internship to provide students hands-on experience in an archival setting. With guidance provided by the instructors, students are expected to arrange and describe a collection, understand the basics of cataloging, and work with researchers in the reference area. Students are asked to complete projects in each area, and are required to turn in work logs or journals regarding the internship experience. *Prerequisite:* HIST 4040/5040, HIST 4042/5042 and 18 hours of history.

5615. Conference on Early American History. 1-4 (Max. 9). *Prerequisite:* consent of instructor.

5620. Conference on Middle-Period and United States History. 1-4 (Max. 9). *Prerequisite:* consent of instructor.

5630. Seminar on Western American History. 3. *Prerequisite:* consent of instructor.

5640. Conferance on American Indian History. 1-4 (Max. 9). An intensive readings course using some of the best Indian history written in the last twenty years. *Prerequisite:* consent of instructor.

5645. Seminar on American Indian History. 3. Research seminar on American Indian history. The focus of the seminar may vary, but emphasis will usually be given to American Indians of the western United States in the nineteenth and twentieth centuries. *Prerequisite:* consent of instructor.

5650. Conferance on Medieval European History. 1-4 (Max. 9). *Prerequisite:* consent of instructor.

5655. Seminar on Medieval European History. 3 (Max. 9). *Prerequisite:* consent of instructor.

5660. Conference on Early Modern Europe. 1-4 (Max. 9). The student, in consultation with the instructor, chooses a topic on which he/she reads extensively. The instructor provides bibliographical guidance. Normally the student discusses the reading at length with the instructor once a week. Written analysis of the reading may also be required. The course may be offered to a group of students who need extensive reading to go with the research experience they are receiving in seminars. *Prerequisite:* 14 semester hours in history and consent of instructor.

5670. Seminar on Early American History. 3. *Prerequisite:* consent of instructor.

5675. Seminar on Middle-Period U.S. History. 3. *Prerequisite:* consent of instructor.

5680. Seminar on Recent U.S. History. 3. *Prerequisite:* consent of instructor.

5685. Conference on European 19th and 20th Century History. 1-4. Available for a maximum of 9 hours. *Prerequisite:* consent of instructor.

5690. Seminar on European History. 3. Available for a maximum of 9 hours. *Prerequisite:* consent of instructor.

5695. Conference on English History. 1-4 (Max. 9). The student, in consultation with the instructor, chooses a topic on which he/she reads extensively. The instructor provides bibliographical guidance. Normally the student discusses the reading at length with the instructor once a week. Written analysis of the reading may also be required. May be offered to a group of students who need extensive reading to go with the research experience they are receiving in seminars. *Prerequisite:* 14 semester hours in history and consent of instructor.

5700. Seminar on Cultural History. 3. Examines the multiple ways in which historians and anthropologists have approached the concept of culture. Readings include both case studies and theoretical writings from different schools of cultural studies, ranging from the French Annales School to Postmodernism. Topics to be covered include popular culture, microhistory, gender and discourse theory. *Prerequisite:* graduate standing.

5800. Conference on Latin American History. 1-4 (Max. 9). *Prerequisite:* consent of instructor.

5810. Seminar on Latin Amican History. 1-4 (Max. 12). *Prerequisite:* consent of instructor.

5880. History Theory. 3. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students involved in research for their dissertation. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

International Studies

405 Ross Hall, 766-3423
FAX: (307) 766-3812
E-mail: uwinst@uwyo.edu
Web site: uwyo.edu/intstudy/
Director: Jean Garrison

Professor:

JEAN A. GARRISON, B.A. University of Wyoming 1990; M.A. University of South Carolina 1992; Ph.D. 1996; Associate Professor of Political Science 2004, 2001.

Assistant Professor:

ADAM HENNE, B.A. Drew University 1997; Ph.D. University of Georgia 2008.

Associate Lecturer:

YARONG JIANG ASHLEY, B.A. University of Shanghai 1986; M.A. University of Wyoming 1995; Ph.D. 1993; Assistant Lecturer 2000.

Advisory Committee:

Stephanie Anderson, political science
Yarong Ashley, international studies
Adrian Bantjes, history
Edward Bradley, agricultural and applied economics
Patricia Hamel, Spanish
Adam Henne, anthropology, international studies
David Messenger, history
Susan McKay, women's studies
Deborah Paulson, geography
Linette Poyer, anthropology
Terri Rittenburg, management and marketing

Adjunct Faculty

(see department section following name for academic credentials)

Anne Alexander, economics and finance
Stephanie Anderson, political science
J. Eric Arnould, management and marketing
David Ashley, sociology
Adrian Bantjes, history
Edward B. Bradley, agriculture and applied economics
Michael Brose, history
Winberg Chai, political science
Roger Coupal, agriculture and applied economics
Lydia Dambekalns, secondary education
Francois Dickman, Emeritus, U.S. Ambassador
Rodney Garnett, music
Patricia Hamel, Spanish
Larry Hubbell, political science
Marianne Kamp, history
Timothy Kearley, law
Quee-Young Kim, sociology
Joseph Krafczik, Russian
Susan McKay, women's studies
David Messenger, history
Deborah D. Paulson, geography
Linette A. Poyer, anthropology
Jeanette Reisenburg, international studies
Terri L. Rittenburg, management and marketing
Amy Roberts, elementary and early childhood education
Stephen C. Ropp, political science
Mona Schatz, social work
Richard J. Schmidt, civil and architectural engineering
Audrey Shalinsky, anthropology
Ed Sherline, philosophy
Sarah Strauss, anthropology
Gerald Webster, geography
Bonnie Zare, women's studies

Students take either the Plan A (thesis), or master's international option. Students taking the Plan A option must have a minimum of 26 hours of graded non-thesis coursework and 4 hours of thesis; students taking the master's international option must have 24 hours of non-thesis coursework and complete their 6 hours Peace Corps service.

Program Specific Admission Requirements

Admission is open to all students with a bachelor's degree who meet the university minimum requirements. The International Studies Program admits qualified students for the fall semester only. The application deadline is February 1.

Program Specific Graduate Assistantships

Students interested in a graduate assistantship should send to the International Studies Program the "Application for a Graduate Assistantship" with their application material by February 1 for the fall semester. On this date, only complete application packets will be considered.

Program Specific Degree Requirements

Master's Program

Students must meet four requirements: 1) Each student must take one graduate course in research methods. 2) Each student must take one advanced theory course. 3) Each student must take international studies graduate classes from three different disciplines. 4) Each student must demonstrate proficiency in a foreign language, accomplished in the course of the program or from previous experience or coursework. Foreign language hours do not count toward the M.A. degree. Note: Master's International - Peace Corps option has separate requirements. Please see below for more information.

Plan A (thesis)

Students are encouraged to construct, with the adviser's approval, a program that focuses their own intellectual interests and career plans. To promote that end, students should be prepared to file a plan of study with the graduate adviser during the second semester of coursework.

No later than the third semester in residence, each student shall select a graduate committee to oversee his or her academic work. The committee will be chaired by the student's major professor and must have at least one member from a discipline other than that of the major professor.

Students must pass an oral examination at the completion of their program. Normally, examination will center on the thesis, but may also encompass coursework of the candidate.

Required Coursework

Research Method Courses (1 course)

AGEC 5650. Research Methods.
ANTH 5650. Field Methods in Cultural Anthropology.
EDRE 5640. Introduction to Qualitative Research.
GEOG 5280. Quantitative Methods in Geography.
GEOG 5790. Reasearch Methods.
HIST 5700. Seminar in Cultural History.
POLS 5680. Research Methods for Political Science and Policy.
SOC 5100. Advanced Social Research Methods.
SOWK 5400. Social Work Government Research Methods.

Advanced Theory Courses (1 course)

POLS 4870. Seminar in International Relations.
POLS 4890. Seminar in Comparative Government and Politics.
POLS 4900. Seminar in International Relations Theories.
POLS 4910. Seminar in Comparative Foreign Policy Analysis.
SOC 5000. Advance Sociological Theory.
INST 5300. The World System.

Master's International - Peace Corps Option

Minimum requirements: 30 hours of graduate work, including 24 hours of graduate coursework and completion of Peace Corps service.

Students admitted to the Peace Corps - but not yet having served - take 24 hours of graduate coursework, working closely with a faculty mentor to prepare themselves for two academic tasks associated with their Peace Corps assignment. The first involves preparatory readings and writing of a critical paper associated with the locale of their anticipated Peace Corps service. It is submitted to three faculty members (their graduate committee) prior to beginning service. The second involves writing an analytic paper based on their Peace Corps service. The paper will be guided by the student's graduate committee and is due no later than six months following the completion of Peace Corps service.

Students must pass an oral examination at the completion of their program. Normally, this examination will center on the second paper, but may also encompass coursework of the candidate.

Students are required to take one course each in theory and research methodology. (See course list below)

Students are encouraged to specialize in one of three areas: agriculture, environment and natural resources, and non-governmental organizations (NGO) administration.

The curriculum for the concentration in agriculture is intended to give the student a general understanding of the issues facing agrarian-based communities. The focus of the curriculum is on economic development and natural resource management issues.

The environment and natural resources concentration allows students to learn about and practice innovative approaches to environmental and natural resource management issues from a global perspective.

The NGO concentration is intended for students who would like a volunteer placement that involves working with NGOs. The curriculum provides a basic foundation in public administration with an emphasis on the relationships, challenges and opportunities that shape the work of civil society organizations.

For more specific information on course requirements for the Master's International - Peace Corps concentrations, please see: uwyo.edu/instudy/Graduate/MIPC/curriculum.asp.

Students also have the option of developing another concentration based on personal experience and interests, although this may be limited by the availability of course offerings.

Required Coursework for Master's International - Peace Corps Program

Theory (1 course)

INST 5300. The World System.
POLS 4870. Seminar in International Relations.
POLS 4890. Seminar in Comparative Government and Politics.
POLS 4900. Seminar in International Relations Theory.
POLS 4910. Seminar in Comparative Foreign Policy Analysis.
POLS 5250. Politics of Developing Nations.
POLS 5290. Inter-American Relations.
POLS 5330. American Foreign Relations.
POLS 5340. International Organizations.

Research Methodology Group (1 course)

AGEC 5600. Community Economic Analysis.
AGEC 5660. Community and Economic Development.
ANTH 5650. Field Methods in Cultural Anthropology.
EDRE 5640. Introduction to Qualitative Research.
GEOG 5790. Research Methods in Geography.
HLED 5004. Program Planning, Implementations and Evaluation.
POLS 5680. Seminar in Research Design.
SOC 5100. Advanced Social Reserach Methods.

International Studies (INST)

USP Codes are listed in brackets by the 1991 USP code followed by the 2003 USP code (e.g. [M2⧫QB]).

5000. Study Abroad Preparation. 1. Prepares students for long-term study in a foreign country. Helps students adapt to and understand the host country: culture, history, geography, political and economic context. Students become familiar with practical information needed for a foreign experience, principles of culture shock, ethnocentrism, cultural relativism, and fundamentals of cross-cultural communication.

5100. Global Public Health. 4. Introduces students to the global context of public health, to principles underlying global health, and to dimensions of public health particular to international settings. It examines major themes and policies in global health and analyzes health problems and varying responses to them in different parts of the world. Cross listed with HLSC 5100, dual listed with INST 4100. *Prerequisite:* upper division or graduate standing.

5175. Gender, Women and Health. 3. Focuses on issues of gender, women and health, including the effects of gender bias in medical research and health care practices and policies. Health care issues of specific concernt to women, both nationally and internationally are examined. Dual listed with WMST/NURS 5175; cross listed with WMST/INST/NURS 4175. *Prerequisite:* upper-division standing, lower division social or psychological science course.

5250. Economic Development in Asia. 3. Designed to explore key issues to the historical development of Asian countries from both comparative and international political economy perspectives. Distinctive political, social, and economic characteristics of these nations will be analyzed. Dual listed with INST 4250. *Prerequisite:* 9 hours of international studies of Asian-focused courses.

5300. The World System. 3. Analyzes structure of political and economic interdependence among nation-states. Reviews and assesses theoretical approaches to explaining changing structure of inequality, power, war and peace. Dual listed with INST 4300. Cross listed with POLS/SOC 5300. *Prerequisite:* SOC 1000 or ANTH 1100 or equivalent political science, international studies, or social science course.

5582. 20th Century U.S. Foreign Relations. 3. Studies Twentieth Century United States foreign relations with a focus on the Cold War period. Examines economic sources of policy decisions, elites and mass public opinion, as well as cultural, religious, ethnic racial and gender issues. Dual listed with 4582; cross listed with HIST 4582/5582. *Prerequisite:* HIST 1221.

5590. Sustainable Business Practices. 3. A close look at what is happening in business practice today through the `lens¿ of sustainability. Business models and systems will be discussed and a framework proposed for assessing the ways in which principles of sustainability may be embedded within corporate strategy. Dual listed with INST 4590; cross listed with MKT 4590/5590. *Prerequisite:* advanced business standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5970. Internship. 1-12 (Max. 24). Integrates practical international experience with academic knowledge. Students are expected to participate in specifically assigned tasks and observe broader activities of sponsoring organization, and reflect on experience in written assignments. Dual listed with INST 4970. *Prerequisites:* 9 hours of INST core courses and consent of instructor.

5990. Topics:. 1-6 (Max. 15). Accommodates seminar series and/or course offerings including those by interdisciplinary teams and visiting faculty in International Studies not covered by departmental courses. Dual listed with INST 4990. *Prerequisites:* junior standing and consent of instructor.

Languages— Modern and Classical

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Department Chair: Philip Holt

Professors:

PHILIP HOLT, B.A. St. John's College 1969; Ph.D Stanford University 1976; Professor of Classics 2005, 1993, 1987.

KEVIN S. LARSEN, B.A. Brigham Young University 1976; M.A. 1978; A.M. Harvard University 1979; Ph.D. 1983; Professor of Spanish 1998, 1989.

CARLOS MELLIZO-CUADRADO, B.A. University of Madrid 1965; M.A. 1966; Ph.D. 1970; Professor of Spanish 1977, 1968.

HANNELORE MUNDT, Staatsexamen, Rheinisch-Westfalische Technische Hochschule Aachen 1977; Ph.D. University of California-Irvine 1984; Professor of German 2004, 1998, 1996.

PAVEL SIGALOV, Diploma, Pedagogical Institute (U.S.S.R.) 1952; Ph.D. Leningrad University 1963; Doctor of Philology, 1978; Professor of Russian 1991, 1983.

Associate Professors:

PATRICIA HAMEL, B.A. Pennsylvania State University 1964; M.A. 1968; Ph.D. University of Kansas 1985; Associate Professor of Spanish 1995, 1989.

HAROLD P. NEEMANN, B.A. Metropolitan State College 1990; M.A. University of Colorado at Boulder 1992; Ph.D. 1998; Associate Professor of French 2004, 1998.

DUANE RHOADES, B.A. Brigham Young University 1967; M.A. 1971; Ph.D. University of Illinois 1977; Associate Professor of Spanish 1988, 1982.

KHAMA-BASSILI TOLO, G3: Gradué en Pédagogie Appliquée, Option: Francais-Linguistique Africaine, Université Nationale du Zaire 1976; L2: Licencié en Pédagogie Appliquée, Option: Francais, 1978; M.A. Vanderbilt University 1986; Ph.D. 1989; Associate Professor of French 1996, 1990.

Assistant Professors:

EMILY HIND, B.A. University of Kansas 1995; M.A. Pennsylvania State University 1997; Ph.D. University of Virginia 2001; Assistant Professor of Spanish 2005.

HERVÉ G. PICHERIT, B.A. University of Wyoming 2000; M.A. Standord University 2003; Ph.D. 2008; Assistant Professor of French 2008.

Temporary Assistant Professor:

MASAHIRO YAMAMOTO, B.A. University of Hokkaido, Japan 1983; Ph.D. University of Alabama 1998; Temporary Assistant Professor of Japanese 2003.

Senior Professional Lecturer:

JOSEPH KRAFCZIK, B.A. University of Wyoming 1983; M.A. University of Michigan 1986; Senior Professional Lecturer in Russian 2005, 1988.

Academic Professional Lecturers:

SARAH CARLE, B.A. Chadron State College 2002; M.A. University of Wyoming 2005; Academic Professional Lecturer in Spanish 2007.

LAURA DE LOZIER, B.A. Beloit College 1990; M.A. University of Wisconsin 1992; Ph.D. 2002; Academic Professional Lecturer in Latin 2006.

MARK W. PERSON, B.A. University of Wyoming 1983; M.A. 1986; Academic Professional Lecturer in German 2008.

YAN ZHANG, B.A. Harbin Institute of Technology 2000; M.A. Heilongjiang Provincial Academy of Social Sciences 2002; Academic Professional Lecturer in Chinese 2006.

Temporary Lecturers:

Petra Heinz, Pamela Heuschkel, Jennifer Lavanchy, Carlos Salas, Walter Wall

Professors Emeriti:

M. Ian Adams, Lewis Bagby, Lowell A. Bangerter, Klaus D. Hanson, Francis S. Heck, Walter G. Langlois, Sigrid Mayer, Marguerite P. van Doorslaer, Jean-Louis G. Picherit

The Department of Modern and Classical Languages offers programs leading to the master of arts degree with majors in French, German, and Spanish under Plan A and Plan B.

Program Specific Admission Requirements

Admission to the graduate program in a specific language is open to students who have completed an undergraduate major, or the equivalent, in the same subject and who meet the minimum requirements set forth in this bulletin.

Students entering the graduate program from other institutions may be required to make up visible deficiencies in areas covered by required courses in this department's undergraduate programs.

Program Specific Degree Requirements

Degree requirements are based on the university minimum requirements.

French (FREN)

5080. Studies in French Language. 3. (Max 9). Topics explored include: French translation, history of the French language, French of the media, and conversation. *Prerequisite:* FREN 3060.

5085. Studies in French Culture. 3. Multiple topic course: (a) Business French focusing on the socio-economic, linguistic and administrative aspects of doing business in French; (b) Explication de textes, providing a systematic introduction to textual analysis; taught alternately. Dual listed with FREN 4085. *Prerequisite:* FREN 3060.

5120. Medieval French Literature. 3. A survey of medieval French literature: Epic, courtly poetry, Arthurian romance, theatre, and the poetry of Villon. Dual listed with FREN 4120. Prerequisites: FREN 3050; FREN 4100 and 4110 strongly recommended.

5130. Renaissance French Literature. 3. A study of the new spirit after the Middle Ages. Authors studied: Rabelais, the poets of the Pleiade, Montaigne, and others. Dual listed with FREN 4130. *Prerequisites:* FREN 3050; FREN 4100 and 4110 strongly recommended.

5140. 17th Century French Literature. 3. A survey of representative works from the major literary genres from the formative period to classicism and its aftermath. Dual listed with FREN 4140. *Prerequisites:* FREN 3050; FREN 4100 and 4110 strongly recommended.

5160. Graduate Readings. 1-5 (Max. 6). *Prerequisite:* undergraduate major or minor in the subject.

5170. Special Problems. 1-2 (Max. 6). *Prerequisite:* undergraduate major or minor in the subject.

5250. 19th Century French Literature. 3. Development of romanticism from Rousseau on with excerpts from Chateaubriand and romantic poets like Hugo and Vigny. The period of realism-naturalism will focus on novels each of Flaubert and Zola while the Symbolist School of poetry will be represented by Baudelaire, Verlaine and Rimbaud. Dual listed with FREN 4250. *Prerequisites:* FREN 2050; FREN 4100 and 4110 strongly recommended.

5260. 20th Century French Literature. 3. The era since 1900 is divided into 4 parts: Pre-World War I, between the wars, post-World War II and the New Wave. These periods are represented by such authors as Valery, Proust, Malraux, Saint-Exupery, Camus, Sartre and others. Dual listed with FREN 4260. *Prerequisites:* FREN 3050; FREN 4100 and 4110 strongly recommended.

5350. Studies in French and Francophone Literatures. 3. An intensive study of a topic, period or author (pertaining to French or Francophone literature, to be selected according to interest and currency). Dual listed with FREN 4350. *Prerequisites:* FREN 3060; FREN 4100 and 4110 strongly recommended.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1 - 3 (Max 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

German (GERM)

5070. 4th Year German. 3. Emphasizes weekly compositions and corrective practice, stylistic analysis of representative texts, and group discussions on prepared topics. Dual listed with GERM 4070. *Prerequisite:* GERM 3060.

5095. Masterpieces of Germ Literature in English. 3. Introduces students to masterpieces of German literature in English translation from the Age of Enlightenment to the present. Discussions of the literary movements and periods, authors and the cultural, social and historical background in which theses masterpieces were written are included in the interpretations of the texts. Dual listed with GERM 4095. *Prerequisite:* graduate standing.

5100. A Survey of German Literature I. 3. A study of German literature and civilization from the Middle Ages to the seventeenth century. Dual listed with GERM 4100. *Prerequisite:* GERM 2140 or equivalent.

5110. A Survey of German Literature II. 3. A study of German literature and civilization from the eighteenth century to the end of the twentieth century. Dual listed with GERM 4110. *Prerequisite:* GERM 2140 or equivalent.

5145. Weimar Classicism. 3. Introduces students to Weimar Classicism, one of the crucial period in German literature and culture. Explores the foundation of the movement, its cultural and historical contexts, aesthetic and philosophical principles, and significant works written by Goethe and Schiller during this period. Taught in German. Students are expected to read, write and discuss in German. Dual listed with GERM 4145. *Prerequisite:* graduate standing.

5150. Studies in German Literature. 2-3 (Max. 6). An intensive study of a topic or an author. Designed primarily for graduate students, the course is open to seniors with permission of the instructor. *Prerequisite:* 12 semester hours of German literature at 4000-level.

5160. Graduate Readings. 1-5 (Max. 6). *Prerequisite:* undergraduate major or minor in the subject.

5170. Special Problems. 1-2 (Max. 6). *Prerequisite:* undergraduate major or minor in the subject.

5180. German Poetry. 3. A survey of poetry from the Middle Ages to the present. Emphasis on poetry after 1600. Treatment of formal elements and genre categories. Dual listed with GERM 4180. *Prerequisite:* GERM 2140.

5190. Contemporary German Drama. 3. A survey of the most important dramas and trends since 1945. Readings in the theory of modern drama. Dual listed with GERM 4190. *Prerequisite:* GERM 2140 or equivalent.

5230. 19th Century German Drama. 3. Popular tastes and phonetic intellectual endeavors in nineteenth century drama after the age of Goethe. Survey of the literature during Romanticism, Young Germany, Realism, Naturalism, and Expressionism. Dual listed with GERM 4230. *Prerequisite:* GERM 2140 or equivalent.

5240. German Literature of the Romantic Period. 3. An introduction to the philosophical bases of German Romanticism and analysis of representative works of prose and poetry. Dual listed with GERM 4240. *Prerequisite:* GERM 2140 or equivalent.

5255. 19th Century German Novellas. 3. Studies a wide selection of German novellas from the period when this genre flourished in the German-speaking world, with a popularity unparalleled in the rest of Europe. Examines the form's origins, evolution, reception, and theory. Dual listed with GERM 4255. *Prerequisite:* GERM 2140 or equivalent.

5265. A Divided Nation: Politics and Culture in Germany 1945-1990. 3. Introduces students to major political, ideological and cultural developments in East and West Germany between 1949 and 1990. Investigates the construction of national identities based on major writings by East and West German philosophers, intellectuals and creative writers. Taught in German. Dual listed with GERM 4265. *Prerequisites:* GERM 2140 or equivalent, graduate standing.

5275. Contemporary Migration Literature. 3. Introduces students to a range of recent cultural productions by artists identified with immigrant communities or communities of color. Topics examined include: the intersections of gender, race, culture, and class; experiences of different minorities in unified Germany; question of national and transnational identity, self-representation, immigration, multiculturalism and integration debates. Taught in German. Students are expected to read, write and discuss in German. Dual listed with GERM 4275. *Prerequisite:* GERM 2140 or equivalent.

5285. 20th/21st Century German Film. 3. Introduces students to classical German films, and thereby enhances their skills to conduct research in the Humanities. Themes to be discussed: representation of authority, issues of race and gender, German culture and history, the Americanization of German culture, minorities in contemporary German. Taught in English. Dual listed with GERM 4285. *Prerequisites:* graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.
5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Modern and Classical Languages (LANG)

5300. Advanced Linguistics. 3. Data is offered to provide the opportunity to analyze phonological, morphological, and syntactic materials from languages throughout the world. Attention is given to the limits within which these aspects of human language appear to vary. *Prerequisite:* ANTH/ENGL/LANG 4750.
5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Russian (RUSS)

5105. Nineteenth Century Russian Culture and Literature in Translation. 3. Presents the classics of Russian fiction of the nineteenth century (read in English). Dual listed with RUSS 4105. *Prerequisite:* ENGL 1010, 1020.
5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status..
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Spanish (SPAN)

5090. Spanish Phonetics and History of the Language. 3. A practical guide to the description and performance of the Spanish phonological system and a general survey of the language's historical development as well as if its major dialectical variations. Dual listed with SPAN 4090. *Prerequisite:* SPAN 2030; SPAN 3050 and 3060 highly recommended.
5100. Hispanic Thought. 3. intensive study of a topic, author, or philosophical movement. Designed for upper level and graduate students. *Prerequisite:* 12 hours of Spanish literature at 4000-5000 level.
5110. Peninsular Spanish Literature. 1-3 (Max. 9). An intensive study of a topic or an author. Designed for upper level and graduate students. *Prerequisite:* 12 hours of Spanish literature at 4000-5000 level.
5120. Spanish American Literature. 1-3 (Max. 9). An intensive study of a topic or an author. Designed for upper level and graduate students. *Prerequisite:* 12 hours of Spanish literature.
5130. Masterpieces of Spanish Renaissanc e Literature. 3. A study of the Spanish Renaissance, taking into consideration social, political, economic, religious philosophical, and aesthetic aspects of the culture as a context for and as reflected in the literature. Dual listed with SPAN 4130. *Prerequisite:* SPAN 2140 or equivalent.
5140. Masterpieces of Spanish Baroque Literature. 3. Studies of the Spanish Baroque, taking into consideration social, political, economic, religious, philosophical, and aesthetic aspects of the culture as a context for and as reflected in the literature. Also covers the relationship between the Spanish Renaissance and the Baroque. Dual listed with SPAN 4140. *Prerequisite:* SPAN 2140 or equivalent.
5150. Spanish Romanticism. 3. A comprehensive study of the romantic movement in Spain. Close reading and commentary of texts by representative authors including Espronceda, Rivas, Zorilla, Becquer and de Catstro. Dual listed with SPAN 4150. *Prerequisite:* SPAN 2140 or equivalent.
5160. Graduate Readings. 1-5 (Max. 6). *Prerequisite:* graduate standing.
5170. Special Problems. 1-2 (Max. 6). *Prerequisite:* graduate standing.
5180. Contemporary Spanish Poetry. 3. Encompasses commentaries and analyses of selected poets dating from Generation of '98 to the present, such as Unamuno, Machado, Jimenez, Garcia Lorca, Alberti and Salinas. Dual listed with SPAN 4180. *Prerequisite:* SPAN 2140 or equivalent and one 4000-level course.
5190. 20th and 21st Century Spanish-American Literature. 3. Provides students with the opportunity to study representative literary texts that reflect the tendencies and trends in 20th and 21st Century Spanish-language works of the Americas. Dual listed with SPAN 4190. *Prerequisite:* 6 hours of Spanish at the 4000-level.
5260. The Realist Novel in Spain. 3. Studies of the major novelists of nineteenth century Spain from 1850 until the Generation of '98. Dual listed with SPAN 4260. *Prerequisite:* SPAN 2140 or equivalent.
5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.
5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Life Sciences Program

138 Aven Nelson Building, 766-4158
FAX: (307) 766-2851
Web site: www.uwyo.edu/lifescience
Program Director: Mark E. Lyford

Students interested in a graduate degree in biology should refer to the departments of Botany or Zoology and Physiology. Along with biology courses offered in those departments, the following additional courses are available.

Life Sciences (LIFE)

5400. Microbial Ecology. 3. Designed for the advanced student interested in the microbial world with an emphasis on ecology and physiology in natural aquatic and terrestrial ecosystems. Dual listed with LIFE 4400. *Prerequisites:* 1 year of biology, 1 year of chemistry, 1 course in general ecology or microbiology.

Mathematics

202 Ross Hall, 766-6546
FAX: (307) 766-6838
Web site: math.uwyo.edu
Department Head: Bryan L. Shader

Professors:

MYRON B. ALLEN III, A.B. Dartmouth College 1976; M.A. Princeton University 1978; Ph.D. 1983; Professor of Mathematics 1992, 1983; Vice President, Academic Affairs 2005.

CRAIG C. DOUGLAS, B.A. University of Chicago 1977; M.S. Yale University 1977; M.Phil. 1980; Ph.D. 1982; SER Professor of Mathematics 2008.

FARHAD JAFARI, B.S. University of Wisconsin-Madison 1978; M.S. 1980; Ph.D. 1983; M.A. 1986; Ph.D. 1989; Professor of Mathematics 1999, 1991.

LUIS FELIPE PEREIRA, B.S. Federal University of Minas Gerais 1983; M.S. 1985; M.S. New York University 1988; Ph.D. State University of New York-Stony Brook 1992; SER Professor of Mathematics 2008.

PETER POLYAKOV, M.S. Moscow State University 1967; Ph.D. 1971; Professor of Mathematics 1998, 1993.

BRYAN L. SHADER, B.S. University of Wyoming 1984; M.S. University of Wisconsin-Madison 1987; Ph.D. 1990; Professor of Mathematics 2000, 1990.

Associate Professors:

HAKIMA BESSAIH, M.S. University of Algiers 1992; Ph.D. Scuola Normale Superiore of Pisa 1999; Associate Professor of Mathematics 2008, 2004.

FREDERICO da CUNHA FURTADO, B.S. Federal University of Minas Gerais 1979; M.S. Federal University of Rio de Janeiro 1984; Ph.D. Courant Institute 1989; Associate Professor of Mathematics 2002, 1997.

STEFAN HEINZ, B.S. Humboldt University 1986; M.S. Heinrich-Hertz University 1986; Ph.D. University of Wyoming 1990; Associate Professor of Mathematics 2007, 2004.

SYLVIA A. HOBART, B.A. University of California-Santa Cruz 1980; Ph.D. University of Michigan 1987; Associate Professor of Mathematics 1993, 1987.

LYNNE IPINA, B.S. South Dakota State University 1972; M.S. New York University 1978; Ph.D. 1986; Associate Professor of Mathematics 1992, 1985.

G. ERIC MOORHOUSE, B.S. University of Toronto 1980; M.S. 1984; Ph.D. 1987; Associate Professor of Mathematics 1995, 1989.

CHANYOUNG LEE SHADER, B.S. Yonsei University 1985; M.A. University of Wisconsin-Madison 1991; Ph.D. 1992; Associate Professor of Mathematics 1999, 1992.

SHAGI-DI SHIH, B.A. National Tsing Hua University (Taiwan) 1973; M.S. University of Connecticut 1978; Ph.D. University of Maryland 1985; Associate Professor of Mathematics 1995, 1985.

MAN-CHUNG YEUNG, B.S. Jinan University, China 1986; M.Ph. University of Hong Kong 1990; Ph.D. University of California-Los Angeles 1997; Associate Professor of Mathematics 2005, 2001.

Assistant Professors:

MICHELLE T. CHAMBERLIN, B.S. Colorado State University 1997; M.S. 1999; Ph.D. Purdue University 2002; Assistant Professor of Mathematics 2007.

VICTOR GINTING, B.S. Institut Teknologi Bandung Indonesia 1995; M.S. Texas A&M University 1998; Ph.D. 2004; Assistant Professor of Mathematics 2007.

LONG LEE, B.S. National Taiwan University, Taipei 1988; M.A. University of Maryland 1998; Ph.D. University of Washington 2002; Assistant Professor of Mathematics 2005.

GREGORY LYNG, B.A. Saint Olaf College 1996; M.A. Indiana University 1999; Ph.D. 2002; Assistant Professor of Mathematics 2005.

SIGUNA MÜLLER, M.S. University of Klagenfurt 1994; Ph.D. 1996; Assistant Professor of Mathematics 2005.

DAN STANESCU, B.Eng. Polytechnic Institute, Romania 1986; M.Eng. McGill University, 1994; Ph.D. Concordia University 1999; Assistant Professor of Mathematics 2003.

Associate Lecturers:

JONATHAN PREWETT, B.S. California State University, Bakersfield 1996; M.S. University of Idaho 1998; Associate Lecturer in Mathematics 2007, 2001.

JOHN SPITLER, B.S. Vanderbilt University 1977; M.S. University of Wyoming 1998; Assistant Research Scientist 1994; Associate Lecturer in Mathematics 2004, 2000.

WILLIAM WEBER, B.S. University of Wyoming 1998; M.S. 1992; Associate Lecturer in Mathematics 2005, 2001.

Assistant Lecturer:

DAVID ANTON, B.S. North Dakota State University 2001; M.S. University of Wyoming 2007; Assistant Lecturer in Mathematics 2007.

Adjunct Professors:

Robert Kansky, Dan Marchesin, Barbara Rüdiger, Richard Shumway, Larry Winter, Shaochang Wo

Professors Emeriti:

Leonard Asimow, Robert Buschman, Benito M. Chen-Carpentier, George C. Gastl, John H. George, Syed Husain, Eli Isaacson, Terry Jenkins, A. Duane Porter, Ben G. Roth, John Rowland, Virindra Sehgal, Leslie E. Shader, Raymond Smithson

The Department of Mathematics offers programs leading to the degrees of master of arts, master of science, master of arts in teaching, master of science in teaching, and the doctor of philosophy.

The degrees and their requirements reflect our belief that mathematicians should have a broad foundation in the core areas of algebra, analysis, and applied mathematics as well as the experience of a more intensive investigation of a specialized area. We provide this within a flexible structure that recognizes the individual interests and varied backgrounds of students.

Program Specific Admission Requirements

The GRE is required, with a minimum composite score of 900 for master's applicants and 1000 for Ph.D. applicants. The GRE is not required if the applicant has a M.S. or Ph.D. from an approved institution.

Upper-division undergraduate courses in abstract algebra, matrix theory, and two semesters of analysis are recommended. Students who enter with a deficiency in these courses may take them at UW, but cannot count them towards a graduate degree.

Serious consideration is given to applicants from a variety of backgrounds, including science, engineering, computer science, statistics and philosophy.

The GRE subject test in mathematics (or in the undergraduate major if not math) may be helpful, but is not required.

Additional Program Requirements for International Admission

International applicants are required to take the TOEFL exam and earn a minimum score of 540 on the written exam or a 76 on the iBT. The TOEFL requirement may be waived for students from an English speaking country, or who have earned a degree from an accredited institution with instruction in English within a year of applying. ETS reports only TOEFL scores taken within two years of date of request.

Requirements for Admission for M.A.T. or M.S.T.

Valid teaching endorsement in any state, or educational requirements satisfied for secondary teaching.

Two years' teaching experience at the pre-college level (may be completed during degree program).

Courses equivalent to MATH 3000 or 3200, 3500 or 3550, 4000, and 4600. Students who enter with a deficiency in these courses must take them at UW, but cannot count them towards the degree.

A course in computer programming.

Program Specific Graduate Assistantships

The Mathematics Department employs approximately 20 graduate assistants each year. Assistantships include a full tuition and fee waiver, monthly living stipend, and health insurance. Ph.D. students normally receive a higher stipend than master's students.

Graduate assistants usually teach one undergraduate course each fall and spring semester.

Students may also compete for research assistantships, provided that their interests align with an externally funded research project.

Summer support is not guaranteed but is usually available through teaching and research opportunities.

Program Specific Degree Requirements

Master's Programs: M.A. and M.S. Plan A and Plan B

Students in the program must:

- Maintain a 3.0 cumulative GPA.
- Complete 30 hours of formal mathematics coursework at the 5000 level.
- Within the 30 hours of 5000-level courses, complete the following courses with a grade of A or B: MATH 5200, 5230, 5310, 5400, 5500, and 5550.
- Within the 30 hours of 5000-level courses, pass 2 hours of MATH 5800-01, Professional Development.
- In addition to the 30 hours of 5000-level courses, the Plan A student must complete 4 hours of MATH 5960, Thesis Research.
- The student must pass one qualifying exam in algebra, analysis, or applied mathematics.
- The student must prepare a master's thesis (Plan A) or a master's paper (Plan B) and give an oral defense.

Master's Program: Second Option for Plan B Degree

A second M.A. or M.S. option exists for the Plan B student. In lieu of writing a paper, the student takes a sequence of three 5000-level courses. The sequence must be approved by the student's advisor and the mathematics graduate committee. Two of the courses must be mathematics-department offerings, and the third can be either a mathematics course (including Reading/Topics courses) or a course from another department in a related field.

In addition to completing the 3-course sequence, the Plan B student must meet the following requirements:

- Maintain a 3.0 GPA.
- Complete 36 hours of courses at the 5000 level.
- Within the 36 hours, complete with a grade of A or B: MATH 5200, 5230, 5310, 5400, 5500, 5550, and two semesters of 5800-01.
- Pass 1 qualifying exam.

In approving the student's proposal for this option, the graduate committee and the advisor will pay attention as to how the writing and independent study spirit of the Plan B option are fulfilled within the recommended plan.

Master of Arts in Teaching or Master of Science in Teaching

This degree is intended for in-service high school or middle school math teachers. The M.S.N.S. (Master of Science in Natural Science) Math option, through the Science and Math Teaching Center of the College of Education, is an alternative for middle school teachers.

Candidates for the M.S.T. or M.A.T. must take at least 30 hours of coursework at the 4000 level or above, of which at least 18 hours must be math courses, and at least 24 hours must be in the College of Arts and Sciences.

GPA of 3.0 in math courses is required.

EDRE 5530 or 5550 is recommended as part of the student's program.

The student prepares a master's thesis (Plan A) or master's paper (Plan B) and gives an oral defense.

Doctoral Program

The student must maintain a 3.0 cumulative GPA.

The student must teach two semesters of college mathematics.

The student must complete a combination of 72 hours of coursework and dissertation research. Within the 72 hours, a maximum of 12 hours can be at the 4000 level, and 42 hours must be formal courses at the 5000 level. The courses should be mathematics courses or courses with significant mathematical content, as approved by the department graduate committee.

Within the 42 hours of 5000-level courses, the student must complete MATH 5200, 5230, 5310, 5400, 5500, and 5550 with a grade of A or B.

Within the 42 hours of 5000-level courses, the student must take a broadening course as defined by the department and pass with a grade of A or B.

Within the 42 hours of 5000-level courses, the student must take 2 hours of MATH 5800-02, Seminars and Colloquia.

Within the 42 hours of 5000-level courses, the student must complete courses distributed in three areas: algebra, analysis, and applied mathematics. The student must take at least two courses in each of two categories and at least one course from the third category. The department maintains a list of course categories.

The student must pass two of the three qualifying exams in the topics of algebra, analysis, and applied mathematics.

Mathematics (MATH)

5090. Topics in the Foundations of Mathematics. 1-6 (Max. 9). *Prerequisites:* MATH 3000 and consent of instructor.

5100. Seminar in Elementary School Mathematics. 1 - 4 (Max. 8). A course to give graduate students in mathematics education, or in-service teachers, an in-depth view of new contents, materials, and strategies for teaching mathematics in elementary schools. The course is primarily designed to meet the needs of students working towards M.S.N.S., M.S.T., M.A.T. degrees. *Prerequisite:* 6 hours of MATH 4100.

5110. Modeling Flow Transport in Soil and Groundwater Systems. 4. Mathematical models are formulated and applied to simulate water flow and chemical transcript in soil and groundwater systems. Soil spatial variability and heterogeneity are considered in the modeling processes. Using and comparing models, students obtain the capability to transfer a physical problem to a mathematical model, to use numerical methods, such as the finite element methods, to solve the mathematical problem, and to correctly interpret the numerical outputs. Students develop and program numerical solutions for select problems and utilize existing codes for modeling a variety of comprehensive problems. Cross listed with SOIL 5110.

5140. Numbers, Operations, and Patterns for the Middle-level Learner. 3. Provides working middle-level mathematics teachers opportunities to understand and discuss numbers, their representations, and operations on them from an abstract perspective that includes elegant proof. Also emphasized is the role of language and purpose in composing definitions. Cross listed with NASC 5140. *Prerequisites:* admission to a university graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics Program.

5150. Seminar in Secondary School Mathematics. 1-4 (Max. 18). Seminar in Secondary School Mathematics. *Prerequisite:* 6 hours of MATH 4150.

5160. Social and Historical Issues in Mathematics and the Middle-Level Learner. 3. Empowers teachers of middle-level mathematics to design more engaging experiences. Emphasizes the historical context for the development of mathematics, especially its symbols, tools, personalities, and classic problems. Cross listed with NASC 5160. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics Program.

5170. Connecting Geometry with Problem-Solving for the Middle-Level Learner. 3. Showcases two aspects of 2D and 3D geometry: measurement and transformation. Emphasis reflects current state and national standards for

middle-level mathematics classroom and teacher preparation, especially appropriate uses of technology, geometric tools, mathematical language, and problem-solving strategies. Cross listed with NASC 5170. *Prerequisites:* admission to a university graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics Program.

5190. Mathematics of Change and the Middle-Level Learner. 3. Students gain a solid understanding of data and functions in the service of calculus. Course is hands-on, project-driven and focuses on the essential concepts of functions and calculus and their role in middle-level mathematics. Emphasis is on writing and technology (calculators and probeware). Cross listed with NASC 5190. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics Program.

5200. Real Variables I. 3. Develops the theory of measures, measurable functions, integration theory, density and convergence theorems, product measures, decomposition and differentiation of measures, and elements of function analysis on Lp spaces. Lebesgue theory is an important application of this development. *Prerequisite:* MATH 4205.

5205. Real Variables II. 3. A continuation of MATH 5200. Prerequisite: MATH 5200.

5230. Complex Variables I. 3. Develops the function theory of holomorphic (analytic) and harmonic functions. Topics covered include the Cauchy-Riemann equations, Cauchy-Goursat theorem, Cauchy integral theorem, Morera's theorem, maximum modulus theorem, Liouville's theorem, power series representation, harmonic functions, theory of singularities of functions of one complex variable, contour integration, analytic continuation, Riemann mapping theorem and topology of spaces of holomorphic functions. *Prerequisite:* MATH 4205.

5235. Complex Variables II. 3. A continuation of MATH 5230. *Prerequisites:* MATH 5230.

5255. Mathematical Theory of Probability. 3. Calculus-based. Introduces mathematical properties of random variables. Includes discrete and continuous probability distributions, independence, and conditional probability distributions, independence and conditional probability, mathematical expectation, multivariate distributions and properties of normal probability law. Dual listed with MATH 4255, cross listed with STAT 5255. *Prerequisites:* grade of C or better in MATH 2210 or 2355.

5265. Introduction to the Theory of Statistics. 3. Presents derivations of theoretical and sampling distributions. Introduces theory of estimation and hypothesis testing. Dual listed with MATH 4265, cross listed with STAT 5265. *Prerequisites:* STAT 4250/5250, MATH 4250.

5270. Functional Analysis I. 3. Topics include the geometry of Hilbert spaces, linear functions and operators on Hilbert spaces, spectral theory of compact normal operators, Banach space theory, the open mapping theorem, Hahn-Banach theorem, Banach-Steinhaus theorem, duality and linear operators on Banach spaces, and different topologies on Banach spaces and their duals. *Prerequisite:* MATH 5200.

5275. Functional Analysis II. 3. Topics may include discussion of topological vector spaces, locally convex spaces, F-spaces, spectral theory of non-compact operators on Hilbert spaces, semigroups or evolution operators, distribution theory, and applications to differential equations and Sobolev spaces. *Prerequisite:* MATH 5270.

5290. Topics in Analysis. 1-6 (Max. 18). Topics in analysis. *Prerequisite:* MATH 5200.

5310. Computational Methods in Applied Sciences I. 3. First semester of a three-semester computational methods series. Review of iterative solutions of linear and nonlinear systems of equations, polynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Identical to COSC 5310. *Prerequisite:* MATH 3310, COSC 1010.

5320. Mathematical Modeling Processes. 3. Introduction to techniques in the process of constructing mathematical models. Application of the techniques to areas such as petroleum reservoir simulation, chemical process industry operations, and plant start-up. Identical to CHE 5870. *Prerequisite:* MATH 5310 and graduate standing.

5340. Computational Methods II. 3. Second semester of a three-semester computational methods series with emphasis on numerical solution of differential equations. Topics include explicit and implicit methods, methods for stiff ODE problems, finite difference, finite volume, and finite element methods for time-independence PDEs semi/fully discrete methods for time-dependent PDEs. Cross listed with COSC 5340. *Prerequisite:* MATH 5310.

5345. Computational Methods III. 3. Third semester of a three-semester computational methods series with emphasis on numerical solution of problems displaying sharp fronts and interfaces (nonlinear conservation laws, Hamilton-Jacobi equations). Cross listed with COSC 5345. *Prerequisite:* MATH 5340.

5390. Topics in Numerical Analysis. 1 - 6. (Max 18). Topics in numerical analysis. *Prerequisite:* MATH 5340 or 5345.

5400. Methods of Applied Mathematics I. 3. First semester of a one-year survey of topics and methods of applied mathematics, emphasis on applications from physics and engineering. The full sequence includes introductions to mathematical aspects of mechanics (e.g., conservation laws), asymptotic expansions, systems of ODE and stability, integral equations and calculus of variations, PDE with boundary value problems and generalized solutions (including wave, heat, and potential equations), numerical methods and stability. *Prerequisite:* MATH 2250, 4200 or 4400, and 2310 or 4430.

5405. Methods of Applied Mathematics II. 3. A continuation of MATH 5400. *Prerequisite:* MATH 5400.

5430. Ordinary Differential Equations II. 3. Differential equations constitute the mathematical language for problems of continuous change. ODEs deal with evolutionary processes involving one independent variable. This course revisits solution techniques but emphasizes the theoretical framework. Topics include: existence and uniqueness, linear and nonlinear differential systems, asymptotics and perturbations, and stability. *Prerequisite:* MATH 4200, 4430.

5440. Partial Differential Equations II. 3. The theory of PDEs is important for abstract mathematics, applied science, and mathematical modeling. This course covers solution techniques but emphasizes the theoretical framework. Topics include: first order systems; characteristics; hyperbolic, elliptic and parabolic equations; separations of variables; series and transforms; integral relations; Green's functions, maximum principles; variational methods. *Prerequisite:* MATH 4200 and 4440.

5490. Topics in Applied Mathematics. 1-6 (Max. 18). Prerequisite: consent of instructor.

5500. Advanced Linear Algebra. 3. An introduction to the theory of abstract vector spaces and linear transformations from an axiomatic point of view, with applications to matrix theory. Topics include vector spaces, dimension, linear transformations, dual spaces and functionals, inner product spaces, and structure theorems. *Prerequisite:* MATH 3000 or 3200, and 4500.

5510. Combinatorial Theory. 3. An introduction to combinatorics covering both classical and contemporary topics. Includes some of the following: generating functions, recursion formulas, partially ordered sets, inclusion- exclusion, partitions, graph theory, Ramsey theory, combinational optimization, Latin squares, finite geometries, and design theory. *Prerequisite:* MATH 3500 or 3550.

5530. The Theory of Groups. 3. An in-depth study of various aspects of group theory, building on MATH 5550. Topics include some of the following: classical theory of finite groups (both Abelian and non-Abelian), infinite Abelian groups, free groups, permutation groups, group representations, endomorphism, extensions, and cohomology. *Prerequisite:* MATH 5550.

5550. Abstract Albegra I. 3. Studies the structure of groups, rings, and fields. For each, concepts of substructures, quotient structures, extensions, homomorphism, and isomorphism are discussed. *Prerequisite:* MATH 3500 or 3550.

5555. Abstract Algebra II. 3. A continuation of MATH 5550, examining in depth selected topics from the theory of rings, fields, and algebras, including Galois theory. *Prerequisite:* MATH 5550.

5570. Matrix Theory and Combinatorics. 3. An overview of matrix theory and its applications to combinatorics. Topics include Smith normal form, the Perron-Frobenius theory of non-negative matrices, location and perturbation of eigenvalues, and interlacing of eigenvalues. Applications include structure theorums for (0,1)-matrices, network flows, spectra of graphs, and the permanent. *Prerequisite:* MATH 5500.

5590. Topics in Algebra. 1-6 (Max. 18). Topics in algebra. *Prerequisites:* MATH 5555.

5600. Point-Set Topology. 3. Topics considered are metric spaces, open spheres, open sets, closed sets, continuous functions, limit points, topological spaces, homeomorphisms, compactness, connectedness, and separability. The familiar notion of distance on the real number line is generalized to the notion of a metric for an arbitrary set, which is in turn generalized to the concept of a set topology for a set. Certain applications to analysis and geometry are indicated. *Prerequisite:* MATH 3000 and 4200.

5605. Topology II. 3. Topics in algebraic topology, including simplicial homology groups and their topological invariance, the Eilenberg-Steenrod axioms, singular homology theory, and cohomology. *Prerequisite:* MATH 5600.

5640. Differential Geometry. 3. Curve theory, theory of surfaces, and geometrics on a surface. *Prerequisite:* MATH 4200 or 4400.

5690. Topics in Topology. 1-6 (Max. 9). *Prerequisite:* consent of instructor.

5700. Topics in Combinatorics. 1 - 6 (Max. 18). Selected topics in combinatorial analysis.

5800. Seminar in Mathematics. 1-3 (Max. 8). *Prerequisite:* consent of Instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate Program of Study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Music

258 Fine Arts Center, 766-5242
FAX: (307) 766-5326
Web site: www.uwyo.edu/music
Department Head: David Brinkman

Professors:

STEVE BARNHART, B.M.E. Texas Tech University 1973; M.M. North Texas State University 1980; D.M.A. University of Kansas 1989. Percussion, Jazz Ensemble.

ROBERT BELSER, B.M.E. Central Missouri State University 1977; M.S. M.E University of Illinois 1982; D.M.A. University of Iowa 1994; Director of Bands, Conducting, Music Education.

THERESA L. BOGARD, B.M. University of Colorado 1983; M.M. Eastman School of Music 1985; D.M.A. University of Colorado 1990; Associate Professor of Music 1998, 1992. Keyboard, Keyboard Area Coordinator, Piano, Theory.

DAVID J. BRINKMAN, B.M.E. University of Nebraska 1971; M.M. 1991; Ph.D. University of Nebraska-Lincoln 1994; Associate Professor of Music 2000, 1995; Music Education.

RODNEY GARNETT, B.M.E. University of Colorado 1975; M.M. 1986; Associate Professor of Music 1998, 1991. Flute, Music Education.

MICHAEL GRIFFITH, B.M.E. Michigan State University 1973; M.M. 1975; D.M.A. University of Colorado 1994; Professor of Music 2001, 1989. Conducting, Woodwinds.

LARRY L. HENSEL. B.A. Macalester College 1981; M.M. 1984; D.M.A in Performance and Literature, Eastman School of Music 1993; Professor of Music 2007, 1996. Vocal Arts Area Coordinator, Voice, Opera Theatre, Vocal Literature.

JAMES PRZYGOCKI, B.M. Western Michigan University 1979; M.M. Indiana University 1984; Professor of Music 2005, 1999, 1993. Viola, String Methods, Music Education.

Associate Professors:

JOHN FADIAL, B.M. North Carolina School of the Arts; M.M. Eastman School of Music; D.M.A. University of Maryland; Violin.

J. SCOTT TURPEN, B.M.E. Boise State University 1994; M.M. University of Georgia 1996; D.M.A. 1999; Assistant Professor of Music 2001. Director of Jazz Studies, Saxophone.

KATRINA ZOOK, B.M. Oberlin College 1986; M.M. University of California—Santa Barbara 1992; D.M.A. Eastman School of Music 2000; Associate Professor of Music 2005, 1999. Voice, Music Appreciation, Vocal Methods, Vocal Pedagogy.

Assistant Professors:

ANNE GUZZO, B.M. University of New Mexico 1992; M.A. University of California, Santa Cruz 1996; Ph.D. University of California, Davis 2002; Assistant Professor of Music 2006.

SCOTT MEREDITH, B.M., B.M.E. University of Northern Colorado; M.A. , D.M.A. University of North Texas; Assistant Professor of Music 2009.

RUBIA SANTOS, B.M. University Sao Judas Tadeu, San Paulo, Brazil; Artist Diploma, Musikhochschule, Cologne, Germany 1987; M.M. Arizona State University 1997; D.M.A. 2004; Assistant Professor of Music 2007.

MARK SHERIDAN-RABIDEAU, B.A., D.M. University of Illinois at Urbana-Champaign; M.M. University of Notre Dame; Assistant Professor of Music 2007.

BETH VANDERBORGH, B.M. Manhattan School of Music; M.M. Eastman School of Music; D.M.A. University of Maryland; Assistant Professor of Music, Cello.

Lecturers:

McKeage, J. Turpen

Part-time Lecturers:

Berlinsky, Boehm Shaffer, Fleg, Hart, Hoffman, Latchininsky, LaTouche, Bird Reynolds, Riner, Sinift, Sorensson, Strampe, Wallace

Professors Emeriti:

Gordon Childs, Julia Combs, Frederick Gersten, Brian Hanly, Edgar Lewis, William Stacy, Carlyle Weiss

The Department of Music offers programs leading to the master of music in performance and to the master of music education.

The following prerequisites and credit hours will pertain to individual lessons for all the instruments and voice listed below. All students enrolled in MUSC 5080 through MUSC 5670 levels will be required to take a jury examination at the end of the semester to determine, in part, the final grade. (See current fee schedule for listing of fees in Individual Lessons.)

Program Specific Admisstion Requirements

In addition to the minimum requirements set forth in this bulletin, the Department of Music requires that applicants for graduate programs submit supplementary documentation of their preparation for advanced study in music.

Master of Music Education

An earned, documented bachelor of music education from an accredited institution of higher learning.
One year of teaching experience plus:
An active background in music education,
A videotape or DVD of classroom teaching and/or rehearsing,
A one- to three-page statement of music education philosophy,
Three letters of recommendation, one from an immediate supervisor, of teaching effectiveness.

Master of Music in Performance

An earned, documented bachelor of music performance from an accredited institution of higher learning.
Live audition or a performance CD or DVD demonstrating:
A strong sense of musicality,
Technical proficiency,
Stylistically correct performance practices in at least three historical periods, where applicable,
A working knowledge of the standard repertoire,
Also, a portfolio of work showing concentrated activity on the major instrument or voice area.

Program Specific Graduate Assistantships

Graduate assistantships are awarded on a competitive basis to defray some of the costs of graduate study and to provide practical experience working under the guidance of faculty members.

Criteria that are taken into account in awarding assistantships include: academic preparation, performing ability, and special skills that would prove valuable in carrying out the duties of the assistantship.

To be considered for a graduate assistantship, the candidate must be fully admitted through the university. The application for an assistantship is considered separately within the Department of Music, although the applications may be made concurrently. After considering the merits of the application, the department then nominates candidates to the university.

Applications for assistantships are due in the department on March 1. Contact the music department for more information.

Program Specific Degree Requirements

Master's Programs

Each of the degree programs consists of 30 semester hours of work composed of the following elements:
Basic music core (11 hours)
- MUSC 5310. Bibliographical Research, 2 hours
- Upper-division music history, 3 to 6 hours
- Upper-division music theory, 3 to 6 hours

Major area courses (12-16 hours)
Thesis requirement (Plan A, four hours); (Plan B, zero hours)
- The thesis requirement may be fulfilled under Plan A or Plan B as appropriate to the specific degree program. A proposal for a thesis or Plan B paper must be submitted to and approved by the Department of Music Graduate Committee.

Electives (0 to 7 hours)

Master of Music Education
Plan A or Plan B

To earn a master of music education, students must complete the following requirements:
Basic music core, (11 hours)
Major area courses (12 - 15 hours)
- EDRE 5530. Introduction to Research, 3 hours
- MUSC 5760. Music Education Seminar, 2 hours
- MUSC 5720. Music Supervision, 2 hours
- Music education electives, 5-8 hours
- Thesis requirement (0 to 4 hours)
- Plan A: MUSC 5960. Thesis Research, four hours (the thesis must be on a music education topic), or
- Plan B: Plan B paper, plus extra courses, 0 hours

Electives (4 to 7 hours)

Master of Music in Performance
Plan B

To earn a master of music in performance, students must complete the following requirements preferred.
Basic music core (11 hours minimum)
Major area courses (16 hours minimum)
- MUSC 5480-5670. Private Lessons in major instrument or voice. A minimum of 8 hours.
- MUSC 5770-5890. Ensembles, 2 hours
- MUSC 5680. Graduate Recital, 2 hours. A faculty jury must approve a recital given for credit one month prior to the performance. The faculty jury will determine the grade after the performance.
- MUSC 5390. Performance Practice and Interpretation, 2 hours
- MUSC 5320. Advanced Seminar, 2 hours
- MUSC 5***. Advanced Teaching Methods (pedagogy), 2 hours

Requirement in lieu of thesis:
- Plan B paper

Foreign language requirement (voice majors only). Singers must demonstrate acceptable proficiency in singing in Italian, German, French, and English.
Electives (0 to 3 hours)
Both degrees require successful completion of the written comprehensive exams, which cover theory, history, and the major area.

Music (MUSC)

5030. Advanced Theory I. 2. First semester of a one-year course. Analysis of, and practice in, the more recent harmonic idioms with advanced aural and keyboard harmony. *Prerequisite:* MUSC 2030, 2035.
5080. Baritone Horn V. 1-4 (Max. 8). *Prerequisite:* 4 semester hours of MUSC 4080 on the same instrument or graduate standing.
5090. Bassoon V. 1-4 (Max. 8).
5100. Cello V. 1-4 (Max. 8).
5110. Clarinet V. 1-4 (Max. 8).
5120. Double Bass V. 1-4 (Max. 8).
5130. Flute V. 1-4 (Max. 8).
5140. French Horn V. 1-4 (Max. 8).
5150. Guitar V. 1-4 (Max. 8).
5160. Harp V. 1-4 (Max. 8).
5170. Oboe V. 1-4 (Max. 8).
5180. Organ V. 1-4 (Max. 8).
5190. Percussion V. 1-4 (Max. 8).
5200. Piano V. 1-4 (Max. 8).
5210. Saxophone V. 1-4 (Max. 8).
5220. Trombone V. 1-4 (Max. 8).
5230. Trumpet V. 1-4 (Max. 8).
5240. Tuba V. 1-4 (Max. 8).
5250. Violin V. 1-4 (Max. 8).
5260. Viola V. 1-4 (Max. 8).
5270. Voice V. 1-4 (Max. 8).
5310. Bibliographical Research. 2 Consideration of the place and scope of musicological disciplines in the world of music and of the basic techniques of musicology. *Prerequisite:* graduate standing in music.
5320. Advanced Seminar. 2-6 (Max. 6). Such topics as The Music of J.S. Bach, The Chamber Music of Mozart, and Contemporary Music will be pursued and will terminate in oral reports and a research paper. *Prerequisite:* 4 hours of upper division music history and literature.
5330. Advanced Instrumentation and Arranging. 1-3 (Max. 3). Continued practice in choral and instrumental scoring. A work of large design will be adapted for performance by one of the organizations within the division. *Prerequisite:* MUSC 4300.
5340. Advanced Composition. 1-4 (Max. 6). A project course to be conducted by individual appointment with the instructor. The result should be the production of a major work suitable for performance by one of the campus organizations. Evaluation is made by a faculty committee on completion and performance of the composition. *Prerequisite:* 4 hours of MUSC 4040.

5350. Advanced Analysis. 2. Consideration of the analytical techniques of Harder, Piston, and Schillinger for traditional music, of Hanson and Hindemith for modern tonal music, and of Schoenberg and Reti for serial music. *Prerequisite:* graduate standing in music.

5360. Pedagogy of Theory. 2. Consideration of the subject matter of all undergraduate theory courses, procedures for presenting the material, and analysis and evaluation of texts and methods. *Prerequisite:* graduate standing in music.

5370. Advanced Choral Conducting. 1-2 (Max. 3). The interpretation of well-known oratories and cantatas; experience in the direction of campus choral groups. *Prerequisite:* MUSC 4070, 4790.

5380. Advanced Instrumental Conducting. 1-2 (Max. 3). Interpretive analysis of instrumental works in large form; experience in the direction of campus performing groups. *Prerequisite:* MUSC 4070, 4780.

5390. Performance Practice and Interpretation. 2. A study of the inherited traditions of correct interpretation and performance as related to the various style periods in music. *Prerequisite:* graduate standing in music.

5400. Independent Study and Research. 1-2 (Max. 6). *Prerequisite:* graduate standing and consent of instructor.

5410. History of Musical Instruments. 2. An investigation of the mechanical evaluation of musical instruments as related to the music written for these instruments. *Prerequisite:* graduate standing in music.

5480. Baritone Horn VI. 1-4 (Max. 8).

5490. Bassoon VI. 1-4 (Max. 8).

5500. Cello VI. 1-4 (Max. 8).

5510. Clarinet VI. 1-4 (Max. 8).

5520. Double Bass VI. 1-4 (Max. 8). to cover appropriate technical and repertory materials in Graduate level dbl bass. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5530. Flute VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level flute. A faculty jury will review each semester's work. Prerequisite: graduate standing in music.

5540. Guitar VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level flute. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5550. Harp VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level harp. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5560. French Horn VI. 1-4 (Max. 8). *Prerequisite:* 4 semester hours of MUSC 4560 or graduate standing.

5570. Oboe VI. 1-4 (Max. 8). *Prerequisite:* 4 semester hours of MUSC 4570 or graduate standing.

5580. Organ VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level organ. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5590. Percussion VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level percussion. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5600. Piano VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level piano. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5610. Saxophone VI. 1 - 4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level sax. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5615. Capstone. 3. Designed to provide a forum to present research in music that fulfills requirements of the Plan B process. Instruction is individualized, but involves cooperative learning opportunities with other students. The student presents the finished product to the class members. Course is restricted to students doing Plan B paper only. *Prerequisite:* Plan B proposal approved by the music department graduate committee.

5620. Trombone VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level trombone. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5630. Trumpet VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level trumpet. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5640. Tuba VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level tuba. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music

5650. Violin VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level violin. A faculty jury will review each semester's work. *Prerequisite:* graduate standing in music.

5660. Viola VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level viola. A faculty jury will review each semester's work. Prerequisite: graduate standing in music.

5670. Voice VI. 1-4 (Max. 8). Designed to cover appropriate technical and repertory materials in Graduate level voice. A faculty jury will review each semester's work. Prerequisite: graduate standing in music.

5680. Graduate Recital. 2. A recital, vocal or instrumental and consisting of selections of advanced difficulty in matters of technique and interpretation, is presented under the direction of a staff member. Quality and content of recital must be approved by a faculty committee one month before the recital date and the faculty committee will determine the final grade. *Prerequisite:* graduate standing in music and consent of instructor.

5690. Advanced Teaching Methods - Brass. 1. Designed to present new and improved methods of teaching the various band and orchestral instruments in the public schools.

5700. Advanced Teaching Methods - String. 1. Designed to present new and improved methods of teaching the various band and orchestral instruments in the public schools.

5710. Advanced Teaching Methods - Woodwind. 1. Designed to present new and improved methods of teaching the various band and orchestral instruments in the public schools.

5720. Musical Supervision: Choral. 2. Examination of the administrative responsibilities of the music teacher, the music department chairman, and the district music supervisor in the public schools, as well as the responsibilities of a music festival chairman and officers of the state music educators association. *Prerequisite:* graduate standing in music.

5730. Musical Supervision:Instruments. 2. Examination of the administrative responsibilities of the music teacher, the music department chairman, and the district music supervisor in the public schools, as well as the responsibilities of a music festival chairman and officers of the state music educators association. *Prerequisite:* graduate standing in music.

5740. Choral Techniques and Materials. 1 (Max. 1.2).

5750. Band Techniques and Materials. 1 (Max. 1.2).

5760. Music Education Seminar. 2. A study and discussion of trends, objectives, and curricula of the various phases of music education.

5770. Marching Band. 0.5 (Max. 2).

5780. Wind Ensemble. 0.5 (Max. 2).

5790. Jazz Band. 0.5 (Max. 2).

5800. Collegiate Chorale. 0.5 (Max. 2).

5810. Vocal Ensemble. 0.5 (Max. 2).

5820. Opera Theatre. 0.5 (Max. 2).

5830. Symphony Orchestra. 0.5 (Max. 2).

5840. Chamber Orchestra. 0.5 (Max. 2).

5850. Percussion Ensemble. 0.5 (Max. 2).

5860. Brass Ensemble. 0.5 (Max. 2).

5870. Woodwind Ensemble. 0.5 (Max. 2).

5880. String Ensemble. 0.5 (Max. 2).

5890. Piano Ensemble. 0.5 (Max. 2).

5895. Baroque Ensemble III. 1 (Max. 1.2). Designed to provide students with the opportunity to play on period instruments of the Baroque era. The repertoire primarily includes music of the seventeenth and eighteenth centuries and whose performance practices reflect the spirit and style of the period in which the music was composed. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3. (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.
5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Philosophy

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Web site: www.uwyo.edu/philosophy
Department Head: Edward D. Sherline

Professor:

JEFFREY A. LOCKWOOD, B.S. New Mexico Institute of Mining and Technology 1982; Ph.D. Louisiana State University 1985; Professor of Philosophy 2006.
CARLOS MELLIZO-CUADRADO, B.A. University of Madrid 1965; M.A. 1966; Ph.D. 1970; Adjunct Research Professor in Philosophy 2006.

Associate Professors:

SUSANNA L. GOODIN, B.A. Texas Technical University 1981; M.A. Rice University 1985; Ph.D. 1990; Associate Professor of Philosophy 1998, 1992.
FRANZ-PETER GRIESMAIER, University of Vienna 1986; M.A. University of Colorado 1988; Ph.D. University of Arizona 1997; Associate Professor of Philosophy 2006, 2000.
MARC A. MOFFETT, B.A. New Mexico State University 1993; M.A. University of Colorado 2002; Ph.D. 2003; Associate Professor of Philosophy 2009, 2003.
EDWARD D. SHERLINE, B.A Princeton University 1982; M.A. University of Chicago 1983; Ph.D. University of Illinois-Chicago 1990; Associate Professor of Philosophy 1996, 1989; Head of the Department of Philosophy 2002.

Assistant Professor:

ROBERT S. COLTER, B.A. The University of Puget Sound 1992; M.A. University of Colorado 1995; Ph.D. Northwestern University 2001; Assistant Professor of Philosophy 2007.

Adjunct Professor:

ROBIN HILL, B.A. University of Wyoming 1975; M.A. University of East Anglia 1978; M.S. University of Arizona 1981; Ph.D. State University of New York at Buffalo 1994; Adjunct Professor in Philosophy 1996.
NANCY H. SHEA, B.S. Northern Arizona University 1975; M.S. University of Nebraska 1977; M.S. Southern Connecticut State University 1979; M.A. University of Massachusetts 1987; Ph.D. 1991; Adjunct Professor in Philosophy 2007.

Professors Emeriti:

James Forrester, Richard L. Howey, James A. Martin

The Department of Philosophy offers the master of arts degree under the Plan A

Program Specific Admission Requirements

A writing sample of no more than 3,000 words on any subject in philosophy.

A statement describing specific philosophical interests.

Progarm Specific Graduate Assistantships

The department offers two to three graduate assistantships yearly on a competitive basis. These assistantships carry a tuition and fee waiver, plus a stipend. For more information, please contact the department.

Program Specific Degree Requirements

Plan A (thesis)
31 hours of graduate credit
27 hours of graduate coursework
4 hours of thesis research

Proof of proficiency in formal logic (through first-order predicate logic with identity) by either passing the department's course (3420) or some other course judged to be its equivalent with a grade B or better or by completing a test with a grade B or better at the end of the second semester.

First year paper at the beginning of the third semester.

Defense of a thesis prospectus by the end of the third semester.

In any cases of deficiency, the department may require remedial work before admission to M.A. candidacy.

Philosophy (PHIL)

5000. Philosophical Issues. 1-3 (Max. 6). Dual listed with PHIL 4000. *Prerequisites:* graduate status and consent of instructor.
5020. Plato. 3. Detailed examination of selected dialogues of Plato. Dual listed with PHIL 4020. *Prerequisite:* graduate standing.
5030. Aristotle. 3. Detailed examination of selected works of Aristotle. Dual listed with PHIL 4030. *Prerequisite:* graduate standing.
5040. Kant. 3. An examination of one or more aspects of the work of Immanuel Kant, conducted either from the perspective of the history of philosophy, or predominantly as a critical study. Dual listed with PHIL 4040. *Prerequisite:* graduate standing.
5060. Nietzsche. 3. A detailed examination of the major doctrines of Nietzsche. *Prerequisite:* 12 hours of philosophy.
5070. Wittgenstein. 3. A detailed examination of Wittgenstein's method of approaching philosophical problems. *Prerequisite:* 12 hours of philosophy.
5100. Figures in Modern and 19th Century Philosophy. 3-6 (Max. 6). A detailed examination of one or more of the figures in modern or 19th century philosophy. *Prerequisite:* 12 hours of philosophy including PHIL 3100.
5110. Figures in Contemporary Philosophy. 3-6 (Max. 6). An advanced study of the work of one, or several related, contemporary philosophers. Dual listed with PHIL 4110. *Prerequisite:* 12 hours of philosophy including PHIL 3100.
5120. Philosophy and the Twentieth Century. 3. Part three of the history of philosophy sequence. Covers the third great age of philosophy. Studies the main ways in which philosophy has been done since 1900. Topics normally include logic and philosophy, Wittgenstein, logical positivism and current trends. Dual listed with PHIL 4120. *Prerequisite:* graduate standing.
5140. Topics in Philosophy of Science. 3-6 (Max. 6). Encompasses selected topics in philosophy of science. Dual listed with PHIL 4140. *Prerequisite:* 12 hours of Philosophy including PHIL 3140.
5190. Philosophy of Language. 3-6 (Max. 6). An advanced study of the work of one, or several related, contemporary philosophers. Dual listed with PHIL 4190. *Prerequisite:* 12 hours of philosophy including PHIL 4510 or 4560.
5200. Topics in Contemporary Philosophy. 3-6 (Max. 6). An advanced investigation of topics of current importance in philosophy not dealt with in other advanced courses. Examples include: truth, nature of conceptual schemes and world views, and nature of philosophical problems and arguments. *Prerequisite:* 12 hours of philosophy including PHIL 1000 and consent of instructor.

5215. Topics in Social and Political Philosophy. 3. Advanced study of such topics as property rights; alternative theories of the state and other social organizations; and concepts of the nature of man. Topics might be approached either historically or analytically. Dual listed with PHIL 4215. *Prerequisite:* 9 hours of philosophy including PHIL 3200.

5300. Topics in Ethics. 3-6 (Max. 6). An advanced investigation of selected topics in ethics. Examples include derivative and basic principles of obligation; justice; morality and utility; generalization of norms; and the relation of morality and law. Dual listed with PHIL 4300. *Prerequisite:* graduate standing.

5340. Issues in Environmental Ethics. 3. Encompasses selected topics in environmental and natural resource ethics. Dual listed with PHIL 4340. *Prerequisite:* PHIL 2330, 2340, 3300 or 3350.

5440. Topics in the Philosophy Of Mind. 3-6 (Max. 6). An advanced study of problems in the philosophy of mind such as the concept of human action; intention; choice; reasons and causes in the explanation of human action; mental states and brain states; and artificial intelligence. Dual listed with PHIL 4440. *Prerequisite:* 12 hours of philosophy including PHIL 3440.

5510. Theory of Knowledge. 3. Studies such problems as knowledge and belief, skepticism, perception and knowledge, memory, truth and justification of induction. Dual listed with PHIL 4510. *Prerequisites:* 12 hours of philosophy including PHIL 3100 and 4100.

5550. Independent Study. 1-6 (Max. 6). A study of a topic selected in consultation with the instructor. *Prerequisite:* 12 hours of philosophy and consent of instructor.

5560. Metaphysics. 3. Examines approaches to metaphysics. Discusses problems such as causality, individuation and distinction between particulars and universals. Dual listed with PHIL 4560. *Prerequisites:* graduate standing.

5890. Problems in Philosophy. 1-10 (Max. 10). A study of specific topics to be selected in consultation with the instructor. *Prerequisite:* 15 hours of philosophy and consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes. *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Physics and Astronomy

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Web site: physics.uwyo.edu
Department Head: Paul E. Johnson

Professors:

YURI DAHNOVSKY, Institute of Chemical Physics, Moscow 1983; Professor of Physics 2007, 2000.

PAUL E. JOHNSON, B.S. Davidson College 1973; M.S. University of Washington 1977; Ph.D. 1979; Head of the Department of Physics and Astronomy 1997; Professor of Physics and Astronomy 1993, 1981.

JINKE TANG, B.S. Jilin University 1982; M.S. Iowa State University 1990; Ph.D. 1998; Professor of Physics 2007.

Associate Professors:

MICHAEL S. BROTHERTON, B.S. Rice University 1990; M.A. University of Texas at Austin 1992; Ph.D. 1996; Associate Professor of Physics and Astronomy 2009, 2002.

RONALD W. CANTERNA, B.A. Colgate University 1968; Ph.D. University of Washington 1976; B.S. University of Wyoming 1982; Associate Professor of Physics and Astronomy 1990.

DANIEL A. DALE, B.S. University of Minnesota 1993; M.S. Cornell University 1996; Ph.D. 1998; Associate Professor of Physics and Astronomy 2005, 2001.

HENRY A. KOBULNICKY, B.S. University of Iowa 1991; M.S. University of Minnesota 1993; Ph.D. 1997; Associate Professor of Physics and Astronomy 2009, 2002.

MICHAEL J. PIERCE, B.S. University of Oklahoma 1980; M.A. University of Hawaii 1983; Ph.D. 1988; Associate Professor of Physics and Astronomy 2005, 2001.

Assistant Professors:

ADRIAN E. FEIGUIN, M.S. Universidad Nacional de Rosario, Argentina 1994; Ph.D. 2000; Assistant Professor of Physics 2009.

WENYONG WANG, B.S. Nankai University 1993; M.S. Yale University 1999; Ph.D. 2004; Assistant Professor of Physics 2008.

Academic Professional Lecturers:

RUTGER MICHALAK, Dipl. Phys FZ Julich 1989; Ph.D. 1993; Academic Professional Lecturer in Physics and Astronomy 2007, 2004.

DAVID R. THAYER, B.S. University of Miami 1977; Ph.D. Massachusetts Institute of Technology 1983; Academic Professional Lecturer in Physics 2002.

Assistant Lecturer:

EDWARD KONCEL, B.S. Portland State University 1969; M.S. University of Wyoming 1988; Ed.D. 1992; Assistant Lecturer in Physics and Astronomy 1999.

Adjunct Professors:

Bianchini, Marquad

Professors Emeriti:

Walter T. Grandy, A. Raymond Kunselman, Glen A. Rebka, Terry P. Roark, James M. Rosen, Lee H. Schick

The Department of Physics and Astronomy offers the degrees of master of science in physics, master of science with an emphasis in physics teaching, master of science in teaching, and doctor of philosophy.

Advanced degrees in physics may be based on experimental or theoretical research in physics or astrophysics. The department offers a Ph.D. in physics with a specialty in observational and theoretical astrophysics. Students who expect to work toward a degree in this specialty must have the same undergraduate background in physics and mathematics as those interested in the other specialties of physics and must take the same core courses in the graduate curriculum.

Please refer to the departmental homepage at physics.uwyo.edu/ for the programmatic updates, or contact the department directly.

Program Specific Admission Requirements

Applicants for graduate study in physics or astrophysics should have an undergraduate preparation in physics and mathematics equivalent to that specified for a physics major. They must submit their scores for the verbal aptitude, the quantitative aptitude, analytical aptitude, and the advanced physics portion of the GRE.

Program Specific Graduate Assistantships

The Physics and Astronomy Department commits to providing first and second year students with teaching assistantships for the nine-month academic year. More advanced students are generally supported on federal grants or fellowships. Both teaching and research assistantships carry a full tuition waiver and insurance. Summer assistantships are often available to students making satisfactory progress. Refer to physics.uwyo.edu/ for current amounts.

Program Specific Degree Requirements

Master of Science in Physics
Plan A (thesis)

24 hours of graduate coursework
2 hours of PHYS 5860. Independent Study Research
4 hours of PHYS 5960. Thesis Research

Thesis planning, development, and production guided by the committee chair and graduate committee.

The department requires specifically that PHYS 5310, 5410, and 5510 be among the minimum of 24 semester hours of graduate coursework. Each graduate student should consult with his or her adviser to develop a Plan A program appropriate to his or her goals. The department will recommend to the university that a graduate student be admitted to candidacy for the Plan A master's after he or she has completed 26 approved credit hours of lecture, seminar, and research courses (including those specified above), has passed the comprehensive examination given annually at the Ph.D. level, and has been accepted as a master's student by a member of the faculty.

Plan B (non-thesis)

24 hours of graduate coursework
6 hours of PHYS 5860. Independent Study Research

Thesis planning, development, and production guided by the committee chair and graduate committee.

The department requires specifically that PHYS 5310, 5410, and 5510 be among the minimum 24 semester hours of graduate coursework. All M.S. students will be required to take a minimum of 6 hours of research during the first two years. Each graduate student should consult with his or her adviser to develop a Plan B program appropriate to his or her goals. The department will recommend to the university that a graduate student be admitted to candidacy for the Plan B master's after he or she has completed 26 approved credit hours of lecture, seminar, and research courses (including those specified above), has passed the comprehensive examination given annually at the Ph.D. level, and has been accepted as a master's student by a member of the faculty.

Master of Science in Teaching
Plan A (thesis)

24 hours of graduate coursework
2 hours of PHYS 5860. Independent Study Research
4 hours of PHYS 5960. Thesis Research

Thesis planning, development, and production guided by the committee chair and graduate committee.

The Master of Science in Physics with emphasis in teaching is designed for graduate students preparing to teach in private secondary schools or in community colleges. It will include a small, carefully designed component in psychology and education, and will include one and one-half years of experience as a teaching assistant. This program will require a thesis project based on experience in the classroom. Course requirements will include eight hours of approved physics credit at the 5000 level, 16 additional approved graduate credit hours selected from astronomy, physics, psychology, or education, and an original research project.

The department will recommend to the department that a graduate student be admitted to candidacy for an M.S. under this program after he or she has completed 26 approved credit hours of lecture, seminar, and research courses (including those specified above), has passed the comprehensive examination given annually at the Ph.D. level, and has been accepted as a master's student by a member of the faculty. Students receiving a degree in this program must serve as a teaching assistant, with or without pay, for at least one and one-half years.

Doctoral Program

42 hours of graduate coursework
30 hours of PHYS 5980 or 5860. Dissertation Research

Dissertation planning, development, and production guided by the committee chair and graduate committee.

During the first two years, students normally take physics and astronomy courses while working with faculty members on one or more research projects. Students participate in weekly research seminars and journal clubs to learn about a broad range of current research. By the third year, Ph.D. students begin research work in the area of their dissertation.

Course work consists of several required courses plus a number of elective courses. Astronomy track students will take the required astronomy courses plus electives. Physic track students will take the required physics courses plus electives.

Physics required courses:
- PHYS 5310 Quantum Theory I
- PHYS 5410 Electromagnetic Theory I
- PHYS 5510 Statistical Mechanics I
- PHYS 5720 Advanced Solid State
- PHYS 5xxx Optical Properties of Solids
- PHYS 5730 Condensed Matter Magnetism
- PHYS 5740 Transport Properties of Solids

Physics elective courses:
- PHYS 5110 & 5120 Methods of Theoretical Physics I & II
- PHYS 5210 & 5120 Classical Mechanics I & II
- PHYS 5320 Quantum Theory II
- PHYS 5550 Advanced Statistical Mechanics
- PHYS 5770 Nanotechnology: Nanophysics & Nanosystems

Astronomy required courses:
- PHYS 5310 Quantum Theory I
- PHYS 5410 Electromagnetic Theory I
- PHYS 5510 Statistical Mechanics I
- ASTR 5150 Astronomical Techniques
- ASTR 5420 Stellar Structure and Evolution
- ASTR 5430 Radiative Processes & Stellar Atmospheres
- ASTR 5460 Cosmology
- ASTR 5470 Interstellar Medium and Diffuse Matter
- ASTR 5465 Galaxies

Astronomy elective courses:
- ASTR 5440 Stars and Milky Way
- ASTR 5480 Planetary Astronomy
- ASTR 5870 Special Topics in Astrophysics

Ph.D. candidates demonstrate their competency in basic undergraduate physics and in required graduate courses through a written examination. After passing the written exam, students will take an oral preliminary exam based on a research project they have completed during the first two years. At the completion of the Ph.D. dissertation, a candidate makes a public presentation of his or her work and the committee conducts a final examination to award the degree.

Astronomy (ASTR)

5150. Astronomical Techniques. 4. Discusses selected topics in observational astronomy such as applications of the Fourier transform, design of optical instruments, properties of various detectors of electromagnetic radiation, sources of uncertainty in astronomical data, reduction techniques for these data, and techniques of image processing. *Prerequisite:* graduate standing in astrophysics.

5420. Stellar Evolution and Structure. 4. The life cycle of stars forms the basis for this course, including formation and early evolution, hydrostatic structure, and late stages of evolution. In addition, energy generation and transport are presented. *Prerequisite:* graduate standing in astrophysics.

5430. Radiative Processes and Stellar Atmospheres. 4. Presents detailed descriptions of radiative transfer mechanisms, both in thermal and nonthermal sources, and the relevant techniques of observation. LTE and non-LTE models are discussed. *Prerequisite:* ASTR 5420.

5440. Stars and the Milky Way. 4. Spatial distribution of stars within our galaxy; photometric/ spectroscopic/ astronomic/ kinematic properties of major classes of stars; structure and dynamics of the observational determination of structure; stellar populations; and the chemical and structural evolution. *Prerequisite:* graduate standing in astrophysics.

5460. Galactic Structure and Evolution: Cosmology. 4. Presents material describing current cosmological models and their application to areas of extragalactic astronomy. Topics include cosmic dynamics, introduction to relativistic models, measuring parameters, dark matter, dark energy, the cosmic microwave background radiation, big bang nucleosynthesis. *Prerequisite:* Graduate standing in astrophysics.

5465. Galaxies. 4. Presents material necessary for study of the Milky Way, galaxies, active galaxies, and the large-scale structure of the universe. Topics include stellar populations, kinematics and dynamics in the Milky Way and other galaxies, galaxy classification and properties, and active nuclei and quasars. *Prerequisite:* graduate standing in astrophysics.

5470. Interstellar Medium and Diffuse Matter. 4. The material between stars is the primary topic, including the chemistry, energetics, and evolution of interstellar matter. The formation of molecules and dust grains, and their composition, are also discussed. Emission processes characteristic of the ISM are described. *Prerequisite:* ASTR 5460.

5480. Planetary Astronomy. 4. Studies to include, but not limited to, area in solar nebula evolution, planetary formation and evolution, planetary surfaces, and planetary atmospheres. *Prerequisite:* graduate standing in astrophysics or consent of the instructor.

5630. General Relativity and Cosmology I. 3. Presents a detailed study of Einstein's theory of the gravitational field with emphasis on the geometric structure of space-time, and selected topics in general relativity. *Prerequisite:* PHYS 5320, 5420.

5640. General Relativity and Cosmology II. 3. This course follows ASTR 5630. It begins with the history of classical theories of cosmology, proceeds to generally relativistic models such as the expanding universe, the evolutionary model of the universe, and other models, and concludes with a discussion of observational cosmology. *Prerequisite:* ASTR 5630.

5860. Independent Study. 1-4 (Max. 8). Investigations on the level of original graduate research in astrophysics. Research projects emphasized are primarily in infrared astrophysics. *Prerequisite:* ASTR 4860 or equivalent.

5870. Special Topics in Astronomy. 1-4 (Max. 10). *Prerequisite:* graduate standing

5960. Thesis Research. 1-12 (Max. 12). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* Enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 12). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate degree program.

Physics (PHYS)

5110. Methods of Theoretical Physics I. 4. First semester of a two-semester sequence which introduces mathematical techniques used in graduate physics courses. The content may be adjusted to meet the needs of the students. This course is required for M.S. and Ph.D. students. *Prerequisite:* PHYS 4310, PHYS 4410, MATH 4440 or equivalent.

5120. Methods of Theoretical Physics II. 4. Designed to follow PHYS 5110 and will introduce further mathematical techniques used in graduate physics courses. Required for M.S. and Ph.D. students. *Prerequisite:* PHYS 5110.

5210. Classical Mechanics. 4. Advanced classical dynamics beginning with classical Lagrangian and Hamiltonian formalism, covering relativistic Lagrangian formulation, canonical transformations, Hamilton-Jacobi theory, and small oscillations. A required course for Ph.D. students. *Prerequisite:* PHYS 4220, MATH 4440 or equivalent, and concurrent registration in PHYS 5110.

5220. Classical Mechanics II. 4. Presents classical mechanics at an intermediate to advanced level and is designed to follow PHYS 4210. Includes a detailed treatment of Langrangian and Hamiltonian mechanics. Rigid-body motion, small oscillations, and an introduction to relativity. Dual listed with PHYS 4220. *Prerequisite:* PHYS 4210.

5230. Advanced Classical Mechanics. 4. The developments of the 1970s and 1980s, including a major expansion in our understanding of chaotic motion in many areas of science, will be brought together in a coherent framework. A strong computational component will be associated with many of the problems studied. *Prerequisite:* PHYS 4210 and 5220 or equivalent.

5310. Quantum Theory I. 4. First semester of a two-semester sequence which presents quantum mechanics on a professional level. Includes topics such as infinite dimensional vector spaces, postulates of quantum mechanics, exactly soluble bound systems, and angular momentum. Required for M.S. and Ph.D. students. *Prerequisite:* PHYS 4220, PHYS 4310, MATH 4440 or equivalent, concurrent registration in PHYS 5110.

5320. Quantum Theory II. 4. Designed to follow PHYS 5310 and will present topics such as scattering by a potential, addition of angular momentum, stationary and time dependent perturbation, identical particles. It is required for M.S. and Ph.D. students. *Prerequisite:* PHYS 5310 and concurrent registration in PHYS 5120.

5410. Electromagnetic Theory I. 4. The first semester of a two-semester sequence which presents electromagnetic theory on a professional level. The classical analytic solutions of the equations of motion are discussed and expressed as quadratures over the Green functions with attention to effect of boundary conditions. It presents topics such as algebra and calculus of vectors in configuration space, electrostatics, potential theory, and steady currents. Required for M.S. and Ph.D. students. *Prerequisite:* PHYS 4420, PHYS 5110, MATH 4440 or equivalent.

5420. Electromagnetic Theory II. 4. Designed to follow PHYS 5410 and will present topics such as magnetostatics, magnetoquasistatics, time dependent electromagnetic theory, physical optics with a vector field, and radiation from antennae. Required for Ph.D. students. *Prerequisite:* PHYS 5410.

5450. Quantum Electrodynamics and Field Theory. 3. A study of classical relativistic electrodynamics and quantum electrodynamics with an introduction to quantum field theory. Required for Ph.D. physics students. *Prerequisite:* PHYS 5320, 5420.

5510. Statistical Mechanics. 4. An introduction to statistical mechanics and the many-body problem, including quantum statistics. Required for Ph.D. students. *Prerequisite:* PHYS 5210, 5320, 5410.

5550. Advanced Statistical Mechanics. 3. A study of modern calculational techniques in the many-body theory of liquids and solids, and an introduction to nonequilibrium processes. *Prerequisite:* PHYS 5520.

5610. Atomic and Molecular Spectroscopy. 3. A quantum mechanical treatment of atomic and molecular structure, transition probabilities, selection rules, and the Zeeman and Stark effects. *Prerequisite:* PHYS 5320.

5650. Atmospheric Physics. 3. An introduction to the physics and chemistry of planetary atmospheres and a detailed study of Earth's stratosphere. *Prerequisite:* PHYS 4220, CHEM 1030 or equivalent.

5720. Advanced Solid State Physics. 3. A course in modern topics and theoretical technique relevant to condensed matter. *Prerequisite:* PHYS 4710 or equivalent, PHYS 5510.

5730. Condensed Matter Magnetism. 4. Designed to give graduate students instruction in the fundamental principles of magnetism, the important properties of magnetic materials and their applications. Required for the physics track of the PhD program. *Prerequisites:* PHYS 4310, 4410, 4510 or equivalent.

5740. Transport Properties of Solids. 4. Instruction in the basic quantum theories of electron and phonon transport, interactions among the carriers and with impurities, and important transport phenomena in various systems. Required for the physics track students in the PhD program. *Prerequisites:* PHYS 4310, 4410, 4510 or equivalent.

5770. Nanotechnology: Nanophysics and Nanosystems. 4. Introduction to nanoscale fabrication techniques including lithography, pattern transfer, thin film deposition etc. Electronic transport in mesoscopic systems. Electrical properties of nanoscale devices including self-assembled monolayers, carbon nanotubes, and semiconductor nanowires. Noise properties of nanostructures. *Prerequisites:* PHYS 4310 or equivalent.

5810. Nuclear and Elementary Particle Physics. 3. An advanced course in nuclear and elementary particle interactions, with emphasis on current development. *Prerequisite:* PHYS 5350.

5860. Independent Study. 1-4 (Max. 8). Designed to provide opportunities for self-study and special projects under supervision of individual professors.

5870. Special Topics In Physics. 1-4 (Max. 10). Intended to accomodate various subjects not offered as regular courses. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Political Science

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FAX: (307) 766-6771
Web site: www.uwyo.edu/pols
Department Head: James D. King

Professors:

R. MCGREGGOR CAWLEY, B.A. Kearney State College 1971; M.A. Colorado State University 1974; Ph.D. 1981; Professor of Political Science 1997, 1987.

WINBERG CHAI, B.A. Wittenberg College 1955; M.A. New School for Social Research 1958; Ph.D. New York University 1968; Professor of Political Science 1988.

LARRY HUBBELL, B.A. American University 1973; M.A. University of Illinois-Chicago 1974; Ph.D. Virginia Polytechnic Institute and State University 1989; Professor of Political Science 2000, 1989.

JAMES D. KING, B.A. Michigan State University 1974; M.A. Western Michigan University 1977; Ph.D. University of Missouri-Columbia 1983; Professor of Political Science 1999, 1992.

MARGARET M. MURDOCK, B.A. Creighton University 1970; M.A. Tufts University 1975; Ph.D. 1978; Professor of Political Science-Casper 1993, 1975.

STEPHEN C. ROPP, B.A. Allegheny College 1963; M.A. University of Washington 1965; Ph.D. University of California at Riverside 1971; Professor of Political Science 1984.

OLIVER WALTER, B.A. Washington State University 1964; M.A. 1966; Ph.D. University of Illinois 1972; Dean of the College of Arts and Sciences 1989; Professor of Political Science 1981, 1970.

Associate Professors:

JEAN A. GARRISON, B.A. University of Wyoming 1990; M.A. University of South Carolina 1992; Ph.D. 1996; Associate Professor of Political Science, 2004, 2001.

BRENT L. PICKETT, B.A. Wichita State University 1989; M.A. University of Colorado at Boulder 1991; Ph.D. 1995; Associate Professor of Political Science - Casper 2005.

ROBERT A. SCHUHMANN, B.S. Appalachian State University 1987; M.P.A. 1989; Ph.D. Virginia Polytechnic Institute and State University 1995; Associate Professor of Political Science 2002, 1995.

Assistant Professors:

STEPHANIE B. ANDERSON, B.S.F.S. Georgetown University 1989; M.Sc. The London School of Economics and Political Science 1990; Ph.D. University of Cambridge 1996; Assistant Professor of Political Science 2005.

A. J. BARGHOTHI, B.A. Appalachian State University 1995; M.A. 1997; Ph.D. University of South Carolina 2009; Assistant Professor of Political Science 2009.

TEENA J. GABRIELSON, B.A. Macalester College 1992; M.A. University of California - Davis 1997; Ph.D. 2002; Assistant Professor of Political Science 2006.

ANDREW D. GARNER, B.S. Kennesaw State University 2002; Ph.D. University of Mississippi 2007; Assistant Professor of Political Science 2008.

TRACY A. SKOPEK, B.A. University of Texas 1992; M.P.A. Texas Tech University 1995; Ph.D. 2000; Assistant Professor of Political Science 2003.

Professor Emeritus:

Michael J. Horan

Associate Professor Emeritus:

Alan E. Schenker

The master of arts and the master of public administration are offered by the Department of Political Science. The department's mission is to give graduate students the understanding of the theories and methods necessary for success in (1) research or in post-baccalaureate study in any of the subfields in political science, (2) high school teaching in social science, or (3) careers in policy analysis or public administration in local, state, or federal government, or international governmental or non-governmental organizations. Our graduate students have progressed to senior positions in government, the U.S. Foreign Service, and international organizations, or advanced to a Ph.D. in political science.

Program Specific Admission Requirements

Master of Arts in Political Science

Submit a one-page, typed statement describing his/her objectives in seeking the degree.

Possess a bachelor's degree in political science or a cognate discipline such as international studies, the administration of criminal justice, history, sociology, or economics, including substantial undergraduate course work in political science.

Master of Public Administration

Applicants for the M.P.A. may have any undergraduate major.

Applications are accepted and processed year round. Only 12 hours (4 classes) may be attempted without full admission into the program.

Program Specific Degree Requirements

Master's Programs

Master of Arts in Political Science Plan A (thesis)

At least 31 hours of graduate credit, to include:
- POLS 5680. Research Methods for Political Science and Public Policy.
- At least 15 additional hours of coursework in political science.
- A maximum of 9 hours of coursework in disciplines other than political science.
- A minimum of 4 hours thesis research.

A master's thesis demonstrating independent research, written under the supervision of the major professor.

An oral examination conducted by the graduate committee covering all coursework and the thesis.

No more than 6 hours of grades lower than "B" may be counted toward the minimum number of hours required for the degree.

Students must maintain a graduate GPA of 3.0.

Plan B (non-thesis)

At least 30 hours of graduate credit, to include:
- POLS 5680. Research Methods for Political Science and Public Policy.
- At least 15 additional hours of coursework in political science.
- A maximum of 12 hours of coursework in disciplines other than political science.

Plan B paper that reflects the quality but not scope of a master's thesis, written under the supervision of the major professor.

An oral examination conducted by the graduate committee covering all coursework and the Plan B paper.

No more than 6 hours of grades lower than "B" may be counted toward the minimum number of hours required for the degree.

Students must maintain a graduate GPA of 3.0.

Master of Public Administration
Plan B (non-thesis)

Thirty-nine hours of graduate credit, to include:
- 18 hours of core credit,
- 6 hours of option-core credit,
- 15 hours of approved elective credit.

In addition to graduate coursework, M.P.A. students must complete a series of papers constituting the Plan B project. It is the purpose of POLS 5690, Capstone in Public Management, to be a framework within which students initiate and substantially complete their Plan B projects.

Following the completion of all other requirements, the M.P.A. student is required to pass a comprehensive oral examination covering the information contained within his/her program of study as well as a defense of the Plan B projects. The oral examination is also conducted within the framework of the POLS 5690 Capstone course.

Significant administrative experience is required of all M.P.A. graduates. If the M.P.A. student has little or no administrative experience an internship is required and will be included as 3 hours of the required elective credits.

Students entering the M.P.A. Program are expected to possess basic computer literacy, and to have access to a computer for such purposes as communicating with professors via e-mail, receiving M.P.A. Program memos, conducting research on the Web, retrieving articles from course documents libraries, working on course projects, and for conducting interactive/electronic class discussion.

Graduate GPA of 3.0.

Students must complete the CAPP program in lieu of a program of study.

Master of Public Administration/Juris Doctorate

See the MPA Director and/or the College of Law for information.

Students must be accepted to both programs.

Political Science (POLS)

5000. Survey of Public Administration. 3. Designed to introduce the beginning graduate student to the study and practice of public administration at all levels of government. Attention is also directed to specific functions and processes such as intergovernmental relations, budgeting, personnel, and regulation. *Prerequisite:* graduate status and consent of instructor.

5013. Political Geography. 3. Geographic space is subdivided into political units to aid human interaction and to facilitate political processes. Examines the spatial organization of political space and its effects upon political processes at varying geographic scales ranging from the local to international. Cross listed with POLS 4013 and dual listed with GEOG 4013/5013. *Prerequisite:* GEOG 1000 or 1020, or 9 hours of social science.

5051. Environmental Politics. 3. Analyzes environmentalism as a political phenomenon. Provides students with a basic understanding of how to analyze political issues by: (1) examining the historical and contemporary issues that produce controversy over environmental matters; and (2) surveying the impacts of these issues on the formulation and implementation of laws, policies, and regulations. Dual listed with POLS 4051; cross listed with AMST/ENR/GEOG/REWM 4051. *Prerequisite:* POLS 1000.

5060. American Intergovernmental Relations. 3. Theory and practice of American federalism. *Prerequisite:* POLS 5000.

5090. Anglo-American Jurisprudence. 3. Considers topics, such as functions of law in a democratic society; historical origins and growth of the common law as contrasted to the civil (code) law systems; and principal theories of nature and functions of law which have influenced development of English and American legal institutions. Dual listed with PHIL/POLS 4090. *Prerequisite:* 9 hours of political science.

5100. Constitutional Law: Institutional Powers. 3. Encompasses case-study analysis of judicial decisions and policies affecting constitutional interrelationships among the three branches of federal government, federal-state relations, as well as powers of the states and federal government in the area of social and economic regulatory laws. Dual listed with POLS 4100. *Prerequisites:* 9 hours of Political Science, POLS 3100 recommended.

5110. Constitutional Powers: Civil Liberties and Civil Rights. 3. Encompasses case-study analysis of judicial decisions and policies of the constitutional interpretation of the 1st Amendment (freedom of speech, press, association and religion), privacy rights, the rights of the criminally accused, and civil rights (racial and gender equality). Dual listed with POLS 4110. *Prerequisites:* 9 hours of political science, POLS 3100 recommended.

5120. Constitutional Rights and Liberties II. 3. A case-study analysis of the legal and political consequences of recent judicial decisions in such areas as race relations, the right to vote, legislative apportionment, and the Constitution in time of war. Dual listed with POLS 4120. *Prerequisite:* 9 hours of political science including POLS 4100/5100.

5230. Governments and Politics Of Asia. 3. Studies political systems of East Asia. Analyzes impact of social and economic factors upon political institutions. Dual listed with POLS 4230. *Prerequisite:* 9 hours of political science or international studies.

5240. Culture, Society, and Political Economy in East Asia. 3. Discusses how culture, history, social systems, and political institutions of East Asian nations have contributed to their political economy of rapid industrialization and social transformation. Dual listed with POLS 4240. *Prerequisite:* one course in global studies; two courses in political science, international studies, history or sociology.

5250. Politics of Developing Nations. 3. An analysis of the processes of political, economic, and social change in the non Western world. Research methods are introduced and applied to selected topics. Dual listed with POLS 4250. *Prerequisite:* 9 hours of political science or international studies.

5290. Inter-American Relations. 3. A survey of the inter-American system and the idea of hemispheric unity, followed by an analysis of the major issues confronting the inter-American community. Dual listed with POLS 4290. *Prerequisite:* 9 hours of political science or international studies, including POLS 2310.

5300. The World System. 3. Analyzes structure of political and economic interdependence among nation-states. Reviews and assesses theoretical approaches to explaining changing structure of inequality, power, war and peace. Dual listed with POLS 4300. Cross listed with INST/SOC 5300. *Prerequisite:* SOC 1000 or ANTH 1100 or equivalent political science, international studies, or social science course.

5330. American Foreign Relations. 3. Analyzes American foreign policy decision-making process and selected contemporary foreign policy problems. Stresses political and institutional factors along with analysis of policy options. Dual listed with POLS 4330. *Prerequisite:* 9 hours of political science or international studies including POLS 2310.

5340. International Organzations. 3. Encompasses development of world organizations such as League of Nations, United Nations and its affiliate bodies. Also studies regional organizations and private international bodies. Dual listed with POLS 4340. *Prerequisite:* 9 hours of political science including POLS 2310.

5350. Sustainable Development and Global Policy. 3. Considers in-depth meaning of "sustainable development" and trade-offs necessary to achieve it. Considers this issue from global perspective through application of theories in economics, political science, international relations, technology studies and ethics. Dual listed with POLS 4350. *Prerequisite:* 9 hours of political science or economics.

5400. Public Personnel Management. 3. Designed to integrate information about the political environment of personnel administration with problem solving exercises in such specific areas as job analysis, affirmative action, and flextime. A number of topics including the evolution of the civil service, the rights and responsibilities of governmental employees, the functions of public personnel management, and collective bargaining processes are also covered. *Prerequisite:* POLS 5000.

5410. Administrative Behavior and Theory of Organization. 3. An advanced course in the theory of organization and the workings of public agencies. *Prerequisite:* POLS 5000.

5420. Seminar In Public Administration. 3 (Max. 6). A reading and research course in selected topics in public administration. Dual listed with POLS 4420. *Prerequisites:* POLS 2410 and consent of instructor.

5430. United States Presidency. 3. Analyzes the office of the president, its roles, development, relationships with other governmental agencies, and problems in the contemporary world. Dual listed with POLS 4430. *Prerequisite:* 9 hours of political science.

5435. Presidential Elections. 3. Examines the process of electing the U.S. president. Topics include the roles of presidential primaries, caucuses, and conventions; campaign strategies; media coverage; citizen participation; the electoral college; and reforms. Dual listed with POLS 4435. *Prerequisite:* POLS 1000.

5440. Principles and Processes of Government Budgeting. 3. Analyzes the principles, processes and politics of the budgetary process in the U.S. It examines the various theories of budgetary decision-making, the politics of budgeting and budgetary reforms. *Prerequisite:* POLS 5000 and graduate standing.

5450. Administrative Regulation. 3. Significant points of contact between government and business are stressed. Government activities designed to regulate and aid such economic interests as business, labor, agriculture, and consumers are dealt with at length. *Prerequisite:* POLS 5000.

5460. Public Administration and Law. 3. Focuses on various facets of the relationship between American public administration and law. Emphasis is placed on the emerging body of administrative law as a context for jurisprudential reasoning in administrative decision making. *Prerequisite:* POLS 5000.

5480. Ethics In Government. 3. The student is introduced to the ethical nature and dilemmas of public administration in American constitutional government. Such topics are addressed as source of ethical obligation, role of loyalty, application of moral philosophy, constitutional theory and ethical obligation, relation of theory and practice, and methods of ethical reflection. *Prerequisite:* POLS 5000.

5500. Internship in Public Administration. 1-6 (Max. 6). Educationally-oriented assignments for work in selected public agencies, with tutorial types of supervision. Offered S/U only. *Prerequisite:* consent of instructor.

5510. Public Policy and Program Management. 3. An overview of governmental policy making processes in the U.S. Attention is then shifted to the uses of applied policy analysis. Students are required to participate in a project which employs a systems approach to deal with managerial problems within a public sector or nonprofit organization. *Prerequisite:* POLS 5000.

5520. Public Opinion. 3. Deals with natures of a public in a democracy and means of forming and manipulating public opinion. Emphasizes the role of public opinion as an essential ingredient of the policy-making process in popular government. Dual listed with POLS 4520. *Prerequisite:* 9 hours of political science.

5530. U.S. Congress. 3. Analyze aspects of the U.S. Congress, including election of congressmen, legislative process, congressional-presidential relations, and the influence of political parties, interest groups, and constituents on the legislative process. *Prerequisite:* 9 hours of political science.

5540. Public Policy Perspectives. 3. Acquaints students with the underlying structure and dynamics of public policy formulation, implementation, and evaluation at the state, local, and federal levels. Drawing on a number of analytic approaches, the course seeks to understand this complex political phenomenon in the context of the institutions that drive it. *Prerequisite:* graduate standing.

5570. Graduate Readings. 1-3 (Max. 9). Special programs of readings of government and politics will be outlined to meet needs of individual students. *Prerequisite:* graduate standing or consent of instructor.

5600. Political Violence. 3. Examines causes and consequences of violence. About one-third is devoted to causes including animal violence, human nature and social norms. Remainder examines causes and consequences of violence in particular contexts. Description of each course project can be found in the syllabus. The final project is an extensive review of the Holocaust in which students are asked to analyze this act of mass murder, then argue whether the conditions that produced that Holocaust are present in Western society. Dual listed with POLS 4600; cross listed with CRMJ 4600. *Prerequisite:* POLS 1000 and SOC 1000.

5640. Political Philosophy: Ancient and Medieval. 3. Surveys political philosophy from Classical Greek period to Machivelli. Dual listed with POLS 4640. *Prerequisite:* POLS 2460 or 3600.

5650. Political Philosophy: Modern. 3. Surveys political philosophy from Machiavelli to present. Dual listed with POLS 4650. *Prerequisite:* POLS 2460 or 3600.

5660. Political Philosophy: Contemporary. 3. Examines central developments in political philosophy that guide action in today's world. Dual listed with POLS 4660. *Prerequisite:* POLS 2460 or 3600.

5670. Experiential Analysis in Public Administration. 3. An opportunity for pre-service students to experience professional life and to complete a reflective paper addressing this experience. In-service students must work with a member of the faculty to write a similar paper addressing a significant professional event or issue. Offered S/U only. *Prerequisite:* POLS 5000.

5680. Research Methods for Political Science and Policy. 3. Introduction to methodology of empirical analysis appropriate for political science and public policy. *Prerequisite:* STAT 2050 or 2070.

5685. Program Evaluation and Policy Analysis. 3. Explores techniques for analyzing and evaluating public policy choices and impacts. Dual listed with POLS 4685. *Prerequisites:* STAT 5070 or equivalent and an introductory research methods course in social science or related discipline.

5690. Capstone in Public Management. 3. Integrates theories and concepts introduced in core and option-core courses, and emphasizes students' application of them to various administrative settings. *Prerequisite:* completion of all other core and option core requirements in the MPA Program.

5710. Topics In Political Science. 1-3 (Max. 9). Intended to accommodate various specialized subjects not offered as regular courses. *Prerequisite:* graduate standing.

5810. Seminar in Political Philosphy. 3. Encompasses reading and research on selected problems in political philosophy. Dual listed with POLS4810. *Prerequisite:* consent of instructor.

5850. Seminar in American Politics and Institutions. 3. Includes reading and research on selected U.S. government and politics problems. Dual listed with POLS 4850. *Prerequisite:* consent of instructor.

5865. Seminar in International Relations Theory. 3. Examines theoretical issues in the study of international politics by analyzing major theoretical schools of thought in the study of international relations such as realism, idealism, constructivism, and theories of foreign policy. Dual listed with POLS 4865. *Prerequisite:* 9 hours of political science or international studies including POLS 2310.

5870. Seminar in International Relations. 3. Encompasses reading and research in international law and politics. Dual listed with POLS 4870. *Prerequisite:* 9 hours of Political Science or International Studies including POLS 2310.

5875. Seminar in Comparison Foreign Policy Analysis. 3. Overviews theories and approaches to cross-national analysis of foreign policy. Examines foreign policies of advanced industrial democracies, Russia, and various Third World nations. Emphasizes foreign policy decision making processes in non-American settings. Dual listed with POLS 4875. *Prerequisite:* 9 hours of political science or international studies including POLS 2310.

5890. Seminar in Comparative Government and Politics. 3. Researches selected topics in comparative government and politics. Dual listed with POLS 4890. *Prerequisite:* 9 hours of political science or international studies.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Psychology

135 Biological Sciences Building, 766-6303
FAX: (307) 766-2926
Web site: www.uwyo.edu/psychology
Department Chair: Carolyn Pepper

Professors:

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GEORGE LOUIS BLAU, B.A. University of Colorado 1969; M.A. University of Wyoming 1972; Ph.D. 1974; J.D. 1979; Professor of Psychology-Casper 1995, 1979.

ANNE M. BOWEN, B.S. Cornell University 1976; M.S. State University of New York at Syracuse 1979; M.S. Idaho State University 1986; Ph.D. West Virginia University 1990; Professor of Psychology 2002, 1995.

WILLIAM E. MACLEAN, JR., B.S. Emory University 1976; M.S. Vanderbilt University 1978; Ph.D. 1980; Professor of Psychology 1998, 1996.

NARINA NUÑEZ, B.A. State University of New York at Cortland 1980; M.S. 1984; Ph.D. Cornell University 1987; Professor of Psychology 2000, 1987.

Associate Professors:

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MATTHEW J. GRAY, B.A. Creighton University 1993; M.S. Drake University 1995; Ph.D. University of Mississippi 2000; Associate Professor of Psychology 2008, 2002.

CAROLYN M. PEPPER, B.S. Western Michigan University 1989; M.A. State University of New York at Stony Brook 1992; Ph.D. 1995; Associate Professor of Psychology 2005, 2002.

WALTER D. SCOTT, B.A. San Diego State University 1989; M.A. University of Illinois at Chicago 1993; Ph.D. 1996; Associate Professor of Psychology 2003, 1999.

Assistant Professors:

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CYNTHIA M. HARTUNG, B.S. University of Wisconsin-Madison 1990; M.A. University of Kentucky 1993; Ph.D. 1998; Assistant Professor of Psychology 2007.

SEAN M. McCREA, B.A. Bucknell University 1996; Ph.D. Indiana University 2002; Assistant Professor of Psychology 2009.

CHRISTINE L. McKIBBIN, B.S. Michigan State University 1991; M.S. University of North Texas 1994; Ph.D. 1997; Assistant Professor of Psychology 2007.

SUZANNA L. PENNINGROTH, B.S. University of Washington 1989; M.A. University of Illinois at Chicago 1993; Ph.D. 1995; Assistant Professor of Psychology 2007.

BENJAMIN M. WILKOWSKI, B.A. Ohio University 2002; M.S. North Dakota State University 2005; Ph.D. 2008; Assistant Professor of Psychology 2008.

Academic Professional Lecturer:

SCOTT FRENG, B.S. Black Hills State University 1995; M.A. University of South Dakota 1998; Ph.D. University of Nebraska - Lincoln 2001; Associate Lecturer in Psychology 2008, 2003.

Professor Emeritus

Charles J. Ksir, Karen B. Nicholas

The Department of Psychology offers the doctor of philosophy in psychology with programs in clinical (APA accredited) and experimental psychology (including developmental, cognitive, social psychology, and psychology and law).

Program Specific Admission Requirements

The Department of Psychology employs a two-phase application process. The initial application is sent directly to the department. Following are the application requirements for the first phase of the application process:

The deadline for receipt of all application materials is January 15.

We only admit students one time per year.

Our graduate students begin their programs of study in the fall semester.

Application materials include the application, one to two page personal statement, official undergraduate and graduate (if applicable) transcripts, official GRE scores (general and Advanced Psychology subject), and three letters of recommendation. The department forwards copies of official transcripts, letters of recommendation, and GRE scores to the Office of the Registrar upon admission.

Applicants who have strong letters of recommendation, whose undergraduate grade point average is above 3.5, and whose GRE scores total 1200 or more for the verbal and quantitative sections of the examination are competitive for admission to the doctoral program. It is strongly suggested that applicants have a strong, well-rounded undergraduate major containing at least 30 semester hours in psychology (preferably 40-45 hours).

Applications are screened by the Department of Psychology and applicants who are admitted to the department will have their application materials sent to the UW Admissions Office. An application fee of $50 is required at this point in the admission process.

Program Specific Graduate Assistantships

Applicants are considered for graduate assistantships at the time of admission. Graduate students typically receive some departmental financial support for the first four years.

Program Specific Degree Requirements

Master's Programs
Plan A (thesis)

In addition to the general requirements specified in this bulletin, the following are required: (1) successful completion and oral defense of a thesis; (2) PSYC 5060. Statistical Methods in Psychology – 3 hours or STAT 5050. Statistical Methods in Biological Science – 3 hours; PSYC 5300. Applied Multivariate Analysis – 3 hours or STAT 5055. Statistical Methods for Biologists II – 3 hours; PSYC 5520. Research Design in Psychology – 3 hours; (3) at least 9 hours in 5000-level courses exclusive of those listed above and exclusive of research and thesis research credit.

A minimum of 30 semester hours is required (26 coursework hours and 4 thesis hours).

For the master of arts and master of sciences in Psychology/Early Childhood Development (developmental students only), please refer to Early Childhood Development section of this bulletin for degree requirements.

Doctoral Programs

Doctor of Philosophy in Clinical Psychology

Students complete a four-year, on-campus sequence of required courses covering core areas of psychology and clinical competency. In addition, the following are required: successful completion of a thesis, a preliminary comprehensive examination, a dissertation, two summer clerkships, and a full year APA accredited internship.

Doctor of Philosophy in Experimental Psychology

Students complete course requirements in topics designated as core areas of psychology, a preliminary comprehensive examination, and a research-based dissertation, typically in an area of psychology and law, social, cognitive, or developmental psychology.

Psychology (PSYC)

5050. Statistical Methods for Biological and Behavioral Sciences. 3. General statistical analyses and their application to the biological and behavioral sciences. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs will be utilized. Credit cannot be earned in more than one of the following courses: STAT 2020, 3050, 5050, 5060 5070. Identical to ZOO 5050. *Prerequisite:* one course in statistics (all introductory courses except 2000).

5060. Statistical Methods In Psychology. 3. General statistical analyses and their application to psychology. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs will be utilized. Credit cannot be earned in more that one of the following courses: STAT 2020, 3050, 5050, 5060, 5070, 5080. Cross listed with STAT 5060. *Prerequisite:* 1 course in statistics (all introductory courses except 2000).

5110. Biochemistry of Behavior. 3. A lecture and seminar course covering the relationship between biochemical systems and behavior. Emphasis is on behavioral changes resulting from modifications of body and brain chemistry. *Prerequisite:* 9 hours in psychology or related biological fields; MOLB 2300 or equivalent.

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing, and psychology. Cross listed with FCSC, EDEC, NURS, HLED, SPPA 5115. *Prerequisite:* graduate status.

5120. Neuropsychology of Human Behavior. 3. Brain mechanisms involved in the expression and control of human behavior will be studied. Findings from classical neuropsychological studies and more recent clinical research investigations will be used in deriving explanations for the structural and physiological basis of normal and abnormal psychological processes. *Prerequisite:* 9 hours in psychology.

5130. Biofeedback and Self-Regulation. 4. The basic concepts, processes and technology of biofeedback and self-regulation are examined in lectures and laboratory activities. Emphasis is on electromyographic, electroencephalographic and cardiovascular control. Gastrointestinal and visual activity are included. Instrumentation, current research, clinical applications, and the role of cognitive process are examined. Laboratory 2 hours per week. *Prerequisite:* 9 hours in psychology or related biological fields.

5140. Personality Science. 3. Examines contemporary scientific research and theory in personality. Surveys the biological, cognitive, affective, social, and interpersonal determinants of personality function with individual differences. A theoretical framework highlights the dynamic transactions between individuals and the sociocultural environment over the life course. *Prerequisite:* graduate standing in clinical or experimental psychology.

5160. Etiology of Alcohol and Drug Dependency. 3. An introduction to issues pertaining to the etiology of alcohol and drug dependency. Emphasis is on genetic, psychological and sociocultural causes of chemical addictions. *Prerequisite:* PSYC 2210, CNSL 4520/5520 or equivalent.

5180. Advanced Developmental Psychology. 3. Provides a graduate-level overview of development psychology, including current theories, issues, and research in both cognitive development and social development. *Prerequisite:* graduate standing.

5210. Advanced Physiological Psychology. 3. Examines the physiological bases of behavior beginning with a treatment of basic neuroanatomy, neurophysiology, and pharmacology. Discussion then proceeds to the physiological correlates of various behavioral states including sleep arousal, sensory processes, motor control, motivational systems, emotions, learning and memory. *Prerequisite:* 30 hours in psychology including PSYC 4080.

5220. Psychopharmacology. 3. Examines clinical psychopharmacology, the science and practice of using drugs to treat psychological disorders. Dual listed PSYC 4220. *Prerequisite:* graduate standing and consent of instructor.

5230. Advanced Cognitive Psychology. 3. Provides the graduate student with an understanding of theoretical and experimental approaches to the study of human cognitive processing. There is an emphasis on critical evaluation of current research in the area. *Prerequisite:* 30 hours in psychology including PSYC 3120.

5270. Behaviorism. 3. Acquaints the graduate student with behaviorist philosophy, the experimental analysis of behavior, and the application of behavioral technology to experimental, educational, and clinical problems. *Prerequisite:* 30 hours in psychology.

5300. Applied Multivariate Anlysis. 3. The application of multivariate statistical methods in behavioral science research. Topics include multivariate regression, canonical correlation, discriminate analysis, factor analysis and multidimension scaling. A wide range of computer assistance is incorporated. Cross listed with STAT 5300. *Prerequisite:* STAT 5050.

5320. Child and Family Therapy. 3. Designed for graduate students in clinical psychology who already possess adequate background knowledge of child psychopathology and diagnostic skills. Emphasis is on theory and techniques of individual psychotherapy with children and on theories of family therapy. *Prerequisite:* PSYC 5500 and consent of instructor.

5330. Introduction To Clinical Practicum. 1. Provides an introduction to psychotherapy and to the Psychology Clinic for first year doctoral students by having them observe a therapy case in the Psychology Clinic and receive instruction from an advanced doctoral student as to therapeutic techniques and client dynamics. *Prerequisite:* admission to the doctoral program in clinical psychology and permission of instructor.

5340. Introduction To Clinical Supervision. 1-4 (Max. 4). Provides an introduction to the supervision of psychotherapy for advanced doctoral students by having them observe a therapy case in the Psychology Clinic with assigned first year doctoral students and then give instruction as to therapeutic techniques used by the therapist and to client dynamics. *Prerequisite:* admission to the doctoral program in clinical psychology and consent of instructor.

5370. Graduate Seminar in Forensic Psychology. 3. To provide graduate level training in forensic psychology for students pursuing careers in psychology, counseling and criminal justice. *Prerequisite:* 16 hours in psychology or consent of instructor.

5380. Theories and Techniques of Psycotherapy. 3. A course for entering clinical doctoral students. Major current psychotherapies are reviewed in terms of theoretical assumptions and related techniques. Required of first-year students in the program. *Prerequisite:* admission to doctoral program in clinical psychology.

5400. Clinical Assessment I. 3. First semester of a three semester practicum course in psychological assessment at the doctoral level. During the semesters, extensive examination is made regarding the standardization, relevant application, and significant limitations of assessment techniques. A thorough grounding is interpretation, and communication of the results of psychological evaluation both in writing and in consultation with referral sources. Normally taken during the first year of the doctoral program. *Prerequisite:* restricted to doctoral students in clinical psychology.

5410. Clinical Assessment II. 3. Second semester of a full-year practicum course in psychological assessment at the doctoral level. *Prerequisite:* PSYC 5400.

5420. Clinical Assessment III. 3. Presents the clinical psychologist in training with an introduction to the clinical application of neuropsychological principles and various assessment tools. Includes the administration and interpretation of neuropsychological instruments and batteries, as well as the integration of more traditional assessment techniques with neuropsychological testing. *Prerequisite:* admission to the clinical psychology doctoral program and PSYC 5410.

5425. Diagnostic Interviewing. 1. Students review research on diagnostic interviews, practice basic interviewing skills and learn to administer the Structured Clinical Interview for DSM-IV (SCID-I) using training tapes, class discussion and role-play exercises. As time permits, other interviews used to assess personality disorders and specific diagnostic categories will be reviewed. *Prerequisite:* admission to the doctoral program in clinical psychology.

5430. Clinical Neuropsychological Assessment. 3. Present the clinical psychologist in training with an introduction to the clinical application of neuropsychological principles and various tools. Includes the administration and interpretation of neuropsychological instruments and batteries, as well as the integration of more traditional assessment techniques with neuropsychological testing. *Prerequisite:* admission to the clinical doctoral psychology program, PSYC 5400, 5410, and 5120.

5440. Behavior Analysis and Therapy. 3. A seminar in behavior analysis and therapy designed to acquaint the student with literature on radical behaviorism and behavior analysis and to develop skills in the use of techniques based on learning principles. *Prerequisite:* admission to doctoral program in clinical psychology and consent of instructor.

5450. Clinical Practicum. 1-4 (Max. 8). Beginning clinical practicum course providing doctoral students in clinical psychology with supervised experience in individual psychotherapy. Psychodynamic, client-centered, and behavioral techniques are employed. Cases and theoretical issues discussed in weekly seminar. Individual supervision of students by clinical faculty. *Prerequisite:* admission to doctoral program in clinical psychology and consent of instructor.

5460. Advanced Clinical Practicum. 1-12 (Max. 12). Advanced clinical practicum course for students beyond their second year in the doctoral program in clinical psychology. Provides additional supervised experience in individual, family, child, and group therapy, as well as in psychological assessment. Experiences include case conceptualization, case management, and provision of direct services. *Prerequisite:* admission to doctoral program in clinical psychology, PSYC 5450, and consent of instructor.

5470. Empirically Supported Psychotherapies. 3. Students become familiar with the efficacy and effectiveness of important state-of-the-art treatments with a focus on treatments of mood and anxiety disorders. Course goals include gaining a critical understanding of the issues involved in identifying psychological treatments that work. *Prerequisite:* PSYC 5380; PSYC 5510.

5480. Community Mental Health I. 2. An advanced lecture and practicum designed to prepare the psychologist to function in the community in an effective way. Particularly, he/she is trained to work as one member of a team in mental health clinics and psychiatric hospitals. Normally taken during the third year of doctoral training in conjunction with PSYC 5610 Community Practicum. *Prerequisite:* admission to doctoral program in clinical psychology and consent of instructor.

5490. Community Mental Health II. 2. A continuation of consideration of community mental health issues relevant to the practice of clinical psychology in a variety of community settings. To be taken in conjunction with PSYC 5620.

5500. Psychopathology I. 3. PSYC 5500 and 5510 are a two-semester sequence of courses designed to provide in-depth knowledge of the etiology, classification, clinical description and course of psychopathology from a developmental, life span, perspective (infancy to old age). Psychological science, including a biopsychosocial approach, are emphasized, as well as issues involved in diagnostic systems. *Prerequisite:* admission to the doctoral program in clinical psychology.

5510. Psychopathology II. 3. PSYC 5500 and 5510 are a two-semester sequence of courses designed to provide in-depth knowledge of the etiology, classification, clinical description and course of psychopathology from a developmental, life span, perspective (infancy to old age). Psychological science, including a biopsychosocial approach, are emphasized, as well as issues involved in diagnostic systems. *Prerequisite:* admission to the doctoral program in clinical psychology.

5515. Introduction to Scientist/Practitioner Training. 2. Acquaints first-year clinical doctoral students with the science-practitioner model for the practice of clinical psychology. Emphasis is on integrating science and practice. Focus is also on the crucial role of the scientist-practitioner in our emerging behavioral healthcare system. *Prerequisite:* entry into Clinical Doctoral Program.

5520. Introduction To Research. 3. Introduction to problems and issues in research methodology. Ongoing research directed by various faculty are used as paradigms for conceptualization of research problems. Students critically evaluate projects presented and begin planning for research leading to theses and dissertations. *Prerequisite:* graduate status in psychology.

5530. Ethical Issues in the Practice of Psychology. 1 (Max 2). Informs and sensitizes the student to ethical issues, precedents, practices, and legal issue in the practice of psychology and in research. *Prerequisite:* graduate standing in psychology.

5550. Clinical Seminar. 1-3 (Max. 18). Graduate level seminar in clinical psychology, the topic of which will vary from semester to semester. Emphasis is on providing students with an in-depth analysis of some specific area of clinical psychology. *Prerequisite:* admission to the doctoral program in clinical psychology.

5630. Clinical Supervised Practicum I. 2. The first semester of a one year practicum in clinical supervision for doctoral students in clinical psychology. Students supervise at least one 2nd or 3rd year clinical doctoral student, attend supervision team meetings, and may conduct group supervision and/or see clients as determined by team leader. *Prerequisites:* enrollment in doctoral program in clinical psychology.

5640. Practicum in Clinical Supervision II. 2. The second semester of a one year practicum in clinical supervision for doctoral students in clinical psychology. Students supervise at least one 2nd or 3rd year clinical doctoral student, attend supervision team meetings, and may conduct group supervision and/or see clients as determined by team leader. *Prerequisite:* enrollment in doctoral program in clinical psychology.

5650. Theories of Social Psychology. 3. Designed to give the student a thorough understanding of the theories and methodologies of contemporary Social Psychology. *Prerequisite:* 16 hours in psychology including PSYC 2380.

5670. Group Theory and Process in Psychotherapy. 3. Theory and practice of group psychotherapy. Enrollment requires that students be willing to learn from both objective research of experts and their own subjective experiences in the training-group lab experience. *Prerequisite:* consent of instructor.

5685. Neurophysiology. 4. Designed to investigate the structure and function of nervous systems, drawing information from both vertebrate and invertebrate organisms. Topics such as sensory systems, motor coordination and central integrative mechanisms will be covered in addition to the basic neurophysiology of nerve cells. The laboratory complements the lecture sequence. *Prerequisite:* one course in physiology, chemistry, physics.

5720. Advanced Social Develoment. 3. Provides a graduate-level introduction to theory and empirical research on social development. Topics include emotional development, attachment, socialization, moral development, aggression, and social context. *Prerequisite:* graduate standing.

5740. Internship in Clinical Psychology. 2-3 (Max. 8). Full-year, 40 hours per week assignment to a mental health or related agency having an established internship program. This placement must be approved by the Department of Psychology and include: (a) adequate supervision of the intern and (b) didactic and other educational experiences that supplement practicum work. Registration for fall, spring, and summer terms is required. *Prerequisite:* completion of master degree, completion of third year of clinical program, and approval of department.

5750. Graduate Seminar in Infant Development. 3. This advanced graduate reading course examines, in detail, the empirical investigation of the development of the human organism from conception through the second to third year of postnatal life. Research, issues, and theoretical models relating to a variety of areas in infant development are studied in a seminar format. Areas of study include history and systems, research methods, birth processes, genetic factors, basic sensory and perceptual abilities and mechanisms of development, psychological and motor milestones, infant cognition and social cognition, early communication, social development and attachment. An empirically-based developmental psychological approach will be incorporated. *Prerequisite:* graduate standing and permission of the instructor.

5760. Graduate Seminar. 1-10 (Max. 18). Topic varies from semester to semester. Emphasis is upon the preparation of reports on special topics in psychology and the presentation and discussion of these reports in the seminar situation. *Prerequisite:* 6 hours in psychology and consent of instructor.

5770. Seminar on Gender-Role Development. 3. An advanced graduate level overview of the study of gender roles and sex differences incorporating both developmental and social psychological perspectives. Topics include in-depth analyses of research and theories associated with (a) the development of gender roles across the life-span, (b) the roles of biological, social, and cultural factors on gender role development, (c) theoretical models and conceptualizations of masculinity, femininity and androgyny, (d) differences in play behaviors of boys and girls, and (e) evaluation of the psychological measurement, research and theory regarding gender role development and sex differences. *Prerequisite:* permission of instructor.

5775. Developmental Psychology Seminar. 1-3 (Max. 18). Graduate level seminar in developmental psychology, the topic of which will vary from semester to semester. Emphasis is on providing student with an in-depth analysis of some specific area of developmental psychology. *Prerequisite:* consent of instructor.

5780. Advanced Cognitive Development. 3. Provides a comprehensive account of current views of cognitive development. Emphasis is given to alternative theoretical explanations for findings from empirical research. *Prerequisite:* graduate standing.

5785. Social Psychology Seminar. 1-3 (Max. 18). Graduate level seminar in social psychology, the topic of which will vary from semester to semester. Emphasis is on providing students with an in-depth analysis of some specific area of social psychology. *Prerequisite:* permission of instructor.

5790. Clerkship in Clinical Psychology. 1-3 (Max. 9). Provides practical clinical and administrative experience in institutional and community settings. Experience includes psychological assessment, group and individual therapy activities, participation in clinical and administrative staff conferences, consultation to various departments and agencies within the institutional setting and in the community, training of professionals in psychological concepts and techniques, and participation in research. Experiences are located in various community, county, and state agencies primarily in the Rocky Mountain region. Successful completion of three clerkships is a required part of the doctoral program in clinical psychology. *Prerequisite:* enrollment in doctoral program in clinical psychology and assignment by department.

5800. Research in General Psychology. 1-8 (Max 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5810. Research in Experimental Psychology. 1-8 (Max. 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5820. Research in Social Psychology. 1-8 (Max. 24). *Prerequisites:* consent of instructor and graduate standing in the department.

5830. Research in Clinical Psychology. 1-8 (Max. 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5840. Research in Developmental Psychology. 1-8 (Max. 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5850. Research in Comparative Psychology. 1-8 (Max. 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5860. Research in Physiological Psychology. 1-8 (Max. 24). *Prerequisites:* consent of the instructor and graduate standing in the department.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.
5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Religious Studies

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Director: Michael Brose

Professors:

KEVIN S. LARSEN, B.A. Brigham Young University 1976; M.A. 1978; A.M. Harvard University 1979; Ph.D. 1983; Professor of Spanish 1998, 1989.
CAROLINE McCRACKEN-FLESHER, M.A. University of Edinburgh 1980; M.A. Brown University 1986, Ph.D. 1989; Professor of English 2004, 1989.

Associate Professors:

MICHAEL C. BROSE, B.S. Seattle Pacific University 1978; M.Sc. University of British Columbia 1985; M.A. University of Washington 1991; Ph.D. University of Pennsylvania 2000; Associate Professor of History 2006, 2000.
PAUL V. M. FLESHER, B.A. University of Rochester 1979; M.Phil. Oxford University 1982; Ph.D. Brown University 1988; Associate Professor of Religious Studies 2001, 1993.
MARIANNE R. KAMP, B.A. Dartmouth College 1985; Ph.D. University of Chicago 1998; Associate Professor of History 2005, 2000.
ERIC W. NYE, B.A. St. Olaf College 1974; M.A. University of Chicago 1976; Ph.D. 1983; Associate Professor of English 1989, 1983.
ROBERT TORRY, B.A. Hiram College 1972; Ph.D. State University of New York-Buffalo 1988; Associate Professor of English 1993, 1983.
KRISTINE T. UTTERBACK, B.A. Bowling Green State University 1972; M.M. University of Wisconsin 1977; M.A. 1977; M.A. University of Toronto 1980; Ph.D. Center for Medieval Studies, University of Toronto 1984; Associate Professor of Religious Studies 2008.

Assistant Professors:

QUINCY D. NEWELL, B.A. Amherst College 1997; M.A. University of North Carolina at Chapel Hill 2001; Ph.D. 2004; Assistant Professor of Religious Studies 2004.

Academic Professional Lecturer:

SETH WARD, B.A. Yale University 1974; M.A. 1978; M.Phil. 1979; Ph.D. 1984; Assistant Academic Professional of Religious Studies 2007, 2003.

Adjunct Professors:

MARY L. KELLER, B.A. Williams College 1987; M.A. Syracuse University 1992; Ph.D. 1999; Adjunct Associate Professor of Religious Studies 2003.
DONALD DALE WALKER, B.A. University of Michigan 1986; M.A. University of Chicago 1988; Ph.D. 1998; Adjunct Assistant Professor of Religious Studies 2006.

Professor Emerita:

Gladys M. Crane

At present, no program for a graduate degree in religious studies is offered; however, some courses may be counted at the graduate level.

Science and Mathematics Teaching Center (SMTC)

453 Wyoming Hall, 766-6381
FAX: (307) 766-3792
Web site: smtc.uwyo.edu
Director: Robert Mayes
Outreach Coordinator: Sylvia Parker

Degrees Offered

M.S. in Natural Science, Middle Level Math
M.S. in Natural Science, Middle Level Science
M.S. in Natural Science, Natural Science Education
M.S.T.

The Science and Mathematics Teaching Center (SMTC) is an intercollegiate interdisciplinary unit committed to effective professional development and excellence in science, mathematics, and technology education. The SMTC, in cooperation with the Wyoming Department of Education and the Professional Teaching Standards Board (PTSB), serves as a science and mathematics education resource and professional development center for the state.

The SMTC provids an extensive off-campus outreach program that serves communities, teachers, students, and school districts throughout Wyoming. Professional development in-service and extension courses, workshops, institutes, and conferences are provided with the principal purpose of improving science and mathematics teaching in Wyoming.

In conjunction with the College of Arts and Sciences and the College of Education, the SMTC offers two master's degree programs: the master of science in teaching designed primarily for secondary teachers, the master of science in natural science which has three concentrations: middle level math and middle level science, which is designed primarily for elementary, middle, and general science and mathematics teachers; and natrural science education, which is designed for students wishing to pursue careers as environmental and natural science educators in non-public school settings. A Ph.D. in curriculum and instruction with areas of specialization in science and mathematics is also available through the College of Education.

Program Specific Admission Requirements

Master of Science in Natural Science - Middle Level Math/Middle Level Science/Natural Science Education

In addition to the minimum requirements set forth by the University of Wyoming, the Science and Mathematics Teaching Center also requires:

- Acceptance to the University of Wyoming
- The student has a valid teaching certification (this requirement is waived for Natural Science Education students);
- The student has a composite score of 900 on the verbal and quantitative sections of the GRE general test or a score of 15 out of 20 on the SMTC GRE Alternative Portfolio;
- SMTC Writing Sample;
- Natural Science Education students only - acceptance in the Teton Science School Residency Program.

Master of Science in Teaching

In addition to the minimum requirements set forth by the University of Wyoming, the Science and Mathematics Teaching Center also requires:

- The student has a current teaching certification or will take courses leading to certification in conjunction with the master's program;
- Acceptance into the University of Wyoming;
- The student has a composite score of 900 on the verbal and quantitative sections of the GRE general test or a score of 15 out of 20 on the SMTC GRE Alternative Portfolio;
- SMTC writing sample.

Program Specific Graduate Assistantships

The SMTC has two graduate assistantships awarded on a competitive basis.

Program Specific Degree Requirements

Master of Science in Natural Science, Middle Level Math/Middle Level Science Plan B (non-thesis)

The university requirement for Plan B is 30 hours of coursework. The program requires at least 24 hours in mathematical sciences, biological sciences, or physical sciences. Of these, 15 hours must be natural sciences courses and 9 credit hours must be from appropriate science and mathematics courses in other departments.

The M.S. in natural science is intended for individuals teaching at the elementary or middle school level in science or mathematics.

The environment and natural resources graduate major or minor is an option for this program.

Master of Science in Teaching Plan B (non-thesis)

The university requirement for Plan B is 30 hours of coursework. The program requires at least 24 hours in the teaching area or areas. A program designed for one teaching area must include 18 hours in that contnet area; a program designed for two teaching areas must include 12 hours in each content area. A program may include hours from other colleges if specifically approved by the supervising departments. Courses offered by the SMTC do not constitute a separate area in themselves, but may be applied to an appropriate area. A program designed for two teaching areas must be approved by the heads of both departments and the graduate committee for this program must include one member from each department.

Students who are interested in interdisciplinary degree option areas, such as biology, earth system science, environmental science, or earth and space science, will work with their graduate committee to tailor a program of study which meets the guidelines for the M.S.T.

The environment and natural resources graduate minor is an option for M.S.T. candidates.

The M.S.T. is intended for individuals teaching at the secondary level.

Master of Science in Natural Science, Natural Science Education Plan B (non-thesis)

The university requirement for Plan B is 30 hours of coursework. This degree is limited to students accepted into the Teton Science School Professional Residency Program. The first year of study is at the Teton Science School site and the second year is at the University of Wyoming campus. 15 designated credit hours will be completed through the Teton Science School Professional Residency Program. For the remaining 15 credit hours (minimum) on the UW campus, students will work with a three-member faculty committee to design a balanced program of study in selected science content, science pedagogy, and related coursework.

The environment and natural resources graduate major and minor is an option for this program.

The M.S. in natural science,Natural Science Education is intended for individuals pursuing careers as environmental and natural science educators in non-public school settings.

Science and Mathematics Teaching Center (NASC)

5110. Physical Science in Global Context, MSC. 3. One in a series of three courses investigating earth as a system. Examines the global dynamics of energy, hydrocarbon combustion, and the physics and chemistry of water. Investigates relationships between energy transformations and pollutants. Considers environmental limitations of fresh water availability and the buffering effect of sea and fresh water. *Prerequisite:* graduate standing and teaching certification in elementary, middle school or general science; or, graduate standing and concurrent enrollment in a program leading to teacher certification in Elementary, middle school or general science education.

5120. Earth Science in Global Context, MSC. 3. One in a series of three courses investigating earth as a system. Emphasizes the lithosphere and atmosphere and their interactions with the hydrosphere and biosphere. Examines the interplay between tectonic processes, earth's radiation balance, ocean processes, ozone depletion and the green house effect. Includes evaluation of methods of measuring and monitoring these phenomena. *Prerequisite:* graduate standing and teaching certification in elementary, middle school or general science; or, graduate standing and concurrent enrollment in a program leading to teach certification in elementary, middle school or general science education.

5130. Life Science in Global Context, MSC. 3. One in a series of three courses investigating earth as a system. Investigates ecosystem composition and processes, and biological responses to changes in ecosystem parameters. Examines terrestrial and aquatic communities, photosynthesis, energy flow, biogeochemical cycles, global climate change, climate warning, deforestation, population ecology, DNA/RNA structure, function, genetic engineering and forensic applications. *Prerequisite:* graduate standing and teaching certification in elementary, middle school or general science education.

5140. Numbers, Operations, and Patterns for the Middle-Level Learner, MMA. 3. Provides working middle-level mathematics teachers opportunities to understand and discuss numbers, their representations, and operations on them, from an abstract perspective that includes elegant proof. Also emphasized is the role of language and purpose in composing definitions. Cross listed with MATH 5140. *Prerequisites:* admission to a UW graduate program, either degree or non-degree seeking status, and acceptance into the Middle-level mathematics program.

5160. Social and Historical Issues in Mathematics and the Middle-Level Learner, MMA. 3. Empowers teachers of middle-level mathematics to design more engaging experiences. Emphasizes the historical context for the development of mathematics, especially its symbols, tools, personalities, and classic problems. Cross listed with MATH 5160. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics program.

5170. Connecting Geometry with Problem-Solving for the Middle-Level Learner, MMA. 3. Showcases two aspects of 2D and 3D geometry: measurement and transformation. Emphasis reflects current State and National standards for middle-level mathematics classroom and teacher preparation, especially appropriate uses of technology, geometric tools, mathematical language, and problem-solving strategies. Cross listed with MATH 5170. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, acceptance into the Middle-level mathematics program.

5185. Analysis of Data in the Media for the Middle-Level Learner, MMA. 3. Focuses on data collection, analysis, interpretation, and communication, using contexts relevant to everyday situations. Topics chosen integrate well with the concerns of middle-level teachers and connect with such curriculum areas as health, science, and social studies. This is not a research methods course. Cross listed with MATH 5185. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics program.

5190. Mathematics of Change and the Middle-Level Learner, MMA. 3. Students gain a solid understanding of data and functions in the service of calculus. Hands-on, project-driven, and focuses on the essential concepts of functions and calculus and their role in middle-level mathematics. Emphasis is on writing and technology (calculators and probeware). Cross listed with MATH 5190. *Prerequisites:* admission to a UW graduate program, in either degree or non-degree seeking status, and acceptance into the Middle-level Mathematics program.

5205. Methods of Teaching Middle-Level Mathematics. 3. Research-based pedagogy and pedagogical content knowledge for teaching middle-level mathematics. Designed for practicing teachers of middle-grades mathematics. Cross listed with EDCI 5205. *Prerequisite:* admission to the SMTC Program.

5215. Using Instructional Technology for Middle-Level Mathematics. 3. Covers the use of technology appropriate to middle-level mathematics teaching, such as microworlds, geographic information systems, spreadsheets, and other content appropriate technologies. Cross Listed with EDCI 5215. *Prerequisite:* admission to the SMTC Program.

5225. Assessment for Middle-Level Mathematics, MMA. 3. Middle-level Mathematics Initiative teacher participants examine, analyze, and implement a variety of assessments that are aligned with standards and instruction appropriate to the middle level math learner. Cross listed with EDCI 5225. *Prerequisite:* admission to the SMTC Program.

5300. Classroom Assessment in Middle-level Science. 2. Deals with the design, construction, and testing of curriculum materials to bring the spirit of scientific inquiry to elementary school pupils. Research to be conducted in the Science and Mathematics Teaching Center. *Prerequisite:* NASC 5690.

5320. Plan B Research in Science/Mathematics Classroom. 3. A course to give graduate students in education, or in service teacher, an in-depth view of the new materials for teaching science in elementary schools. *Prerequisite:* consent of instructor.

5510. Integrated Instructional Strategies, MSC. 2. Appropriate instructional strategies are discussed and modeled for aligning standards, expectations, and experiences in an integrated science environment. Attention is given to unique characteristics of each strategy, including a review of research on the effectiveness of each strategy on student achievement and attitudes. *Prerequisite:* graduate standing and teaching certification in elementary, middle school or general science; or graduate standing and concurrent enrollment in a program leading to teacher certification in elementary, middle school or general science education.

5600. Mathematics and Statistics in Science Teaching, MSC. 2. Provides science teachers with the knowledge and experience necessary to help students use statistics in the scientific process. Activities emphasize a hands-on inductive approach closely related to the school science curriculum. Important statistical ideas and methods are studied as they arise naturally in the biological, physical, and earth sciences. *Prerequisite:* graduate standing and teaching certification in elementary, middle school or general science; or, graduate standing and concurrent enrollment in a program leading to teacher certification in elementary, middle school or general science education.

5610. Field Studies in Environmental Education. 4. Expands student's knowledge of ecological and physiological animal and plant adaptations to environmental conditions, the use of teaching methods and tools of naturalists, the range of resources available for designing and evaluating curriculum, and promotes an appreciation and understanding of the diversity of environments. Contains 4 modules. *Prerequisite:* graduate standing; must be accepted into the Teton Science School Program and matriculating at the TSS site.

5620. Advanced Elements of Field Ecology Course Design. 5 (Max. 6). Addresses designing field ecology courses that include research, outdoor leadership, and natural history components. Opportunities are provided to gain deeper understanding of key natural history and ecology concepts of the bioregion; practical strategies for teaching these concepts in field programs; and to formally present student work. *Prerequisite:* graduate standing; must be accepted into the Teton Science School Program and matriculating at the TSS site.

5650. Place-Based Learning. 3. Place-based learning is explored and related to cognitive development, assessment, and education for a democracy. The focus in on science and mathematics and how to use "place" to provide meaningful learning experiences for students while making contributions to the community. Students develop a local place-based project. Prerequisites: none.

5700. Seminar in Science for Secondary School Teachers. 1-6 (Max. 6). A course to give graduate students in education, or in-service teachers, an in-depth view of the new materials for teaching science in secondary schools. *Prerequisite:* consent of instructor.

5770. Investigation in Natural Science for Secondary Teachers. 1-5 (Max. 10). Deals with the design, construction, and testing of curricula materials to bring the spirit of scientific inquiry to secondary school students. Research to be conducted in the Science and Mathematics Teaching Center. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes. S/U only. *Prerequisite:* graduate standing.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5961. Plan B Project. 1-4 (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. *Prerequisites:* must be enrolled in Plan B program and have departmental approval.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Sociology

406 Ross Hall, 766-3342
FAX: (307) 766-3812
Web site: www.uwyo.edu/Sociology
Department Head: Donna Barnes

Professors:

DAVID ASHLEY, B.A. University of York, England 1972; Ph.D. University of Pittsburgh 1979; Professor of Sociology 1996, 1987.

BURKE D. GRANDJEAN, B.A. Rice University 1971; M.A. University of Texas 1973; Ph.D. 1976; Professor of Statistics and Sociology 1990; Executive Director, Wyoming Survey and Analysis Center 2004.

GARY D. HAMPE, B.A. St. Olaf College 1962; M.A. University of Iowa 1967; Ph.D. 1970; Professor of Sociology 1988, 1969.

MALCOLM D. HOLMES, B.A. University of Texas at El Paso 1974; M.A. 1976; Ph.D. University of Texas at Austin 1982; Professor of Sociology 1999, 1991.

RICHARD S. MACHALEK, B.S. Texas A&M University 1969; M.A. University of Texas 1972; Ph.D. 1975; Professor of Sociology 1988.

PATRICIA A. TAYLOR, B.A. Vanderbilt University 1970; M.A. University of Texas 1972; Ph.D. 1976; Professor of Sociology 1990; Research Professor, Wyoming Survey and Analysis Center 2007.

Associate Professors:

DONNA A. BARNES, B.A. Louisiana State University 1975; M.A. University of Texas 1978; Ph.D. 1982; Associate Professor of Sociology 1993, 1991.

QUEE-YOUNG KIM, B.A. Seoul National University 1965; M.A. University of Houston 1968; M.A. Harvard University 1970; Ph.D. 1975; Associate Professor of Sociology 1984, 1978.

ANNA ZAJACOVA, B.A. Hunter College (CUNY) 1999; M.S. Rutgers 2004; Ph.D. Princeton University 2006; Assistant Professor of Sociology 2009.

MARGARET M. ZAMUDIO, B.A. University of California, Los Angeles 1989, M.A. 1991; Ph.D. 1996; Associate Professor of Sociology 2008, 2003.

Adjunct Professors:

Anatchkova, Davidson, Heinlein, Inman, Massey, Woolcott

Professors Emeriti

Audie Blevins, Katherine Jensen

The Department of Sociology offers programs leading to the master of arts degree in sociology under Plan A.

Program Specific Admission Requirements

Admission based on the university minimum requirements.

Program Specific Graduate Assistantships

Graduate education allows students to acquire both teaching and research experience. Assistantships are available, upon application, to many incoming students and continued support is contingent on adequate progress in the program.

Program Specific Degree Requirements

Master of Arts in Sociology
Plan A (thesis)

To graduate with a master's degree in sociology, the student must complete a minimum of 26 hours of coursework.

The student is required to take Advanced Social Theory (SOC 5000), Statistical Methods for the Social Sciences (SOC 5070 - no other statistics course can be substituted), Advanced Social Research Methods (SOC 5100), and two courses from SOC 5340, SOC 5440, SOC 5500 and an additional course from this list or SOC 5250. Seminars with varying topics are offered under SOC 5250.

The student may select the remaining courses as electives within the department. In some cases, upon the approval of the graduate director, as many as 6 hours of graduate coursework outside the department may be counted toward the elective hours. Exceptions to these requirements can be requested by petition to the sociology department graduate committee.

Credit for Practicum in College Teaching (SOC 5900) may not be included in the minimum number of course hours.

A minimum GPA of 3.0 is required for satisfactory progress in the program and graduation. Students must earn a grade of "B" or better in required classes.

Students whose undergraduate training in sociology does not include the prerequisites for the required graduate courses may correct the deficiencies by taking such undergraduate courses early in the graduate program, however such work does not count toward graduation requirements.

Students also are required to write a master's thesis for which they receive a minimum of four hours of credit (SOC 5960). Before undertaking the thesis work, the student must write and defend their thesis prospectus before a select faculty committee.

The department emphasizes both research skills that prepare the student for immediate job placement and broad academic work facilitating entrance to doctoral programs.

Sociology (SOC)

5000. Advanced Sociological Theory. 3. A consideration of the nature of theory and the major theoretical perspectives in sociology. Prerequisite: SOC 3700 and 3750 or equivalent.

5020. Sociology of Work. 3. Examines social organization of work-especially in response to change in technology, demands for equal opportunity, size and goals of firms and desires for meaningful work. Historically and comparatively analyzes work-life experiences shaping of labor markets and role of collective action. Explores impact of the labor process on distribution of society's material and symbolic rewards. Dual listed with SOC 4020. *Prerequisite:* SOC 1000, MGT 3210 or ECON 1010.

5070. Statistical Methods for the Social Sciences. 3. General statistical analyses and their application to the social sciences. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs are utilized. Credit cannot be earned in more than one of the following courses: STAT 2110, 3050, 5050, 5060, 5070, 5080. Cross listed with STAT 5070. *Prerequisite:* one course in statistics (all introductory courses except STAT 2000).

5100. Advanced Social Research Methods. 3. In-depth survey of research concepts and methods with emphasis on application that culminates in the designing and execution of a research project by the student. *Prerequisite:* SOC 5070 or equivalent.

5140. The Family. 3. Two major themes of the course are change experienced by the family institution and the centrality of the family in America today. Subjects that are covered include: A brief history of the family in the United States, kinship, family structure, mate-selection, marriage, divorce, and socialization. Dual listed with SOC 4140. *Prerequisite:* 6 hours in sociology including SOC 1000 and at least junior standing.

5160. Sociology of Aging. 3. The process of aging from the individual to the societal level is the focus of the course. Consequences of this process such as the increase in the number of elderly, retirement and health are examined for the major social institutions, the relationships between these institutions and American society as a whole. Dual listed with SOC 4160. *Prerequisite:* 6 hours of sociology including SOC 1000 and at least junior standing.

5200. Conference. 1-8 (Max. 8). Consideration of topics of current sociological interest in consultation with a member of the faculty. *Prerequisite:* consent of instructor.

5250. Seminar. 3-6 (Max. 6). Consideration of topics of sociological interest in the content of a graduate seminar. Cannot be dual-listed with any course below the 5000 level. May be repeated for credit when the topic of the seminar is different. *Prerequisite:* consent of instructor.

5300. The World System. 3. Analyzes structure of political and economic interdependence among nation-states. Reviews and assesses theoretical approaches to explaining changing structure of inequality, power, war and peace. Dual listed with SOC 4300 Cross listed with POLS/INST 5300. *Prerequisite:* SOC 1000 or ANTH 1100 or equivalent political science, international studies, or social science course.

5340. Comparative and Global Sociology. 3. In-depth survey of sociological theory and research on substantive issues such as economic development, nation-building, and conflict and war. *Prerequisite:* graduate standing.

5400. Women and Work. 3. Surveys general patterns of women's paid and unpaid work in the U.S. and abroad. Offers reconceptualizations of the meaning of work in women's lives, as well as debates surrounding comparable worth, pay equity, women's work experience and women in the world economy. Dual listed with SOC4400, Cross listed with WMST4400/5400. *Prerequisite:* 6 hours of women's studies or sociology.

5440. Deviance and Social Control. 3. In-depth survey of theory and reserch on substantive topics such as the social construction of deviance categories, causes of deviant behavior, and formal mechanisms of social control. *Prerequisite:* graduate standing.

5500. Societal Institutions. 3. In-depth survey of theory and research on substantive topics in areas such as religious, political, and medical institutions. *Prerequisite:* graduate standing.

5540. Stratification and Inequality. 3. In-depth survey of sociological theory and research on substantive issues such as social class structure, racial/ethnic relations, and gender stratification. *Prerequisite:* graduate standing.

5600. Global Population Issues. 3. Analyzes U.S. and world populations emphasizing implications of population trends. Dual listed with SOC 4600. SOC 4600 cross listed with INST 4600. *Prerequisites:* SOC 1000 or equivalent and STAT 2070 or equivalent.

5650. Urban Sociology. 3. Considers growth of metropolis and its impact on modern life. Dual listed with SOC 4650. *Prerequisite:* SOC 1000 or equivalent.

5890. Special Topics In Sociology. 1-3 (Max. 9). Consideration of special topics of current sociological interest. May be repeated for credit when the topic of the course is different. *Prerequisite:* consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 12). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). The course is designed to provide an enrichment experience in a variety of topics. NOTE: Credit in this course may not be included in a graduate program of study for degree purposes. Offered S/U only. Prerequisite: graduate standing.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Statistics

327 Ross Hall, 766-4229
FAX: (307) 766-3927
Web site: www.uwyo.edu/stats
Department Head: Richard Anderson-Sprecher

Professors:

RICHARD ANDERSON-SPRECHER, B.A. Carleton College 1974; M.A. University of Minnesota 1976; Ph.D. University of Iowa 1990; Professor of Statistics 2006, 1990.

STEPHEN L. BIEBER, B.S. University of California-Davis 1971; M.A. University of California-Berkeley 1977; Ph.D. 1979; Professor of Statistics 1990, 1979.

KENNETH G. GEROW, B.S. University of Guelph, Canada 1981; M.Sc. 1984; Ph.D. Cornell University 1992; Professor of Statistics 2007, 1993.

BURKE GRANDJEAN, B.A. Rice University 1971; M.A. University of Texas-Austin 1973; Ph.D. 1976; Professor of Statistics and Sociology 1990; Executive Director, WYSAC 2004.

Associate Professors:

SNEHALATA V. HUZURBAZAR, B.A. Grinnell College 1984; M.A. Vanderbilt University 1988; Ph.D. Colorado State University 1992; Associate Professor of Statistics 2001, 1995.

TIMOTHY J. ROBINSON, B.S. James Madison University 1989; M.S. Virginia Polytechnic Institute and State University 1994; Ph.D. 1997; Associate Professor of Statistics 2006, 2000.

SHAUN S. WULFF, B.S. Montana State University 1991; M.S. 1994; Ph.D. Oregon State University 1999; Associate Professor of Statistics 2005, 1999.

Assistant Professors:

JARRETT J. BARBER, B.S. Northern Arizona University 1990; M.S. 1992, 1997; Ph.D. North Carolina State University 1997; Assistant Professor of Statistics 2006.

KIONA OGLE, B.S. Northern Arizona University 1997; M.S., Ph.D. Duke University 2003; Assistant Professor of Botany and Statistics, 2006.

Academic Professional Lecturer:

CHRISTOPHER R. PRETZ, B.A. University of Northern Colorado 1996; M.A. University of Colorado at Boulder 1999, Ph.D. University of Northern Colorado 2003; Academic Professional Lecturer 2004.

Adjunct Professors:

Hampe, Legg, L. McDonald, T. McDonald, Manly

Emeriti Faculty:

Robert S. Cochran

The Department of Statistics offers graduate programs leading to a minor in statistics, to a master of science in statistics (Plan B Option 2), to a master of science in applied statistics (Plan B Option 1), and to a doctor of philosophy in statistics. The minor is designed to enhance the M.S. or Ph.D. program of any student enrolled in one of the graduate programs at the University of Wyoming. All of these programs emphasize the understanding and application of a broad variety of statistical methods on real projects. Students will be provided with numerous opportunities to perform analyses and communicate findings. The M.S. and Ph.D. programs in statistics are grounded in theory, primarily in the areas of mathematical statistics and linear models.

Program Specific Admission Requirements

The prerequisite for admission to graduate study is an undergraduate degree from an accredited institution, including work in mathematics through calculus, although mathematical analysis is preferred, and six semester hours of statistics. A combined score of at least 1200 on the verbal and quantitative areas of the GRE is required. Students whose native language is not English must have a TOEFL score of at least 600.

Program Specific Degree Requirements

Minor

Twelve hours at the 4000 or 5000 level with the exception of STAT 4220.

Master's Program
Plan B (Option 1)
Master of Science in Applied Statistics

Profile

The Master's Program in Applied Statistics will give the student an extensive and broad background in statistical methods, data analysis, and written and oral presentation skills. This degree is a terminal experience in graduate statistical education and should not be viewed as preparatory for entrance into a Ph.D. program in statistics. Graduates will have the necessary background to work as data management specialists, statistical analysts, and as project managers within a wide range of research organizations.

Coursework

In addition to the general requirements of the university all candidates for the MS (Plan B – Option 1) degree must successfully take and complete:

Required: 18 credit hours
- STAT 5015. Regression Analysis
- STAT 5025. Design and Analysis of Experiments
- STAT 5155. Fundamentals of Sampling
- STAT 5255. Mathematical Theory of Probability
- STAT 5265. Introduction to the Theory of Statistics
- STAT 5470. Data Analysis

Electives: a minimum of 18 credit hours from the following list of courses:
- STAT 5045. Categorical Data Analysis
- STAT 5115. Time Series and Forecasting
- STAT 5350. Survey Construction and Analysis
- STAT 5360. Spatial Statistics
- STAT 5370. Survival Statistics
- STAT 5300. Applied Multivariate Analysis
- STAT 5320. Design and Analysis of Experiments II
- STAT 5380. Bayesian Statistics
- STAT 5420. Linear Models
- STAT 5490. Statistical Consulting
- STAT 5615. Time Series Analysis II

Total: 36 credit hours

Graduation Requirements: (1) successful completion of coursework and (2) a data analysis project (Plan B paper)

Plan B (Option 2)
Master of Science in Statistics

Profile

The Master's Program in Applied Statistics will give the student a solid background in statistical theory and in statistical methods, and in technical reading and writing skills. This program represents the first two years of doctoral coursework necessary for entrance into a Ph.D. program in statistics. Graduates will have the necessary background to further pursue the Ph.D. degree, to work in industrial or research organizations, or to teach in community college level institutions or as academic professionals in four-year-college and universities.

Coursework

In addition to the general requirements of the university all candidates for the MS (Plan B – Option 2) degree must successfully take and complete**:**

Required: 27 credit hours
- STAT 5210. Statistical Methods 1
- STAT 5220. Statistical Methods 2
- STAT 5510. Distribution Theory
- STAT 5520. Inference I
- STAT 5620. Theory of Linear Models

Ph.D. Level Electives: a minimum of 9 credit hours from the following list of courses:
- STAT 5530 Inference II
- STAT 5540 Large Sample Theory
- STAT 5615 Time Series Analysis II
- STAT 5630 Multivariate Analysis
- STAT 5640 Generalized Linear Model
- STAT 5660 Computational Statistics
- STAT 5670 Mixed Models
- STAT 5680 Bayesian Statistics
- STAT 56xx Spatial Statistics (pending)
- STAT 56xx Response Surface Analysis (to be proposed)

Total: 36 credit hours

Graduation Requirements: successful completion of coursework and a passing grade on a two-day qualifying examination (Plan B paper)

Doctoral Program
Program for a Doctor of Philosophy in Statistics

Profile

The Ph.D. Program in Statistics will give the student a solid background in statistical theory and in statistical methods, in technical reading and writing skills, and in conducting independent research. Most graduates from our doctoral program have been employed as tenure-track faculty at other universities; however, they also will have the necessary background to work as lead researchers in industrial and research organizations.

Coursework

In addition to the general requirements of the university all candidates for the PhD degree must successfully take and complete:

Required: 30 credit hours
- STAT 5210. Statistical Methods 1
- STAT 5220. Statistical Methods 2
- STAT 5510. Distribution Theory
- STAT 5520. Inference I
- STAT 5530. Inference II
- STAT 5540. Large Sample Theory
- STAT 5620. Theory of Linear Models
- STAT 5810. Seminar (3 hours; 3 presentations)

PhD Level Electives: a minimum of 15 credit hours from the following list of courses:
- STAT 5615. Time Series Analysis II
- STAT 5630. Multivariate Analysis
- STAT5640. Generalized Linear Model
- STAT5660. Computational Statistics
- STAT 5670. Mixed Models
- STAT 5680. Bayesian Statistics
- STAT 56xx. Spatial Statistics (pending)
- STAT 56xx. Response Surface Analysis (to be proposed)
- Graduate Level Statistics Electives: a minimum of 9 credit hours from any of the 5000 level courses in Statistics as determined by the student's doctoral committee.

Total: 57 credit hours

Graduation Requirements: 1) At the end of the first year in the doctoral program each student must take a comprehensive qualifying examination. If needed a student may retake this examination. A passing grade on this examination is mandatory for continuance in the doctoral program. 2) After completing this examination a student with the assistance of her/his advisor will be expected to form a doctoral committee. This committee will determine which courses are to be included in the Graduate Level Statistics electives, and will set the conditions of and conduct the preliminary examination. A passing grade on this examination is mandatory for official admittance into the doctoral program by the graduate school. 3) The student must write and successfully defend a dissertation research project. The specific conditions of the dissertation project are to be determined by each student's doctoral committee, but should consist of original research suitable for publication.

Statistics (STAT)

5000. Statistical Anaysis for Research Workers. 3. Covers basic concepts of data collection and statistical inference. The material applies to experimental work when one or two samples have been drawn and one variable has been measured, rather than sophisticated mathematical development, a conceptual statistical approach is utilized in presenting material. Credit cannot be earned in more than one of the following courses: STAT 2010, 2050, 2070, 4220 and 5000. *Prerequisite:* graduate standing.

5015. Regression Analysis. 3. Contains standard topics, as well as some newer and more unconventional ones. Oriented towards analysts who use computer packages for problem solutions. Includes balance of application and theory. Dual listed with STAT 4015. *Prerequisite:* STAT 3050 or equivalent.

5025. Design and Analysis of Experiments I. 3. Reviews design and analysis of one-factor experiments and introduces multifactor experiments, Latin squares, nested designs, and random effects. Includes topics such as polynomial response curves, trend analysis, split plots and incomplete blocks as time permits. Dual listed with STAT 4025. *Prerequisite:* STAT 3050 or equivalent.

5045. Categorical Data Analysis. 3. Applied methods for analyzing associations when some or all variables are measured in discrete categories, not continuous scales. Topics include the binomial, multinomial, and Poisson probability models, parameter estimation and hypothesis-testing about proportions, measures of association and tests for contingency tables, logistic regression, and log-linear models. Dual listed with STAT 4045. *Prerequisite:* two courses in statistics.

5050. Statistical Methods for the Biological Science. 3. General statistical analyses and their application to the biological and behavioral sciences. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs will be utilized. Credit cannot be earned in more than one of the following courses: STAT 2020, 3050, 5050, 5060, 5070. Cross listed with ZOO and PSYC 5050. *Prerequisite:* one course in statistics (all introductory courses except 2000).

5055. Statistical Methods for the Biological Sciences II. 3. The statistical toolkit (regression and ANOVA-driven) of methods applicable to the biological and behavioral sciences will be extended to include multiple logistic regression, power and sample size considerations, and computer-intensive methods such as bootstrapping and randomization tests, which will considerably expand the repertoire of methods that a person could use. *Prerequisite:* STAT 5050 or equivalent.

5060. Statistical Methods In Psychology. 3. General statistical analyses and their application to psychology. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs will be utilized. Credit cannot be earned in more that one of the following courses: STAT 2110, 3050, 5050, 5060, 5070, 5080. Cross listed with PSYC 5060. *Prerequisite:* one course in statistics (all introductory courses except 2000).

5070. Statistical Methods for the Social Sciences. 3. General statistical analyses and their application to the social sciences. Analysis of variance, regression and correlation methods are studied from a data analytic perspective, emphasizing the conceptual understanding of where and when these techniques should be used and the interpretation of their results. Available computer programs will be utilized. Credit cannot be earned in more that one of the following courses: STAT 2110, 3050, 5050, 5060, 5070. Cross listed with SOC 5070. *Prerequisite:* one course in statistics (all introductory courses except STAT 2000).

5080. Statistical Methods for the Agricultural and Natural Resource Sciences. 3. Brief review of statistical principles. Use of SAS programming. Numerous analysis of variance techniques along with commonly-used experimental designs. Multiple mean comparison, linear contrasts, power of F test, simple linear regression, polynomial regression, analysis of covariance, and some categorical data techniques for students in the agriculture and natural resources sciences. Credit cannot be earned in more that one of the following courses: STAT 2110, 3050, 5050, 5060, 5070, 5080. Cross listed with ENTO 5080. *Prerequisite:* STAT 2050 or equivalent.

5115. Time Series Analysis and Forecasting. 3. An applied introduction to time series and forecasting. Brief coverage of time series regression, decomposition methods, and smoothing will lead into a more detailed coverage of Box-Jenkins (ARIMA) modeling. Computer analysis using MINITAB and SAS will be an important part of the course. Dual listed with STAT 4115; cross listed with ECON 5115. *Prerequisites:* STAT 3050 or equivalent; STAT4015/5015 recommended.

5155. Fundamentals of Sampling. 3. Develops methodology of simple random sampling, stratified sampling, and multistage samples. Provides applications related to physical, social, and biological sciences. Discusses single and two-variable estimation techniques. Presents estimation based on subsamples from subpopulations. Dual listed with STAT 4155. *Prerequisite:* STAT 2070 or equivalent.

5185. Analysis of Data. 3. Focuses on data collection, analysis, interpretation, and communication, using contexts relevant to everyday situations. Topics chosen integrate well with the concerns of middle-level teachers and connect with such curriculum areas as health, science, and social studies. This course is not a research methods course. Cross listed with NASC 5180. *Prerequisites:* admission to the UW Graduate school, in either degree or non-degree seeking status, and acceptance into the Middle-level mathematics program.

5210. Statistical Methods I. 3. Introduction and Overview of Statistical Methods aimed at preparing students for Regression, Design, Linear Models and generalized linear models courses at the graduate level. Students also get an introduction to programming in R/S-Plus and SAS. *Prerequisite:* concurrent registration in STAT 5510, will form the basis of the 1st semester in the grad school.

5220. Statistical Methods II. 3. Introduction and Overview of Statistical Methods aimed at preparing students for advanced topics courses in Statistics. Also included is an introduction to programming in SAS and R/Splus. *Prerequisites:* STAT 5210 and concurrent registration in STAT 5520.

5230. Statistic Methods III. 4. Continuation of topics in Statistical Methods from 5220; aimed at preparing students for advanced topics courses in Statistics. *Prerequisites:* STAT 5220 and 5520.

5255. Mathematical Theory of Probability. 3. Calculus-based. Introduces mathematical properties of random variables. Includes discrete and continuous probability distributions, independence and conditional probability distributions, independence and conditional probability, mathematical expectation, multivariate distributions and properties of normal probability law. Dual listed with STAT 4255; cross listed with MATH 5255. *Prerequisite:* grade of C or better in MATH 2210 or 2355.

5265. Introduction to the Theory of Statistics. 3. PPresents derivations of theoretical and sampling distributions. Introduces theory of estimation and hypothesis testing. Dual listed with STAT 4265; cross listed with MATH 5265. *Prerequisites:* STAT 4255/5255.

5300. Applied Multivariate Analysis. 3. The application of multivariate statistical methods in behavioral science research. Topics include: multivariate regression, canonical correlation, discriminate analysis, factor analysis and multivariate regression, canonical correlation, discriminate analysis, factor analysis and multidimensional scaling. A wide range of computer assistance is incorporated. Dual listed with STAT 4300. *Prerequisite:* STAT 5050, 5060, 5070, 5080.

5320. Design and Analysis of Experiments II. 3. Linear models included analysis of variance, analysis of covariance, and regression within its general framework. This is a basic course in the applications of these models containing the standard topics as well as some newer and more unconventional ones. The course is oriented toward the professional statistician who will be involved in the design and analysis of experiments. Extensive use is made of SAS and BMDP in the course. *Prerequisite:* STAT 4025 or 5225.

5350. Survey Construction and Analysis. 3. Examines the issues surrounding the construction (item wording, test theory, and numerical scales), assessment (sampling and psychometrics), and analysis (tem analysis, qualitative data analysis, and factor analysis) of survey instruments. Roughly a third of the course is devoted to each of these areas. Dual listed with STAT 4350. Prerequisite: STAT 3050.

5360. Spatial Statistics. 3. Emphasis is on a generalized linear model approach to the modeling of continuous data, placing model building and the various kriging methods into a single conceptual framework. Dual listed with STAT 4360. *Prerequisite:* STAT 4015.

5370. Survival Analysis. 3. Introduction to the modeling of time to event data as it arises in epidemiological and medical research. Topics include parametric and non-parametric estimation for censored data without covariates, and for data with covariates, the proportional hazards regression model, additive hazards regression model and parametric regression models. Dual listed with STAT 4370. *Prerequisites:* STAT 4015, 4025 and 4265.

5380. Bayesian Data Analysis. 3. Bayesian statistical methods for analyzing data, with emphasis on ecological and biological data. Includes Bayes rule, basic Bayesian formulation (priors, posteriors, likelihoods), single-and multiple-parameter models, hierarchical models, generalized linear models, multivariate models, mixture models, models for missing data, merging statistical and process models, and introduction to computation models. Cross listed with BOT/ECOL 5380. *Prerequisites:* at least 2 semesters of calculus and one semester of statistics.

5420. Linear Models. 3. An introduction to the theory of basic statistical linear models. Topics include: special matrix theory for statistics, multivariate normal distributions, distributions of quadratic forms, as well as estimation and hypothesis testing in the full rank and less than full rank models. *Prerequisite:* STAT 4015, 4025, 4265 and MATH 2250.

5430. Geostatistical Sampling and Ore Reserves Estimation. 3. Designed to provide general geostatistical analyses and their applications for spatial random variables and functions. Topics covered include variogram, cross validation, kriging, cokriging, sampling strategies, and both non-conditional and conditional simulations. Several geostatistics packages will be used to analyze real field data and students are encouraged to use their own data for practicing geostatistical applications. Examples are taken from geohydrology, soil science, crop science, mining, and various environmental studies. Cross listed with SOIL/GEOL 5430. *Prerequisite:* STAT 4015.

5450. Biological Sampling and Estimation of Animal Abundance. 3. A quantitative treatment of techniques useful in the biological sampling and estimation of animal abundance. Included are mark release methods, catch-effort methods, change in ratio methods, mortality and survival estimation, transect and quadrat sampling. *Prerequisite:* ZOO 4400.

5470. Data Analysis. 3. This course is designed to develop the skill of analyzing data sets using methods of classic statistical analysis, such as analysis of variance, regression, discrete models, descriptive analysis, non-parametrics, and multivariate methods. The focus will be on understanding the various models and methods, computer assisted data analysis, and communication of results (oral and written). *Prerequisite:* 12 graduate level hours in statistics (excluding STAT 5000).

5490. Statistical Consulting. 1. An introduction to the art and practice of statistical consulting. Topics include active listening, ascertaining client knowledge level and ability, determining appropriate methods of analysis given limitations, and organizing and managing a consulting session. *Prerequisite:* graduate standing in statistics, 15 hours in statistics.

5510. Distribution Theory. 4. Topics covered include probability theory, conditional probability, random variables, special distribution functions, functions of random variables, expectation, random samples, and limiting distributions. *Prerequisite:* MATH 2210, 3000 or MATH/STAT 4265.

5520. Inference I. 4. Topics covered include Properties of a random sample, Sufficiency principle, Likelihood principle, point estimation (mle, mom, Bayes estimators, etc. and methods for evaluating estimators), some interval estimation.

5530. Inference II. 3. Topics covered include methods used in Bayesian, Likelihood, Frequentist inference; some methods for robust inference and some large sample theory as needed. *Prerequisite:* STAT 5520.

5540. Large Sample Theory. 3. Treats various limiting techniques which can be used to predict the behavior of statistics computed from large data sets. The characteristic function is used in deriving the law of large numbers and various forms of the central limit theorem, including the multivariate normal case. The central and noncentral chi-square distributions are derived as the probability law for certain statistics in the limit. Other topics discussed include modes of probabilistic convergence, speed of convergence, and large sample approximation procedures. *Prerequisite:* STAT 5510.

5615. Time Series Analysis II. 3. A treatment of theory and application of ARIMA modeling of times series. Frequency domain analysis is also introduced. Additional topics will be selected from intervention analysis, transfer function (ARMAX) models, outlier analysis, vector ARIMA models, ARCH, GARCH, and state-space models, according to the interests and abilities of the class. *Prerequisites:* STAT 4015/5015, 4115 and 4265/5265.

5620. Theory of Linear Models. 3. A theoretical approach to estimation and testing in the general linear model. Topics include: special linear algebra results for statistics, para-meterizations, estimability, least squares, best linear unbiased estimation, and testing linear hypotheses. *Prerequisite:* STAT 5630, 5520, MATH 4500.

5630. Multivariate Analysis. 3. The subject matter includes derivation of multi-variate normal distributions, the Wishart, and related sampling distributions, multivariate estimation, confidence regions, and hypothesis testing are covered including topics as Hotelling's T squared, profile analysis, discriminate analysis, factor analysis, and cluster analysis. *Prerequisite:* STAT 4265, MATH 2250.

5640. Generalized Linear Models (GLIM). 3. This class of models based on exponential family distributions provides a unifying framework for linear normal models, models for categorical data and for survival analysis. Modeling and inference relies on familiarity with exponential family distributions, maximum likelihood inference and likelihood ratio tests. *Prerequisite:* STAT 5520 and STAT 5420.

5650. Theory of Sampling. 3. Consists of the theory of simple random sampling, stratified sampling, multistage sampling, and regression and ratio estimation. Recent developments in sampling are presented. *Prerequisite:* STAT 4265, 4150.

5660. Computationally Intensive Methods in Statistics. 3. Advanced statistical inference often relies on methods which are computationally intensive. The basic methods include Newton-Raphson; the EM algorithm; bootstrap and other resampling procedures; kernel density estimators; Laplace's method, importance sampling and MCMC, and saddlepoint and Edgeworth approximations. *Prerequisite:* STAT 5520.

5670. Mixed Models. 3. An advanced treatment of models with fixed and random effects. Topics include: model definitions, least- squares, analysis of variance techniques, likelihood procedures, and computational applications. *Prerequisite:* STAT 5620.

5680. Advanced Bayesian Statistics. 3. Philosophical principles underlying Bayesian and non-Bayesian statistics. Decision theoretic foundations of Bayesian statistics including loss functions, minimaxity, and admissibility. Construction of conjugate prior distributions and non-informative prior distributions. Bayesian oint estimation, hypothesis tests and credible sets. Computational tools for Bayesian problems including Markov chain Monte Carlo (McMC) and other methods for approximating posterior distributions with some emphasis on implementation via a programming language or statistical computing software. As time and interest permit: the normal linear model, non-normal models, hierarchical models, Bayesian model averaging, other topics. *Prerequisites:* STAT 5380; 5420 and 5520.

5810. Seminar. 1-2 (Max. 4). Research results are presented by statistics majors. (Faculty also present papers). *Prerequisite:* graduate status in statistics.

5820. Teaching of Statistics. 1 - 2. (Max 2). The following topics are presented and discussed: traditional and innovative teaching methods, assessment methods, the purpose of lectures and laboratories, in-class activities, projects, mathematics versus statistics, computer assistance, math anxiety, and group and one-on-one interaction guidelines. *Prerequisite:* consent of instructor.

5880. Advanced Problems. 1-8 (Max. 8). Intended to develop the graduate student's ability to expand his theoretical knowledge by using library materials and working under close supervision of a faculty member who is an expert in the area of study. *Prerequisite:* 12 hours in statistics and consent of instructor.

5890. Advanced Topics. 1-3 (Max. 3). Special offerings beyond formal course work in thesis areas. *Prerequisite:* graduate status.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.
5990. Internship. 1-12 (Max 24). *Prerequisite:* graduate standing.

Theatre and Dance

205 Fine Arts Center, 766-2198
FAX: (307) 766-2197
Web site: uwyo.edu/th&d/
Department Head: Leigh Selting

Professors:

WILLIAM MISSOURI DOWNS, B.S. Northern Michigan University 1977; M.F.A. University of Illinois 1980; M.F.A. University of California-Los Angeles 1988; Professor of Theatre and Dance 2004, 1994.
REBECCA HILLIKER, B.F.A. University of Wisconsin, Milwaukee 1971; M.F.A. University of Wisconsin, Madison 1974; Ph.D. 1984; Professor of Theatre 1997, 1988.
LEE HODGSON, B.A. University of Wyoming 1977; M.A. 1980; M.F.A. California Institute of the Arts 1983; Professor of Theatre and Dance 2000, 1987.
MARSHA F. KNIGHT, B.F.A. University of Utah 1979; M.F.A. 1983; Professor of Theatre and Dance 1998, 1984.
LEIGH SELTING, B.A. University of Nebraska at Kearney 1983; M.F.A. University of Idaho 1985; Professor of Theatre and Dance 1999, 1989.
LOU ANNE WRIGHT, B.A. California State University-Northridge 1990; M.F.A. National Theatre Conservatory 1993; Professor of Theatre and Dance 2007, 1994.

Associate Professors:

MARGARET WILSON, B.A. University of Wyoming 1981; M.S. 1987; Ph.D. Texas Woman's University 2007; Associate Professor of Theatre and Dance 2008, 2005.

Assistant Professors:

CECILIA ARAGÓN, B.S. McMurry University 1991; M.A. University of New Mexico 1996; Ph.D. Arizona State University 2003; Assistant Professor of Theatre and Dance 2005.
JENNIFER DECKERT, B.F.A. University of Utah 2003; M.F.A. 2005; Assistant Professor of Theatre and Dance 2007.
LAWRENCE JACKSON, B.F.A. University of Southern Mississippi 2000; M.F.A. Florida State University 2007; Assistant Professor of Theatre and Dance 2008.
CASEY KEARNS, B.A. Chadron State College; M.F.A. University of Kansas; Assistant Professor of Theatre and Dance 2005.
ADAM MENDELSON, B.A. Tufts University 1996; M.F.A. University of Nebraska-Lincoln 2004, Assistant Professor of Theatre and Dance 2008.
JOHN O'HAGAN, B.F.A. University of Idaho 1997; M.F.A. 2005; Assistant Professor of Theatre and Dance, 2008.

Adjunct Professor:

Neil F. Humphrey

Academic Professional Lecturer:

PATRICK NEWELL, B.M. University of Indiana-Purdue at Fort Wayne 1992; M.M. 1994, Ph.D. 2003; Academic Professional Lecturer of Theatre and Dance 2007.

At present, no program for graduate degrees in theatre and dance is offered; however, courses may be counted at the graduate level.

Theatre and Dance (THEA)

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Women's Studies

100 Ross Hall, 766-2733
FAX: (307) 766-2555
Web site: www.uwyo.edu/wmst
Director: Marianne Kamp

Professors:

CATHERINE CONNOLLY, B.S. State University College at Buffalo 1984; M.A. State University of New York at Buffalo 1989; J.D. 1991; Ph.D. 1992; Professor of Sociology 2004, 1998, 1992.
COLLEEN DENNEY, B.A. Louisiana State University 1981; M.A. 1983; Ph.D. University of Minnesota 1990; Professor of Art 2005, 1990; Professor of Women's Studies 2009.
SUSAN R. MCKAY, B.S. De Pauw University 1964; M.S. University of Colorado 1965; Ph.D. University of Wyoming 1978; Professor of Nursing 1990, 1986; Professor of Women's Studies 1993.

Associate Professor:

BONNIE ZARE, B.A. Stanford University 1988; M.A. University of Wisconsin 1989; Ph.D. Tufts University 1994; Assistant Lecturer in English 1997; Associate Professor in Women's Studies 2006, 2002.

Assistant Professor:

Danielle Pafunda, B.A. Bard College 1999; M.F.A. New School University 2002; Ph.D. University of Georgia 2008. Assistant Professor of Women's Studies, 2008.

Adjunct Faculty:

(see department section following name for academic credentials)

Stephanie Anderson, political science
Judith A. Antell, American Indian studies
Susan C. Frye, English
Teena Gabrielson, political science
Kendra Gage, history
Susanna L. Goodin, philosophy
Anne Guzzo, music
Emily Hind, modern and classical languages
Jeanne Holland, English
Katherine Inman, women's studies
Angela Jaime, educational studies
Michelle Jarman, WIND
Marianne R. Kamp, history
Diane Kempson, social work
Frieda E. Knobloch, American studies
Gracie Lawson-Borders, African American studies
Kari Morgan, family and consumer sciences
Hannelore Mundt, German
Quincy Newell, religious studies
Tracey Owens Patton, Communication and Journalism
Mary Sheridan-Rabideau, English
Margaret Zamudio, sociology

Advisory Committee:

Stephanie Anderson (political science)
Deb Beck (education)
Teena Gabrielson (political science)
Kendra Gage (history)
Susanna Goodin (philosophy)
Emily Hind (modern and classical languages)
Angela Jaime (educational studies)
Michelle Jarman (WIND)
Marianne Kamp (history)
Diane Kempson (social work)
Gracie Lawson-Borders (African American studies)
Barbara Ellen Logan (women's studies)
Jennifer Mayer (libraries)
Quincy Newell (religious studies)
Kari Morgan (family and consumer sciences)
Tracey Owens Patton (communication and journalism)
Mary Sheridan-Rabideau (English)
Mary Ann Stout (Women's Center Director)

Professor Emeritus:

Katherine Jensen

Students interested in an interdisciplinary master's in women's studies should contact the director of women's studies. Also available is a graduate minor in women's studies, contact the women's studies director for details.

Minor

A total of 12 hours of course work, nine hours of which must be at the 5000 or above level.

WMST 5700, Feminist Theories and Methods and three electives.

Students are encouraged to complete at least one independent study (WMST 5975) with a WMST faculty member.

Work with a WMST faculty member on Plan B paper, Thesis or Dissertation. [Students in professional programs without a culminating writing element can meet this alternatively.]

Women's Studies (WMST)

5000. Special Topics. 1-4 (Max. 8). Presents findings from current research and new areas of inquiry into women's studies at the graduate level, by present and visiting faculty. *Prerequisite:* 18 hours of undergraduate women's studies.

5155. Women, War & Health. 3. Focuses on the physical and psychological health of women and children as influenced by armed conflict. Examines the psychosocial, public health, and socioeconomic effects of living in contemporary war zones or conditions of threatened war. Key international documents that address effects upon women and children are discussed in order to evaluate feminist initiatives to prevent and mediate the consequences of war. *Prerequisites:* upper division standing, lower division social or psychological science course and instructor's consent.

5175. Gender, Women & Health. 3. Focuses on issues of gender, women and health, including the effects of gender bias in medical research and health care practices and policies. Health care issues of specific concern to women, both nationally and internationally are examined. *Prerequisites:* upper-division standing, lower division social or psychological science course. Dual listed with-WMST 4175; cross listed with INST/NURS 5175.

5330. European Gender History. 3. The experiences of women and the history of gender from the Renaissance through the nineteenth century. Focuses on the changing notions of the masculine and the feminine through such historical episodes as the Reformation, the Enlightenment, the French Revolution and the Industrial Revolution. Dual listed with WMST 4330; cross listed with HIST 4330/5330. *Prerequisite:* HIST 1110 or 2110.

5335. Woman and Islam. 3. Examines women's lives in Islamic societies from the seventh century to the present in the Middle East and throughout the world. Themes include women's position in Islamic law, society and culture, Western images of Muslim Women, veiling and Islamist movements, theoretical readings on power, gender and agency. Dual listed with WMST 4335; cross Listed with HIST 5335. *Prerequisite:* six hours in women's studies, international studies, religious studies, or history.

5360. American Indian Women. 3. Explores the lives of American Indian women in a variety of contexts through time. The complexity and diversity of Indian women's experiences throughout history are emphasized. Much of the class concerns Indian women's lives within the reality of European American colonization and its consequences for Indian peoples. Dual listed with WMST 4360; cross listed with SOC 5360. Prerequisite: 6 hours of AIST 2000-level classes.

5400. Women and Work. 3. Surveys general patterns of women's paid and unpaid work in the U.S. and abroad. Offers reconceptualizations of the meaning of work in women's lives, as well as debates surrounding comparable worth, pay equity, women's work experience and women in the world economy. Dual listed with WMST 4400; cross listed with SOC 4400/5400. *Prerequisite:* six hours of women studies or sociology.

5450. Ecofeminism. 3. Focus is on issues of gender, women and ecology. Ecofeminist thinkers argue that there is no liberation for women and no solution to the ecological crisis without a fundamental shift in relationships of domination. Uniting the two movements results in a radical reshaping of modern socioeconomic relations. Dual listed with WMST 4450. *Prerequisite:* six credits from women's studies, philosophy, and/or ENR.

5500. Readings in Women's Studies. 3. An interdisciplinary course at graduate level focusing on feminist criticism and theory, which draws on current debates in feminist analysis from the general areas of history, literature and social science, to inform students of reformulations of research and unresolved issues. Identical to HIST 5500. *Prerequisite:* graduate status, 12 hours of 4000-level work.

5580. Women and Third World Development. 3. Women's contributions to the development of third world countries and the effects of development projects on women, their work, and their families are examined in this course. Dual listed with WMST 4580; cross listed with SOC 5580. *Prerequisite:* WMST 1080 or 3500.

5590. Women of India. 3. Introduces students to concepts that influence the daily lives of contemporary women from India. Organized around two themes: how women have made history in India, and how today's women are performing, confronting and modifying cultural traditions. *Prerequisites:* USP WA class and a CS or CH class.

5700. Feminist Theories. 3. Surveys contemporary feminist theories and places those theories within the framework of social, literary, and artistic criticism. Uses feminist theories to address questions such as nature of meaning in literature and artistic forms; construction of science; and identity of the individual as these phenomena are affected by gender construction. Dual Listed with WMST 4700. *Prerequisite:* 12 hours of WMST.

5770. Gender and Film. 3. Investigates gender construction in mainstream, mainly contemporary Hollywood cinema. Includes readings of seminal essays in film theory and extensive viewing of films, which provide critical tools to understand how and why stereotypical images are presented, how and why the spectator is manipulated to identify with these images. Dual listed to WMST 4770. *Prerequisites:* WMST 1080, 3500 or 3710.

5830. Victorian Women's Lives: Their Art, Literature, and Culture. 3. An interdisciplinary approach to the study of women's issues in art, using literary, cultural and sociological texts to enlarge the art historical basis. Topics include "domestic goddess," class issues, racial questions, working women, prostitution, education, marriage and divorce. Dual listed with WMST 4830; cross listed with ART/ENGL 5830. *Prerequisite:* ART 2020, WMST 1080, ENGL 1080.

5900. Prac- College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 14). Graduate level course designed for students who are involved in research for their thesis project. Also designed for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5970. Independent Studies. 1-4 (Max. 8). Allows the graduate student to pursue studies in gender issues with the supervision of an instructor from the Women's Studies faculty. *Prerequisite:* graduate standing.

5990. Internship. 1-12 (Max. 12). *Prerequisite:* graduate standing.

Zoology and Physiology

428 Biological Sciences Building, 766-4207
FAX: (307) 766-5625
Web site: www.uwyo.edu/Zoology
Department Head: Frank J. Rahel

Professors:

CRAIG W. BENKMAN, B.A. University of California at Berkeley 1978; M.S. Northern Arizona Sate University 1981; Ph.D. State University of New York 1985; Robert Berry Professor of Ecology, Professor of Zoology and Physiology 2004.

HAROLD L. BERGMAN, B.A. Eastern Michigan University 1968; M.S. 1971; Ph.D. Michigan State University 1973; Director SENR/IENR 1997; Professor of Zoology and Physiology 1984, 1975.

STEVEN W. BUSKIRK, B.S. University of Redlands 1969; M.S. University of Arizona 1972; Ph.D. University of Alaska 1983; Professor of Zoology and Physiology 1997, 1984.

DANIEL F. DOAK, B.A. Swarthmore College 1983; Ph.D. University of Washington (Seattle) 1990; Professor of Zoology and Physiology 2007.

FRANCIS W. FLYNN, B.A. University of Colorado, Boulder 1973; M.A. Northern Arizona University 1977; Ph.D. Kansas State University 1981; Professor of Zoology and Physiology 2001.

ZOLTAN M. FUZESSERY, B.S. University of California-Santa Barbara 1970; M.S. 1973; Ph.D. University of Illinois 1982; Professor of Zoology and Physiology 2004, 1993, 1987.

WILLIAM A. GERN, B.A. Western State College-Colorado 1971; M.A. 1973; Ph.D. University of Colorado-Boulder 1976; Professor of Zoology and Physiology 1989, 1979.

HENRY J. HARLOW, B.A. California State University 1966; M.A. 1973; Ph.D. University of Wyoming 1979; Director UW-NPS 1992; Professor of Zoology and Physiology 1996, 1981.

WAYNE A. HUBERT, B.S. Illinois State University 1969; M.S. Southern Illinois University 1972; Ph.D. Virginia Polytechnic Institute 1979; Assistant Leader, Wyoming Cooperative Research Unit 1982; Professor of Zoology and Physiology 1991, 1982.

JAMES R. LOVVORN, B.S. University of Georgia 1977; M.S. Purdue University 1980; Ph.D. University of Wisconsin 1987; Professor of Zoology and Physiology 2002, 1989.

CARLOS MARTINEZ del RIO, B.Sc. Universidad Nacional de Mexico 1984; Ph.D. University of Florida 1990; Professor of Zoology and Physiology 2004, 2000.

GRAHAM MITCHELL, B.Sc. University of the Witwatersrand, Johannesburg, South Africa 1967; Ph.D. 1977; B.V.Sc. University of Pretoria, South Africa 1971; D.V.Sc. 1983; FRSSAf; Professor of Zoology and Physiology 2003.

FRANK J. RAHEL, B.A. Kenyon College (Ohio) 1974; M.S. University of Wisconsin 1977; Ph.D. 1982; Professor of Zoology and Physiology 1998, 1991.

Associate Professors:

MERAV BEN-DAVID, B.S. Tel Aviv University 1984; M.S. 1988; Ph.D. University of Alaska 1996; Associate Professor of Zoology and Physiology 2004, 2000.

BRUCE W. CULVER, B.S. University of Wyoming 1969; Ph.D. University of Kansas Medical Center 1975; Associate Professor of Pharmacy 1981, 1977, Zoology and Physiology 1984.

ROBERT O. HALL JR., B.S. Cornell University 1989; Ph.D. University of Georgia 1996; Associate Professor of Zoology and Physiology 1998.

DAVID B. MCDONALD, A.B. Harvard College 1973; Ph.D. University of Arizona 1987; Associate Professor of Zoology and Physiology 2002, 1996.

ROBERT S. SEVILLE, B.S. San Diego State University 1981; M.S. University of Wyoming 1987; Ph.D. 1992; Associate Professor of Zoology and Physiology 2001, 1995.

DONAL C. SKINNER, B.S. Rhodes University 1987, B.S. (Hons.) University of the Witwatersrand 1988; Ph.D. University of Cambridge 1993; Associate Professor of Zoology and Physiology 2005, 2002.

CHARLES J. WOODBURY, B.S. Arizona State University 1982; Ph.D. State University of New York, Stony Brook 1989; Associate Professor of Zoology and Physiology 2008, 2003.

Assistant Professors:

MICHAEL E. DILLON, B.S. University of Texas, Austin 1998; Ph.D. University of Washington 2005; Assistant Professor of Zoology and Physiology 2009.

MATTHEW J. KAUFFMAN, B.A. University of Oregon 1992; Ph.D. University of California, Santa Cruz 2003; Assistant Professor of Zoology and Physiology 2006.

QIAN-QUAN SUN, B.Sc. Shandong Normal University 1990; M.S. 1993; Ph.D. St. Andrews University 1998; Assistant Professor of Zoology and Physiology 2004.

Assistant Academic Professional Lecturers:

MARGARET J. FLANIGAN, B.Sc. University of Strathclyde 1984; Ph.D. University of the Witwatersrand 1993; Academic Professional, Zoology and Physiology 2006, 2003.

Senior Academic Professional: Research Scientist

ZHAOJIE ZHANG, B.S. Shandong University 1985; M.S. 1988; Ph.D. University of Oklahoma 1999; Director, Microscopy Core Facility, University of Wyoming 2001; Associate Academic Professional/Research Scientist in Zoology and Physiology 2007, 2004.

Assistant Academic Professional Research Scientist:

ANNA D. CHALFOUN, B.A. Smith College 1995; M.S. University of Missouri-Columbia 2000; Ph.D. University of Montana-Missoula 2006; Assistant Research Scientist, Zoology and Physiology 2008.

AMY C. KRIST, B.A. S.U.N.Y. Potsdam 1991; Ph.D. Indiana University 1998; Research Scientist, Zoology and Physiology 2004.

Temporary Academic Professionals:

DIANE GORSKI, B.S. University of Wyoming 1989; M.S. 1991; Lecturer, Zoology and Physiology 1996.

BETH RINTZ, B.S. Pennsylvania State University 1995; M.S. University of Wyoming 2005; Lecturer, Zoology and Physiology 2006.

Professors Emeritus:

Robert W. Atherton, Robert P. George, Robert M. Kitchin, J.A. Lillegraven, Frederick G. Lindzey, James D. Rose, Joan Smith-Sonneborn

Academic Professional Lecturer Ameritus:

Jane Beiswenger

Wyoming Cooperative Fish and Wildlife Research Unit

Leader: Hubert
Assistant Leader: Kauffman
Assistant APRS: Chalfoun

The Department of Zoology and Physiology offers programs leading to the master of science and the doctor of philosophy in zoology and physiology.

Program Specific Admission Requirements

Admission is open to all students who meet the minimum requirements set forth in the admissions section of this bulletin.

Research and teaching assistantships are available for graduate students working toward the M.S. or Ph.D. degrees. Applicants can apply for this financial assistance at the time they apply for admission to graduate standing. Applications must be completed by February 15 in order to be considered for the following academic year.

To be considered for graduate standing in the department, the applicant must file an application for a graduate assistantship with the department as well as an application for admission with the university. The department requires the statement of educational objectives called for in the application for graduate assistantship, even if the applicant does not wish to be considered for financial assistance. Furthermore, a student will be recommended for admission only if a faculty member consents to serve as a student's academic adviser.

Program Specific Degree Requirements

Master's Program
Plan A (thesis)

Includes 26 hours of coursework and 4 hours of thesis research.

Applicants should have at least 20 semester hours of undergraduate work in zoology, physiology, or other areas of the biosciences and have completed introductory courses in mathematics, chemistry, and in at least one other natural or physical science. Early in the second semester the student must file a program of study with the university and have a graduate committee appointed. Plan A candidates shall orally defend the thesis before the graduate committee.

All M.S. candidates will be required to complete credit in two graduate seminars. A student may enroll in more than one of these required seminars during one semester or academic year.

After two semesters of tenure in the department, a Plan A master's candidate may request permission from the department's graduate advisory board to proceed directly to the Ph.D. degree; however, such a bypass is granted only by the department head after considering recommendations from the graduate advisory board.

Zoology and physiology may be used as a field by a candidate working for the interdisciplinary master of science in natural science in the College of Arts and Sciences and the College of Education.

Plan B (non-thesis)

Includes 30 hours of coursework.

The program for the Plan B is established by the student and a faculty adviser and must be approved by the department head during the student's second semester or summer session.

The graduate committee will require the candidate to take a written examination. An oral examination may also be required.The final examination is comprehensive, covering all areas of zoology, but emphasizing one major area.

Doctoral Program

This is a 72 hour program.

A Ph.D. applicant must have 20 hours of undergraduate work in zoology, physiology, or other areas of biology and also have completed substantial undergraduate work in other sciences. Under exceptional circumstances a student with an undergraduate major in a scientific discipline other than biology may be admitted. After the Ph.D. student has completed two semesters of graduate work s/he must be approved for continued work toward the doctorate by the graduate advisory board. This board can reconsider a candidate thereafter if it so desires.

A graduate committee shall be appointed for the individual student no later than the third semester. After consultation with the student, this committee will prescribe special requirements (courses, minors, research tools, etc.) that must be fulfilled. At this time, the graduate committee shall consult with the candidate on the proposed research and shall identify the subject matter areas to be included in the preliminary examination. The preliminary examination will consist of a written research proposal, its oral defense, and a written and oral preliminary examination. When training outside zoology and physiology is specified by the committee, certification of satisfactory completion of the requirement will be made by the appropriate department.

In addition to the general university requirements for the Ph.D. degree, the department requires the following:

The coursework program should include work in a discipline outside the department, generally in the sense of a minor, to be identified in consultation with the graduate committee.

The preliminary examination consisting of written and oral portions should be taken no later than midterm of the fourth semester in residence. The graduate committee will certify satisfactory performance for the preliminary examination.

The dissertation must be received by each member of the graduate committee three weeks before the final dissertation seminar. As oral defense of the dissertation, the candidate will deliver a formal 50 minute seminar on original research from the dissertation. The seminar will be followed by an examination by the graduate committee.

Some time during their degree program, all Ph.D. candidates will be required to complete credit in three graduate seminars. A student may enroll in more than one of these required seminars during one semester or academic year.

All candidates for the Ph.D. degree shall be required to teach for one semester during their program.

The dissertation may be written in a format suitable for publication in a journal and the usual extensive literature review, description of study sites, technical details, raw data, supporting figures, charts, and photographs should be included in a well-organized appendix. (See also format requirements by the university.)

Although the doctorate received from this department is in zoology and physiology, the department offers opportunities for advanced study and research in a wide range of specializations. Details concerning requirements for graduate study in the department are available from the department upon request.

Zoology (ZOO)

5100. Structure and Function of the Nervous System. 4. Aimed at understanding the structure and interconnections of neurons in the brain and how structure gives rise to the complex functions mediated by the brain; an essential feature of neuroscience. Covers gross anatomy of the brain, followed by detailed consideration of the divisions of the brain and their functional significance. Cross listed with NEUR 5100. *Prerequisite:* admission to the graduate neuroscience program or graduate standing.

5125. Human Integrative Physiology. 4. Examines how functional organ systems are coordinated and integrated to establish and maintain health. Considers, among others, the functions of the endocrine and central nervous systems. Dual listed with ZOO 4125. *Prerequisites:* C Grade or higher in ZOO 3115; and/or a Pharmacy 1 standing; Graduate students must have permission from the instructor.

5140. Histology. 4. Studies microscopic structure of the principal types of tissues. Correlates structure and function. Most laboratory preparations are from human tissues. Dual listed with ZOO 4140. *Prerequisite:* LIFE 2022 or 2023.

5190. Comparative Environmental Physiology. 4. Studies and interprets principles of physiology which adapt animals to various environmental constraints. Introduces the discipline which has risen between the traditional fields of physiology and ecology and provides an understanding of animal distribution and survival. Dual listed with ZOO 4190. *Prerequisite:* LIFE 2022 or 2023 and 1 year or chemistry.

5280. Introduction to Neuroscience. 3. Examines the basic properties of neurons and from there identifies determinants of brain development and how neuronal circuits are formed. How neuronal circuits underlie processing sensory information, coordinated movement, complex functions (e.g. sleep, learning) and homeostasis are discussed. Cross listed with NEUR 5280; dual listed with ZOO 4280. *Prerequisite:* ZOO 3115 or equivalent.

5300. Wildlife Ecology and Management. 1-5 (Max. 6). Concepts of vertebrate ecology integrated with the art of wildlife management, stressing approaches to deal with the inherent uncertainty of managing populations. Strategies to increase or decrease populations of target species, tools used to determine population status (e.g. viability analysis, monitoring, habitat assessment), and ecosystem management approaches are discussed. Lab included. Dual listed with ZOO 4300. *Prerequisite:* LIFE 3400.

5310. Fisheries Management. 3. Acquaints students with theory and techniques of inland fisheries management. Includes methods of evaluating growth and recruitment, and the use of yield models in fisheries biology. Laboratory and field exercises included. Dual listed with ZOO 4310. *Prerequisite:* ZOO 4330.

5330. Ichthyology. 3. Studies anatomy, physiology, and classification of fishes, emphasizing classification and identification of Wyoming fish. Includes laboratory. *Prerequisite:* LIFE 2022 or 2023.

5340. Developmental Biology and Embryology. 4. Introduces study of vertebrate embryology and cellular differentiation. Includes gametogenesis, fertilization, blastulation and organogenesis, growth and differentiation, teratology, metamorphosis, regeneration, and asexual reproduction. Emphasizes mechanisms that create form and cellular differentiation. Dual listed with ZOO 4340. *Prerequisite:* one year of life science or one year of chemistry.

5350. Ornithology. 3. Acquaints students with classification, identification, morphology, distribution, natural history, and ecology of the birds of North America. Laboratory included. Dual listed with ZOO 4350. *Prerequisite:* LIFE 2020..

5370. Mammalogy. 3. Studies mammals of the world, emphasizing natural history, distribution, taxonomy, ecology, and morphology of mammalian species. Includes laboratory. Dual listed with ZOO 4370. *Prerequisite:* LIFE 2022 or 2023.

5380. Herpetology. 3. Introduces the ecology, behavior, morphology, evolution, systematics and conservation of reptiles and amphibians. Dual listed with ZOO 4380. *Prerequisite:* LIFE 2022.

5390. Environmental Toxicology. 3. Explores the disciplines of aquatic and wildlife toxicology from environmental, chemical, and regulatory perspectives. Emphasis on standard environmental toxicology testing methods, field studies, statistical analysis, and mechanistic principles, with discussions of contemporary issues in the field. Dual listed with ZOO 4390. *Prerequisites:* LIFE 3400, CHEM 1030, or STAT 2050.

5400. Population Ecology. 3. Explores quantitative ecology of animal populations, emphasizing theoretical and empirical work. Provides modern coverage of principles of population ecology for wildlife majors and others who expect to deal with ecological problems in their careers. Dual listed with ZOO 4400. *Prerequisites:* LIFE 1010, 3400 and STAT 2050.

5415. Behavioral Ecology. 3. Behavioral ecology applies empirical and theoretical approaches to ecological and evolutionary underpinnings for behaviors ranging from foraging and predation to social grouping and mating systems. Emphasizes comparative analyses (what phylogenetic patterns exist across diverse species?) as well as genetic/fitness benefits (how do individuals benefit from apparently puzzling behaviors?). Dual listed with ZOO 4415. *Prerequisite:* ZOO 3600 or LIFE 3400.

5420. Ecological Inquiry. 3. Addresses basic ecological concepts and natural resource management issues in the Greater Yellowstone Ecosystem (GYE). Emphasis will be placed on developing critical thinking skills and exploring the effects of resource management policy and actions. Course direction will involve moving from a known facts way of thinking in to realm of evaluating effects of human management of the GYE. *Prerequisites:* LIFE 2022, 3400, and graduate standing.

5425. Genetic Markers. 3. Overview of the use of genetic, molecular markers for the analysis of natural populations of plants and animals. Approaches range from individual identification to systematics, with a core focus on populations. Dual listed with ZOO 4425. *Prerequisite:* LIFE 3050.

5430. Ecology of the Greater Yellowstone Ecosystem. 3. Covers plant and animal community ecology from both a qualitative and quantitative perspective. Topics include: community interaction of plants and animals; community dynamics, succession, and disturbance; basic data collection and statistical analysis of habitat association data; and the effect of abiotic factors on community structure. *Prerequisite:* LIFE 2022, 3400, and graduate standing.

5540. Invertebrate Zoology. 4. Studies invertebrate phyla of the animal kingdom. Studies each phylum with respect to morphological and taxonomic characteristics; functional and evolutionary relationships; environmental adaptations; life cycles of representative types. Includes laboratory. Dual listed with ZOO 4540. *Prerequisite:* LIFE 2022.

5550. Wetland Ecology. 3. Study of the function of inland and coastal wetlands: hydrology, biogeochemistry, microbial ecology, distribution and production of algae and macrophytes, decomposition, contaminant processing, ecology of invertebrates and vertebrates, and foodweb structure. Roles of wetlands in aquatic and terrestrial landscapes, wetland classification schemes, and conservation programs. One-day field trip required. Dual listed with ZOO 4550. *Prerequisites:* LIFE 1010; LIFE 2022 or 2023; CHEM 1030.

5560. Quantitative Conservation Biology. 4. Covers the application of ecology and genetics to conservation biology, emphasizing the use of mathematical analysis and quantitative thinking. Includes mathematical homework, discussion sections, computer labs, and independent student projects. Dual listed with ZOO 4460. *Prerequisite:* approval of instructor.

5600. Research in Physiology. 1-16 (Max. 16). Opportunities are available for research in physiology and in animal behavior. Maximum credit not to exceed 8 hours for master's candidates and 16 hours for PhD candidates.

5670. Cell Physiology. 4. Focuses on the cellular mechanisms, functions, and pathways that define the cell as the fundamental living unit. Topics include metabolism, second messengers, cell ultrastructure, membrane excitability, transport physiology, contractile systems, cell division, and programmed cell death. Dual listed with ZOO 4670. *Prerequisite:* LIFE 3600.

5685. Neurophysiology. 3. Designed to investigate the structure and function of nervous systems, drawing information from both vertebrate and invertebrate organisms. Topics such as sensory systems, motor coordination and central integrative mechanisms are covered in addition to the basic neurophysiology of nerve cells. The laboratory complements the lecture sequence. Cross listed with NEUR 5685. *Prerequisite:* one course in physiology, chemistry, physics.

5690. Advanced Animal Behavior. 3. An advanced consideration of research in, and theory of, animal behavior. *Prerequisite:* senior or graduate standing in zoology or psychology.

5715. Seminar in Neuroscience. 2 (Max. 20). A continuing seminar. All students in the graduate neuroscience program are expected to register for this seminar each semester. The interdisciplinary approach to the nervous system is used employing work from physiology, neuroanatomy and neurochemistry, psychology, pharmacology, and biochemistry. Cross listed with NEUR 5715. *Prerequisite:* admission to the graduate neuroscience program or graduate standing.

5725. Transmission Electron Microscopy. 3. With the emphasis on modern techniques, course prepares students via theory and technical experience to use transmission electron microscopy in biological and material science research. An individual research project is required. *Prerequisite:* consent of instructor.

5735. Advanced Topics in Physiology. 1-4 (Max. 12). Designed to cover advanced topics in Physiology for students specializing in Physiology or related fields. Examples of topics include endocrinology, cardiovascular, renal, neurological, respiratory, and metabolic physiology. Integrative topics (e.g. circadian rhythms, thermal stress) may also be included. Dual listed with ZOO 4735. *Prerequisites:* ZOO 3115 and 4125 or equivalent as approved by the instructor.

5740. Biological Confocal Microscopy. 2. With the advances of technology, confocal microscopy is an increasingly important tool for biological research. Teaches students the basic principles of confocal microscopy and its biological applications. This is a hands-on course and students have the chance to practice on a state-of-the-art confocal microscope. *Prerequisites:* none.

5750. Research: Ecology. 1-16 (Max. 16). A wide variety of biotic communities, both terrestrial and aquatic, occur in Wyoming which afford excellent opportunities for ecological studies with responses of animals to the physical, chemical, and biotic factors of their environment. The research must be conducted under the supervision of a faculty member.

5780. Advanced Limnology. 3. A consideration of recent limnological work, emphasizing its relation and contribution to the development of ecological theory. Laboratory provides training in advanced limnological work. *Prerequisite:* ZOO 4440.

5820. Research in Vertebrate Fauna. 1-16 (Max. 16). Wyoming affords unusual opportunities for the study of a wide variety of vertebrate animals. The taxonomy, distribution, and certain aspects of the life histories of these animals are still inadequately known and afford excellent opportunities for research. Numerous problems concerning the management of our game animals remain to be investigated. The research must be conducted under the supervision of a zoology faculty member.

5840. Advanced Fisheries Management. 3. Familiarizes students in wildlife management and ecology with the advanced methods and techniques in fisheries management. *Prerequisite:* ZOO 4310/5310 and consent of instructor.

5890. Graduate Seminar. 1-4 (Max. 10). Provides an opportunity for graduate students to critically evaluate publications on zoological research. Prerequisite: 20 hours of biological sciences.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 12). *Prerequisites:* graduate standing.

Neuroscience (NEUR)

5100. Structure and Function of the Nervous System. 4. Aimed at understanding the structure and interconnections of neurons in the brain and how structure gives rise to the complex functions mediated by the brain. This is an essential feature of neuroscience. Covers gross anatomy of the brain, followed by detailed consideration of the divisions of the brain and their functional significance. Cross listed with ZOO 5100. *Prerequisite:* admission to the graduate neuroscience program or graduate standing.

5160. Degeneration and Regeneration in the Nervous System. 2. Important neurodegenerative diseases of man and animals are discussed in terms of: impact on society, clinical findings, pathology, disease mechanisms and potential preventive and treatment strategies. There are lectures, class discussions and a written project. Cross listed with PATB 5160. *Prerequisite:* graduate standing.

5280. Introduction to Neuroscience. 3. Examines the basic properties of neurons and from there identifies determinants of brain development and how neuronal circuits are formed. How neuronal circuits underlie processing sensory information, coordinated movement, complex functions (e.g. sleep, learning) and homeostasis are discussed. Cross listed with ZOO 5280. *Prerequisite:* ZOO 3115 or equivalent.

5685. Neurophysiology. 3. Designed to investigate the structure and function of nervous systems, drawing information from both vertebrate and invertebrate organisms. Topics such as sensory systems, motor coordination and central integrative mechanisms will be covered in addition to the basic neurophysiology of nerve cells. Cross listed with ZOO 5685. *Prerequisite:* one course in physiology, chemistry, physics.

5715. Seminar in Neuroscience. 1-2 (Max. 20). A continuing seminar. All students in the graduate neuroscience program are expected to register for this seminar each semester. The interdisciplinary approach to the nervous system is used employing work from physiology, neuroanatomy and neurochemistry, psychology, pharmacology and biochemistry. Cross listed with ZOO 5715. *Prerequisites:* admission to the graduate neuroscience program or graduate standing.

5800. Research in Neuroscience. 1-16 (Max.16). The research must be conducted under the supervision of one of the neuroscience program faculty. Laboratory opportunities for research include neuroendocrinology, behavioral neuroscience, sensory neurophysiology, neuroanatomy, neuropharmacology, neurotoxicology, neural cell biology, and neurochemistry. *Prerequisite:* admission to the graduate neuroscience program or graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). Prerequisite: advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). *Prerequisite:* advanced degree candidacy.

5980. Dissertation Research. 1-12 (Max. 48). *Prerequisite:* advanced degree candidacy.

College of Business

Brent A. Hathaway, Dean
105 Crane Hall
Phone: (307)766-4194 FAX: (307)766-4028
Website: http://business.uwyo.edu

The College of Business is comprised of three academic departments: accounting, economics and finance, and management and marketing. The faculty of these departments cooperate in the presentation of graduate work leading to the following degrees:

Master of Business Administration
Master of Science in Accounting
Master of Science in Economics
Master of Science in Economics and Finance
Master of Science in Finance
Doctor of Philosophy in Economics

The College of Business faculty is firmly committed to the excellence of its graduate programs. The graduate programs in the College of Business are accredited by AACSB-International.

The three academic departments coordinate course offerings to support all of the graduate degree programs; the M.B.A. program in particular is a college-wide effort.

Minor in Environment and Natural Resources

College of Business graduate students may earn an interdisciplinary minor in environment and natural resources (ENR) in cooperation with the UW School of Environment and Natural Resources. The appropriate use of natural resources and awareness of environmental consequences of decisions have become major issues for all areas of business and economics. The School of Environment and Natural Resources is designed to move beyond the strictly disciplinary design and management of their long-term solutions. The school seeks to attract outstanding graduate students from a variety of disciplines, who are eager to pursue careers that engage other professionals, policymakers, and the public in finding innovative ways to resolve complex environmental and natural resource issues. To pursue a minor in ENR, students must first be admitted to another master's or doctoral degree program offered at the University of Wyoming. For more information call the ENR office at (307) 766-5080.

Business (BUSN)

5540. Global Business Issues. 1-6 (Max. 6). Designed to give students a broad overview of current issues in international business. Includes classroom instruction and may include travel to a foreign country and visits to major foreign firms and organizations. A written assignment is required. Dual listed with BUSN4540. *Prerequisite:* consent of instructor.

Department of Accounting

141 Crane Hall, 766-3136
FAX: (307) 766-4028
Web site: business.uwyo.edu/acct
Department Chair: Penne Ainsworth

Professors:
PENNE AINSWORTH, B.S. Kansas State University 1983; M.Acc. 1984; Ph.D. University of Nebraska 1988; Professor of Accounting 2001, 1997.
KENTON B. WALKER, B.B.A. University of Wisconsin-Whitewater 1974; M.S. 1978; Ph.D. Texas A & M 1986; Professor of Accounting 2001, 1985.
STUART K. WEBSTER, B.A. Heidelberg College 1964; M.B.A. Bowling Green State University 1965; Ph.D. University of Iowa 1975; Professor of Accounting 1994.

Associate Professors:
GARY M. FLEISCHMAN, B.S. California State University—Chico 1984; M.S.A. 1987; M.S.T. San Jose State University 1991; Ph.D. Texas Tech University 1995; Associate Professor of Accounting 2002, 2000.
LINDA A. KIDWELL, B.A. Smith College 1984; Ph.D. Louisiana State University and Agricultural and Mechanical College 1993; Associate Professor of Accounting 2008, 2005.

Assistant Professors:
ROHIT SINGH, B.S. University of New Delhi 1996; M.S. University of Arizona 2005; Ph.D. 2008; Assistant Professor of Accounting 2008.
TERESA M. STEPHENSON, B.B.A. National University 1989; M.P.A. Indiana University 2000; Ph.D. University of Kentucky 2006; Assistant Professor of Accounting 2006, 2005.

Visiting Assistant Professor:
ANDREW D. HOLT, B.A. Kingston Polytechnic University 1990; M.Sc. London School of Economics and Political Science 1992; Ph.D. 2005; Visiting Assistant Professor 2009.

Academic Professionals:
JANICE A. BENSON, B.S. Kansas State University 1991; M.B.A. 1993; Associate Lecturer of Accounting 2004, 1999.
MICHAEL J. DOHERTY, B.S. University of Wyoming 1994; M.B.A. 2000; Associate Lecturer of Information Management 2006, 2000.
RONALD R. PEDERSEN, B.A. California State University 1971; B.S. University of Wyoming 2001; M.S. 2002; Associate Lecturer of Accounting 2008, 2003.
JO LYNNE STALNAKER, B.A. Southwestern College 1995; M.Ed. Wichita State University 2002; Assistant Lecturer of Information Management 2007.

Emeriti:
Richard G. Elmendorf
George R. McGrail
Suzanne S. Roe

Accounting is an integral part of the College of Business degree programs. The department offers courses in support of college graduate degree programs as well as a master of science in accounting (MS in Accounting degree. The MS in Accounting degree has been developed in response to emerging needs of the accounting profession. Those students who wish to become professional accountants, whether that be in a corporate setting, a not-for-profit setting, or public accounting, will find the MS in Accounting degree to be one that enables them to develop both the personal and professional skills needed to enjoy a productive working lifetime.

The MS in Accounting program satisfies the state requirements for individuals to take the Certified Public Accountant (CPA) exam and it further develops students' professional skills. The MS-Acctg program focuses on the three main areas of development: 1) advanced accounting and business educaton, 2) additional non-business education, and 3) professional skills development–including written, oral, interpersonal communicaiton, computer applications, critical thinking, and adaptability.

The MS in Accounting degree is designed for students who have completed an undergraduate degree in accounting in the United States. However it is possible to be admitted to the program once deficiency courses have been successfully completed. Those holding a bachelor's degree from within the U.S., but not in accounting, and international applicants can still apply for admission once the deficiency courses have been successfully completed.

Program Specific Admission Requirements

To be admitted to the master of science in accounting, a student must have a bachelor's degree in accounting and must have completed courses in the following core areas: accounting (U.S. GAAP, U.S. tax code, U.S. auditing, managerial accounting), finance, management, and marketing. Coverage in these courses must include: ethical and global issues; political, social, legal, and environmental issues; technological issues; and the impact of diversity on organizations.

Completed M.S. in Accounting application (submit online at www.uwyo.edu/business/acct).

Completed university application.

An undergraduate GPA of 3.0/4.0.

Official transcripts of all undergraduate and graduate coursework sent directly from the school issuing the transcript (not necessary if UW is the most recent institution attended).

GMAT total score of 550 or better (Official scores should be sent directly from the Educational Testing Service (ETS)).

For international students a TOEFL score of 540 on the written exam or 76 on the Internet-based exam. The ETS only reports TOEFL scores taken within two years of the date of the request. TOEFL scores must be sent directly from the ETS.

Three work- or school-related letters of recommendation sent directly to the M.S. in Accounting Program.

Summer/fall admittance requires all completed application materials to be submitted on or before March 1 if applying for a graduate assistantship, or June 1 if not applying for an assistantship. Spring admittance requires all completed application materials to be submitted on or before October 15. GMAT scores and TOEFL scores must be sent directly from the ETS; transcripts and letters of recommendation should be sent to:

M.S. in Accounting Program
College of Business
Dept. 3275
1000 East University Avenue
Laramie, WY 82071 USA

Program Specific Degree Requirements

Master of Science in Accounting
Plan B (non-thesis)

The objectives of the master of science in accounting are:
- To provide students with an advanced understanding of the field of accounting,
- To provide students with specific advanced knowledge of the sub-topics within accounting,
- To provide students with professional skills that will enable them to enjoy productive and rewarding careers in accounting and other accounting-related areas.

The program consists of a minimum of 30 hours of graduate credit.

Students must take a minimum of 15 hours of accounting coursework as shown below:
- ACCT 5030. Advanced Financial Accounting (Spring)
- ACCT 5040. Seminar in Managerial Accounting (Spring)
- ACCT 5060. Audit II (Spring)
- ACCT 5070. Tax II (Fall)
- ACCT 5650. Seminar in Accounting Information Systems (Fall)

Students may take up to 9 additional hours of accounting coursework from the following:
- ACCT 5065. Fraud Examination (Fall)
- ACCT 5270. Tax: Pass Through Entities (offered based on sufficient demand and resources)
- ACCT 5075. Individual and Estate Tax Planning (Summer)
- ACCT 5800. Seminar in Contemporary Topics in Acct (as needed)
- ACCT 5850. Advanced Problems in Accounting (as needed)

Eighty percent of the student's total coursework must consist of 5000-level courses; the remaining 20 percent may be 4000- level courses (approximately six hours). Non-accounting courses should be selected in consultation with the student's graduate committee.

The student must select a graduate committee consisting of a committee chair (graduate faculty member from the accounting department), another faculty member from the accounting department, and one graduate faculty member from outside the accounting department.

The student must complete the required coursework (both graduate and prerequisite) with a minimum GPA of 3.0 (on a 4.0 scale).

A student may have only one C in his or her program of study. Any courses in which a grade lower than a C is earned must be repeated.

Any student falling below a cumulative GPA of 3.0 is automatically placed on probation for the following semester and must raise their GPA to 3.0 to avoid dismissal.

In consultation with her or his graduate committee, the student must select and successfully complete one of the following: a) internship, b) service learning project, c) capstone project, or d) comprehensive examination.

Accounting (ACCT)

NOTE: ACCT 4010, 4050, 4060, 4100, 4600, 4900, and 5000 are not applicable for M.S. accounting students' programs of study.

5000. Foundations of Accounting. 3. Provides an introduction to financial and managerial accounting topics for students without previous study in accounting. Includes basics of financial accounting and fundamental accounting concepts and techniques for planning and control applicable to all types of organizations. MBA prerequisite course. *Prerequisite:* graduate standing.

5030. Advanced Financial Accounting. 3. Advanced topics in financial reporting for students planning careers as professional accountants. Topics may include: business combinations, consolidated financial reporting, segment and interim reporting, SEC reporting, multinational accounting and reporting, and other emerging topics. *Prerequisite:* ACCT 3830 (or equivalent) with a grade of C or better; graduate standing.

5040. Seminar in Managerial Accounting. 3. Organizational development of financial and nonfinancial budgets, interaction between performance measurement systems and human behavior, and advanced topics in uses of information for decision making. *Prerequisite:* ACCT 2240 (or equivalent) with a grade of C or better; graduate standing.

5060. Auditing II. 3. An in-depth study of the financial statement audit and the professional responsibilities of public accountants. Covers professional standards, audit services, planning, internal control, audit testing including sampling, audit reports, the code of professional conduct, and the legal liability of auditors. *Prerequisite:* ACCT 4060 (or equivalent) with a grade of C or better; graduate standing.

5065. Fraud Examination. 3. Gives consideration to the methodology for resolving allegations of fraud from inception to disposition. Topics covered include: gathering evidence, taking statements, writing reports, and assisting in the detection and deterrence of fraud. Coverage may also include emerging topics germane to fraud and ethics. *Prerequisite:* ACCT 4060 (or equivalent) with a grade of C or better; graduate standing.

5070. Tax II. 3. Choice of entity and special tax subjects. Emphasis will be placed on the importance of ethical considerations, competent tax research, and thoughtful tax planning. *Prerequisite:* ACCT 3070 (or equivalent) with a grade of C or better; graduate standing.

5075. Tax Planning. 3. Focuses on tax-planning strategies and techniques. Investigates a wide variety of topics, ranging from individual issues to estate, gift, trust, and small business tax planning. Dual listed with ACCT 4075. *Prerequisite:* ACCT 3070 (or equivalent) with a grade of C or better, graduate standing.

5270. Tax: Pass Through Entities. 3. Discuss and analyze the income tax law and income tax preparation requirements for Subchapter S Corporations, Partnerships, Limited Liability Corporations (LLCs) and other entities in which the income tax liability primarily passes through to the owner's individual income tax return (pass-through entities). *Prerequisites:* ACCT 3070, admission to the Master of Science in Accounting program.

5650. Seminar in Accounting Information Systems. 3. An advanced study of the implications of information systems for accountants with emphasis upon accounting application as well as the body of knowledge required for the accountant who is expected to provide relevant, significant data for an increasingly wide range of purposes. *Prerequisite:* ACCT 3610 (or equivalent) with a grade of C or better; graduate standing.

5800. Seminar in Contemporary Accounting Topics. 1-3 (Max. 6). An in-depth investigation of selected issues in accounting. Course is offered on an infrequent basis. *Prerequisite:* consent of instructor; graduate standing.

5850. Advanced Problems in Accounting. 1-8 (Max. 8). An arrangement whereby students may investigate a more advanced problem area in accounting on an individual basis. *Prerequisite:* consent of instructor; graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.
5990. Internship. 1-12 (Max. 24). Prerequisite: graduate standing.

Department of Economics and Finance

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Professors Emeriti:

John W. Birch, Curtis A. Cramer, Thomas D. Crocker, Ralph C. d'Arge, William E. Morgan

The Department of Economics and Finance offers programs leading to a master of science degree in economics, a master of science degree in finance, a dual master of science, and the doctor of philosophy degree in economics.

Program Specific Admission Requirements

Economics Program

Admission to the economics program is granted to students who show high promise of success. Candidates of high promise generally have a cumulative grade point average of 3.0 or better (A=4) and score at or about the 65th percentile or better on both the verbal and quantitative sections of the GRE. It should be noted that attainment of the minimal GPA and GRE does not necessarily constitute automatic admission.

The TOEFL is required for international students, with a minimum score of 550.

In addition to the minimum requirements, the Department of Economics and Finance requires that students have completed courses in intermediate micro and macro theory (ECON 3010, 3020 or equivalent) and 6 hours of introductory calculus (MATH 2200, 2205 or equivalent). A course in linear algebra (MATH 2050) is recommended but not required. No graduate credit is given for making up these deficiencies. In addition, an entering student may be required to take an examination to aid in planning his or her course of study.

Finance Program

All candidates for the master of science in finance must complete or have previously completed, for a letter grade (no S/U grades), courses which satisfy the master of science in finance prerequisite course requirements. Students admitted to the M.S. finance program may take graduate courses in conjunction with their prerequisite courses once the prerequisites for those graduate courses have been met. A minimum 3.0 GPA (on a 4.0 scale) must be maintained in a student's finance prerequisite courses. The prerequisit courses include:

- Accounting (3 to 6 hours): ACCT 5000 Foundations of Accounting, or ACCT 2010 and 2020 Principles of Accounting I and II.
- Economics (6 hours): ECON 3010 (2010, 4010) Intermediate Macroeconomics and ECON 3020 (2020, 4020) Intermediate Microeconomics, or ECON 4330 Managerial Economics.
- Finance (3 hours): FIN 4520 Financial Markets. ECON 2100 Introduction to Money and Banking can be substituted for FIN 4520.
- Mathematics (4 hours): MATH 2350 Business Calculus I or MATH 2200 Calculus I.
- Statistics (4 hours): STAT 2010 Statistical Concepts for Business and Management Science or STAT 2070 Introductory Statistics for the Social Sciences meets this requirement.

Program Specific Degree Requirements

Master of Science in Economics

A minimum of 18 hours in economics is required; at least 15 of these must be at the 5000 level. A basic core sequence of ECON 5010, 5020, and 5330 (math econ) must be taken and is credited toward the 15 hours of 5000-level courses required. Also, ECON 4340 and one of FIN 5310, 5510, or 5520 are required.

The student must complete 26 hours of coursework and 4 hours of ECON 5960 Thesis Research for the Plan A option. The student must complete 30 hours of coursework and a shorter paper for the Plan B option.

Students may take 4000-level courses for graduate credit up to 12 hours.

A maximum of 6 semester hours of graduate coursework not used toward any other degree from another institution may be applied to the M.S. economics program subject to regulations regarding transfer of credit listed in this bulletin and with the approval of the director of graduate studies.

At the beginning of the second semester, the student selects a major professor who directs the Plan A or Plan B research. A graduate committee, nominated by the major professor, the student, and the department chair, conducts an oral examination of the student on the paper or thesis and area he/she has studied in the program. A favorable report by the committee and approval by the Office of the Registrar complete the degree requirements.

The majority of students complete the M.S. degree within two years.

Master of Science in Finance

A minimum of 21 hours in economics and finance is required. At least 21 hours must be at the 5000 level beyond the prerequisite course requirements. A basic core sequence of ECON 5010, FIN 5310, FIN 5320, FIN 5510 and FIN 5520 must be taken and is credited toward the 21 hours of 5000-level courses required. Also, ECON 4340 or 5340 is required to complete the econometrics requirement. Remaining courses necessary to fulfill the requirement of 21 credit hours in finance and economics can be chosen in consultation with the Director of Graduate Studies. Possible electives include ACCT 5050, ACCT 5650, FIN 5810, DSCI 5500, STAT 5110, STAT 5300 or STAT 5310.

The student must complete 26 hours of coursework and 4 hours of FIN 5960 Thesis Research for the Plan A option. The student must complete 30 hours of coursework and a shorter paper for the Plan B option.

Students may take 4000-level courses for graduate credit up to 12 hours.

A maximum of 6 semester hours of graduate coursework not used toward any other degree from another institution may be applied to the M.S. finance program subject to regulations regarding transfer of credit listed in this bulletin and with the approval of the director of graduate studies.

At the beginning of the second semester, the student selects a major professor who directs the Plan A or Plan B research. A graduate committee, nominated by the major professor, the student, and the department chair, conducts an oral examination of the student on the paper or thesis and area he/she has studied in the program. A favorable report by the committee and approval by the Office of the Registrar complete the degree requirements.

The majority of students complete the M.S. degree within two years.

Master of Science with a Dual Major in Economics and Finance

This program is designed for students who wish to have a more quantitative background suitable for research, including study at the Ph.D. level or analysis as a financial market researcher. The program includes heavy emphasis in the areas of research and quantitative methodologies not usually emphasized at the master's level. The dual major will prepare a student for research or future graduate studies at the Ph.D. level in both finance and economics.

A program like this is offered at few other schools. We are able to offer this dual major at the University of Wyoming because our economics and finance programs reside in the same department. Several of our faculty members have expertise in financial economics, allowing students to study topics in finance from an economics perspective.

The master's with a dual major in economics and finance offers two different plans to the students, both of which require 39 credits to be completed. Plan A consists of 33 credits of coursework and a master's thesis, which completes the final 6 credits for the degree. Plan B consists of completing 36 credits of coursework and writing a Plan B paper, worth 3 credits.

Students will start their course of study with three courses in economics theory (ECON 5010, 5020, and 5330). The students will then complete courses in econometrics (ECON 4340, 5340, or 5350), investment management (FIN 5310), and finance theory (FIN 5520). Students will also take a two semester series of financial economics (ECON 5640 and ECON 5650) and a course in corporate governance (FIN 5320). The students are also offered a variety of electives to fulfill their 39 credits.

A maximum of 6 semester hours of graduate coursework not used toward any other degree from another institution may be applied to the M.S. degree subject to regulations regarding transfer of credit listed in this bulletin and with the approval of the director of graduate studies.

At the beginning of the second semester, the student selects a major professor who directs the Plan A or Plan B research. A graduate committee, nominated by the major professor, the student, and the department chair, conducts an oral examination of the student on the paper or thesis and area he/she has studied in the program. A favorable report by the committee and approval by the Office of the Registrar complete the degree requirements.

The majority of students complete the M.S. degree within two years.

Doctoral Program

Doctor of Philosophy in Economics

To earn a doctor of philosophy degree in the field of economics, students are required to specialize in two of four complementary areas: resource and environmental economics, financial economics, international trade and development, and industrial organization. A third optional field in applied econometrics is also available. These four areas compose a unified field of study adapted to faculty research and to the unique opportunities for study of Wyoming's resource and environmental problems.

Student participation in faculty research programs to gain experience in applying concepts and techniques is considered an integral part of one's education. A minimum of 42 hours of coursework is required; at least 21 of these must be at the graduate (5000) level. A minimum of 28 hours must be in economics. Graduate credits may be transferred from other institutions subject to the approval of the Office of the Registrar. A minimum of 24 hours must be taken at the University of Wyoming and at least two semesters in residence are required.

The first-year program is designed to give the student a strong foundation in economic theory and the basic quantitative and mathematical tools necessary for professional research. Doctoral students are required to take the basic theory sequence consisting of six courses (ECON 5010, 5020, 5130, 5330, 5110, 5120) and to pass a written qualifying examination in economic theory. The qualifying examination is taken following completion of the first year theory sequence. The examination is given in May and in August. Students who enter the program with advanced standing and have taken courses equivalent to ECON 5010, 5020 and 5110, 5120 are not required to take the theory sequence but are required to pass the qualifying examination. Doctoral students must also demonstrate an ability to use mathematical and statistical tools of research. This requirement may be satisfied by taking

courses in Mathematical Economics (ECON 4320 or ECON 5330) and Econometrics (ECON 5350 and 5360) and earning a grade of B or better. Students who have taken equivalent courses elsewhere may demonstrate proficiency by passing the final examinations in ECON 4320, 5350 and 5360 with a grade of B or better.

During the second year, the student chooses two areas of concentration. Two graduate courses (6 hours) must be taken in each area. Additional courses in related fields in economics or other disciplines may be required at the discretion of the faculty in the areas chosen. The optional field in econometrics consists of three advanced econometrics courses. By the beginning of the fifth semester, the student selects the area of concentration in which he/she intends to write his/her dissertation.

After completing the coursework in the two areas of concentration, written examinations in both areas are required. These field examinations may not be taken until the qualifying examination in theory has been passed and proficiency requirements in mathematics and econometrics met.

During the third year, or no later than the fall semester of the fourth year, a graduate committee nominated by the major professor and the director of graduate studies, will conduct an oral examination of the student following successful completion of the field examinations. The purpose of the oral examination is to determine whether the student has formulated a workable dissertation project and has the necessary skills to complete it.

Following successful completion of the dissertation, and completion of 30 hours of dissertation research, the student presents an oral defense to the graduate committee. The doctor of philosophy degree is granted on recommendation of the committee and approval by the Office of the Registrar, providing all other requirements have been satisfactorily fulfilled.

Economics (ECON)

5010. Advanced Macroeconomic Analysis. 3. An advanced application of economic theory to complex macroeconomics problems facing the economy of the state and nation, such as inflation, unemployment, and fiscal and monetary policies. *Prerequisite:* ECON 3010, 3020, or equivalent.

5020. Advanced Microeconomic Analysis. 3. A rigorous course in the analysis of demand and the theory of consumer behavior, supply and the theory of the firm, market equilibrium and stability, and income distribution. *Prerequisite:* ECON 3010, 3020, or equivalent.

5110. Advanced Topics in Economic Theory. 3. A study of selected topics in modern economic theory. Topics include growth theory, optimal control, dynamics, uncertainty, and game theory. *Prerequisites:* ECON 5010, 5020.

5115. Time Series Analysis and Forecasting. 3. An applied introduction to time series and forecasting. Brief coverage of time series regression, decomposition methods, and smoothing will lead into a more detailed coverage of Box-Jenkins (ARIMA) modeling. Computer analysis using MINITAB and SAS will be an important part of the course. Dual listed with ECON 4115; cross listed with STAT 5115. *Prerequisites:* STAT 3050 or equivalent, STAT 4015/5015 recommended.

5120. Advanced Analysis II-Microecomics. 3. Part of a sequence with ECON 5020. It is advanced microeconomic analysis covering general equilibrium and welfare economics, and advanced topics in consumption and production theory. *Prerequisites:* ECON 5010, 5020.

5130. Dynamic Optimization. 3. Covers methods for obtaining the optimal choice for economic variables that change over time, including calculus of variations and optimal control. These methods are applied to various dynamic economic problems, including optimal resource extraction, optimal capital allocation, and optimal growth. *Prerequisites:* ECON 5020, 5370.

5300. Game Theory. 3. Discusses a variety of important concepts in the application of game theory to modern microeconomics, including Nash equilibrium, subgame perfect equilibrium,and Bayesian Nash equilibrium. Time permitting, the class will also explore some relatively new uses of game theory, including evolutionary games and differential games. *Prerequisites:* admission to the graduate program in Economics and Finance.

5310. Research Methods. 3. A variety of topics of importance to the advanced student who is preparing to write his or her dissertation are discussed. *Prerequisite:* admission to the graduate program in Economics and Finance.

5320. Experimental Methods in Economics. 3. Accepted experimental techniques in behavioral economics are studied. Critical review of previous experimental work is used to learn proper procedure. The value of subject control and creative construction is stressed. *Prerequisites:* ECON 3010, 3020.

5330. Advanced Mathematical Economics. 3. Study of the principal mathematic techniques used in economic theory and modeling. Taught jointly with ECON 5020. *Prerequisite:* graduate standing.

5340. Applied Econometrics. 3. Presents a thorough coverage of the general and normal linear regression models. Then proceeds to deal with the standard methodologies for estimating variations of this model including autocorrelation and hetero-skedasticity, extreme multicolinearity, disturbance-related sets of regression equations, simultaneous equation bias, and simultaneous equation models. *Prerequisites:* ECON 3010, 3020, 4340.

5350. Advanced Economic Theory I. 3. Covers important topics in advanced econometric analysis such as: (1) cross-section time series pooling; (2) the concept of maximum likelihood, maximum likelihood methods, and computer algorithms; (3) selection of regressors, use of prior information, and Bayesian analysis; (4) qualitative or limited dependent variables; (5) unobservable variables; and (6) the use of nonsample information. *Prerequisites:* ECON 5340 and MATH 4450 or STAT 4020.

5360. Advanced Economic Theory II. 3. dependent variables, simultaneous systems, and Bayesian analysis. Additional topics will be selected based on students' research interests. Possible topics include: time series analysis, methods of estimating nonlinear models, specification, errors in variables, variable parameter models, and causality. *Prerequisites:* ECON 5340 and 5350.

5370. Seminar in Advanced Economics. 1 - 3. (Max 9). An advanced tutorial-conference course intended to give graduate students experience in research in economic problems. *Prerequisite:* consent of instructor.

5400. Advanced Resource and Environmental Economics. 3. An analysis of resource development projects and environmental change. Included are cost-effectiveness analysis and other quantitative techniques used in evaluating resource projects and public policy issues concerning the environment. Prerequisite: ECON 3020, 4400 or consent of instructor.

5410. Seminar in Resource and Environmental Economics. 1-3 (Max. 6). An analysis of resource development projects and environmental change. Included are cost-effectiveness analysis and other quantitative techniques used in evaluating resource projects and public policy issues concerning the environment. *Prerequisite:* ECON 3020 or 4400.

5520. Theory of Public Finance. 3. A survey course covering welfare foundations of public finance, theory of public goods, benefit-cost analysis, fiscal federalism, the economics of taxation (incidence analysis, excess burden and optimal taxes), the U.S. tax system, and tax issues in open economics. *Prerequisite:* ECON 5010, 5020 or equivalent.

5640. Financial Economics I. 3. Focuses on theoretical topics. Covers optimal portfolio selection under uncertainty and differential information as well as fundamental theoretical issues in banking and financial intermediation. In the latter part of the semester, students have an opportunity to present one of the assigned articles in class and lead a discussion on it, with active participation by the entire class. *Prerequisites:* PhD-level microeconomics class (5020) and at least one 4000-level finance class.

5650. Financial Economics II. 1-3 (Max. 6). Topics include corporate finance, capital structure and the theoretical valuation of financial securities; also, asset pricing and financial econometrics. *Prerequisite:* ECON 5640.

5700. Advanced Economic Development. 3. Explores basic growth theory, "economic history" models of economic expansion, theories of natural resource based development and trade-resource models, the role of institutions and public policy in influencing development, and the effects of population, trade and finance on development. *Prerequisites:* ECON 5010, 5020.

5720. Advanced International Economics. 3. Studies the economics of trade between nations. Important trade theories are studied along with their empirical evaluation. Time is devoted to the importance of international trade growth. Government trade policies are given theoretical and empirical evaluation. *Prerequisite:* ECON 5020.

5730. Advanced Regional Analysis. 3. An advanced study or regional economic models. Included are structural and simulation models, regional growth models, and income estimation models. Emphasis is placed on quantitative analysis of regional growth and development. *Prerequisite:* ECON 3010, 3020 and 4600 or equivalents.

5820. Advanced Industrial Organization and Public Policy. 3. An application of market and price theory to concentration, size, competition; antitrust; close-knit and loose-knit combinations; business practices; price leadership and discrimination; delivered pricing; fair trade; unfair competition; and public policy. *Prerequisite:* ECON 5010, 5020, or equivalent.

5830. Empirical Industrial Organization. 3. Focuses on methods of analyzing data and testing hypotheses arising in the field of industrial organization. Much of the material builds on concepts introduced in ECON 5020 along with concepts presented in econometrics classes. Although many of the relevant concepts are primarily covered in ECON 5820, this course can be taken before or without taking ECON 5820. *Prerequisite:* admission to the graduate program in Economics and Finance.

5840. Advanced Public Utility Economics. 3. Explores the contribution that economics can make to government regulation of business. Regulation theory is concerned with defining the goal of economic efficiency and providing rules for achieving it. Specifically covers market structures, systems of incentives, laws and administrative procedures, and economic performance in the field of regulation. *Prerequisite:* ECON 4840 or equivalent.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. Prerequisites: enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Finance (FIN)

5000. Macroeconomics and Management Finance. 3. Introduction to macroeconomics and management finance. Macroeconomics helps define the environment in which firms make financial decisions. *Prerequisite:* ACCT 2010, STAT 2010, MATH 2350 or 2355.

5310. Investment Management and Analysis. 3. The theory of investment management and security values, portfolio management including the analysis of investment policies and objectives, the analysis and use of investment information, and the development and application of the tools for determining values. *Prerequisite:* FIN 5510 and graduate standing.

5320. Corporate Finance and Governance. 3. Designed to provide a framework to analyze issues in corporate finance and governance. The firm is viewed as a nexus of contracts designed to reduce the costs of trade-and corporate finance is regarded as an investigation of the incomplete contracts that involve the providers of capital. *Prerequisites:* FIN 3250 (or equivalent); admission to the Master of finance, Graduate Program in Economics and Finance or Master of Accounting.

5400. Empirical Finance. 3. Involves the application of basic econometric methods to the analysis of financial data. The course is focused on empirical estimation and analysis of theoretical financial models. The study of market microstructure models and other characteristics of financial data are included. Dual listed with FIN 4400. *Prerequisites:* FIN 3250, IMGT 2400 and advanced business standing; graduate standing.

5510. Financial Management. 3. Studies of environmental influences on corporate financial decision making and measurement devices useful in corporate financial management. *Prerequisite:* MATH 2220, STAT 2020, ACCT 2020, COSC 1200 or equivalent; accepted in a graduate program.

5520. Seminar in Finance Theory. 3. Deals with the theory and application of security analysis and portfolio management. *Prerequisite:* FIN 5510 or equivalent; accepted in a graduate program.

5810. Real Estate Appraisal. 3. Covers the basics of appraisal, the three main approaches to valuation, reconciliation, and report. Topics of mass appraisal and multiple regression analysis are also considered. Deals with elements of real estate appraisal as they apply to residential, commercial/industrial and rural real property. Dual listed with FIN 4810. *Prerequisites:* FIN 3250 and advanced business student.

5890. Advanced Problems in Finance. 1-9 (Max. 9). An arrangement whereby a student is permitted to develop an advanced phase of finance not offered in the formally structured courses or to investigate a finance problem, a written report is required. *Prerequisite:* 9 hours in finance and consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Management and Marketing

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JOSEPH T. COOPER, B.S. Case Western Reserve University 1997; M.B.A. 2003; Ph.D. Ohio State University 2009; Assistant Professor of Management 2009.

DAVID M. HUNT, B.S.B.A. University of Arkansas 1990; M.B.A. Colorado State University 1996; Ph.D. University of Missouri 2005; Assistant Professor of Marketing 2005.

MATTHEW F. KEBLIS, A.B. University of Chicago 1986; M.S. Illinois Institute of Technology 1989; Ph.D. University of Michigan 1995; Assistant Professor of Management 2008.

STEPHANIE A. ONETO, B.S. University of Nebraska-Lincoln 1999; M.A. University of Houston 2001; Ph.D. 2007; Assistant Professor of Marketing 2007.

KAREN L. PAGE, B.A. University of Utah 1985; J.D. University of Denver 1988; M.A. University of Colorado 1995; M.A. Stanford University 2000; Ph.D. 2002; Assistant Professor of Management 2002.

MELEA PRESS, A.B. Wellesley College 1996; Ph.D. Pennsylvania State University 2007; Assistant Professor of Sustainable Business Practices 2008.

CRAIG SOROCHUK, B.S. University of Alberta 1995, 1998; M.B.A. College of William and Mary 2004; Ph.D. University of Western Ontario 2009; Assistant Professor of Management and Marketing 2009.

ROBERT D. SPRAGUE, B.S.B.A. University of Denver 1980; J.D. 1985; M.B.A. University of Southern California 1999; Assistant Professor of Management 2004.

Academic Professionals:

R. CLIFFORD ASAY, B.S. Brigham Young University 1991; M.B.A. Portland State University 1998; Assistant Lecturer 2006.

DELBERT E. WELLS, B.A. Northwestern State University 1961; M.A. University of New Mexico 1968; J.D. 1972; Senior Lecturer of Management 1989.

Professors Emeriti:

Robert E. Allen, Anthony F. McGann, J. Brooks Mitchell, Robert G. Roe, Jack C. Routson, Samuel G. Taylor

At present, no program for a graduate degree in management and marketing is offered; however, the department is the primary staffing department for the M.B.A. degree. Some courses at the 4000 and 5000 level may be counted at the graduate level in other degree programs.

Business Administration (BADM)

5100. Foundations in Quantitative Analysis. 3. For MBA students with limited background in quantitative analysis. Topics covered include introductions to business information systems, the mathematics of change, and linear programming. The major emphasis is on statistical methodology commonly utilized for data analysis and decision-making. *Prerequisites:* accepted to a graduate program.

5890. Advanced Problems in Business Administration. 1-6 (Max. 8). An arrangement whereby a student is permitted to develop an advanced phase of administration not offered in formally structured courses or to investigate an administrative problem. A written report is required. *Prerequisite:* 9 hours of 5000-level courses in Department of Management and Marketing, written consent of instructor, accepted in a graduate program.

Decision Sciences (DSCI)

5890. Advanced Problems in Decision Science. 1-8 (Max. 8). An arrangement whereby a student is permitted to develop some advanced phase of decision sciences not offered in the formally structured courses or to investigate a particular decision sciences problem. A written report is required. *Prerequisite:* consent of instructor and acceptance into a graduate program.

Management (MGT)

5600. Graduate Internship in Business. 1-4 (Max. 6). Provides student with practical business knowledge, policy, procedure and decision making. Student works as intern in operating organization. *Prerequisite:* 12 hours of graduate preparatory courses and consent of instructor; accepted in a graduate program.

5890. Advanced Problems in Management. 1-8 (Max. 8). An arrangement whereby a student is permitted to develop some advanced phase of management not offered in the formally structured courses, or to investigate a management problem. A written report is required. Prerequisite: 9 hours in management including one 5000-level course, accepted in a graduate program and consent of instructor.

5920. Continuing Registration: On Campus. 1-2. *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2. *Prerequisite:* advanced degree candidacy.

Marketing (MKT)

5590. Sustainable Business Practices. 3. A close look at what is happening in business practice today through the lens of sustainability. Business models and systems will be discussed and a framework proposed for assessing the ways in which principles of sustainability may be embedded within corporate strategy. Dual listed with MKT 4590; cross listed with INST 4590/5590. *Prerequisite:* advanced business standing.

5890. Advanced Problems in Marketing. 1-8 (Max. 8). An arrangement whereby a student is permitted to develop some advanced phase of marketing not offered in formally structured courses, or to investigate a marketing problem. A written report is required. *Prerequisite:* 9 hours in marketing including one 5000-level course, written consent of instructor, accepted in a graduate program.

Master of Business Administration

162 Ross Hall, 766-2175
FAX: (307) 766-5090
Web site: business.uwyo.edu/EconFin
Department Chairman: Robert Godby

Degrees offered through this program include the Master of Business Administration and the Executive Master of Business Administration (offered via online courses).

Minimum Admission Requirements

Bachelor's degree from a regionally, or preferably, an AACSB International, accredited institution;
Completion of prerequisite courses with a grade of 'B' or better in each course;
Official transcripts of undergraduate coursework sent directly from the school issuing the transcript;
GMAT total score of 550;
Three letters of recommendation from business professionals or university educators;
Professional résumé

Attainment of minimum requirements does not guarantee admission. No application will be considered until all application materials are received. Individuals with at least two years of professional business experience are considered to be preferred candidates. See www.business.uwyo.edu/MBA/Apply_online.asp for an application checklist and links to application documents.

Additional Requirements for International Admissions:

Sufficient financial resources as established by the University of Wyoming. To find the required amount for the current academic year, www.uwyo.edu/UWGrad/pdf%20files/Confidential_Financial_Statement_0304.pdf.

A minimum TOEFL score of 550 on the written exam or 80 on the Internet-based exam. The TOEFL requirement will be waived if you are from an English speaking country or if you have already earned a degree from an accredited institution in an English speaking country. ETS only reports TOEFL scores taken within two years of the date of the request.

Prerequisite Courses

Principles of Accounting I & II (ACCT 1010, 1020) or
Foundations of Accounting (ACCT 5000)
and
Legal Environment of Business (BADM 1040)
and
Business Calculus (MATH 2350)
Mathematical Applications for Business (MATH 2355)
and
Statistical Concepts for Business and Management Science (STAT 2010) or
Quantitative Analysis (BADM 5100)
and
Management and Organization (MGT 3210)
and
Introduction to Marketing (MKT 3210)
Production and Operations Management (DSCI 3210)
and
Managerial Finance (FIN 3250)
and
Managerial Economics (ECON 4030)
and
English Oral Skills (ENGL 2100), (for international students only)

Prerequisite Course Requirements

If the student has earned a non-business undergraduate degree, Foundations of Accounting (ACCT 5000) may be taken in lieu of Principles of Accounting I & II, and Quantitative Analysis (BADM 5100) may be taken in lieu of the two mathematics and statistics courses.

All students admitted to the MBA program must have completed all prerequisite courses with at least a grade of 'B' in each course.

To waive prerequisite courses, students will have their undergraduate transcripts and, on some occasions, course syllabi reviewed to determine whether they have completed course work that is substantially equivalent to the courses listed above.

Normally, prerequisite courses must be taken from an AACSB-accredited institution within the last 10 years. Exceptions to these requirements can only be made by the program director in consultation with the student.

All 'X" (incomplete) grades incurred in prerequisite courses must be removed before final consideration of a student's admission to the program.

Students who have at least 12 hours of prerequisite study to complete may apply and be admitted as "Pre-MBA" and thus be eligible for graduate assistantships. Students with less than 12 hours of prerequisite courses to complete are not eligible for assistantships and should complete the remaining courses before applying to the program.

Graduate Assistantships

Applicants desiring a graduate assistantship should see the program's Web site (www.business.uwyo.edu/MBA/) for applications. Additional information can be found in the Graduate Bulletin at www.uwyo.edu/UWGrad/GraduateBulletin/Misc/Financial%20Support.pdf.

Degree Requirements

39 hours of graduate credit, including a minimum of three hours of Professional Development

The course sequence is highly structured, beginning each May or June and ending the following May. Variations in course offerings will occur in order to keep the curriculum current

Additional Information

Students must maintain a cumulative GPA of 3.0 and not earn a grade lower than 'C' in MBA program courses to remain in good standing. If a student's cumulative GPA falls below 3.0, he or she is automatically placed on probation for the following semester and must raise their GPA to at least 3.0 to avoid dismissal. A student who earns a grade lower than C is dismissed from the program. Graduate GPAs do not include prerequisite courses for purposes of determining good standing in the program.

A maximum of nine semester hours of graduate course work taken at another institution and not applied toward any other degree may be applied to the MBA program subject to regulations regarding transfer of credit and with the approval of the program director.

Students enrolled in the MBA program may not apply credits from the Executive MBA program (courses with an MBAX prefix) to their degree, and vice versa.

Tuition information: http://uwadmnweb.uwyo.edu/UWGrad/tuition&fees.asp

Students must complete the CAPP program in lieu of a program of study.

All MBA students are required to pass the ETS exam during their final semester. The ETS exam is a learning assessment tool, utilized by the college, to ensure that program learning objectives are met.

Course of Study

Sequence subject to change

Summer		***Hrs.***
MBAM	5125	3
MBAM	5130	3
MBAM	5500	1
	Term Total	***7***

Fall		***Hrs.***
MBAM	5200	3
MBAM	5510	3
MBAM	5151	3
MBAM	5220	3
MBAM	5235	3
MBAM	5500	1
	Term Total	***16***

Spring		***Hrs.***
MBAM	5300	3
MBAM	5152	3
MBAM	5500	1
MBAM	5345	3
MBAM	5320	3
First 8 Weeks		
MBAM	5330	1.5
Second 8 Weeks		
MBAM	5331	1.5
	Term Total	***16***
	Program Total	***39***

Master of Business Administration (MBAM)

5100. Introduction of Electronic Business. 1.5. Provides an overview of electronic business as facilitated by the Internet and related technologies. Topics covered include the catalysts for e-business, convergence of technologies and capabilities, technological challenges, legal and regulatory framework, behavior and educational challenges, organizational and business barriers, and strategies for e-business. *Prerequisite:* admission into MBAM Program.

5125. Business Information Systems. 3. Provides foundation for capturing relevant business data through multiple sources, the theory, concepts, and tools to create, interrogate, and manipulate databases, the methodology for successfully managing information systems projects, and skills for evaluating information systems from a business process perspective. *Prerequisites:* admission into MBAM program.

5130. Communication Tools. 3. Designed to improve and evaluate communications skills in a business setting. Focuses primarily on written and speaking skills. Job search skills such as resume writing, interviewing, networking, politics in corporate culture, performance appraisals, gender differences in communication, and intercultural communication are also addressed. *Prerequisite:* admission into Masters level program in the College of Business.

5140. Java Programming. 1.5. Covers WEB programming techniques in JAVA. Building on a basic understanding of programming concepts acquired through previous experience, coursework, or assigned readings, the course will cover data structures, their implementations in JAVA, and other topics. *Prerequisite:* admission into MBAM program.

5150. The Organizational Venture Lifecycle. 1.5. Traces the lifecycle of new organizational ventures using a dual perspective: creation of a new business start-up, and creation of a new business within an already established organization. Important issues include organizational form, assessment of liability exposure, initial financing options, and exit strategies and ownership succession necessitated by the end of the business's life cycle. *Prerequisite:* admission into MBAM program.

5151. New Ventures. 3. Explores and evaluates various intrapreneurial and entrepreneurial opportunities, including business plans. Considers the dynamic business environment characterized by technology, diversity and global enterprise. Students analyze a business opportunity and make a presentation to potential investors. *Prerequisite:* admission into MBAM Program, MBAM 5150.

5152. Financing New Ventures. 3. Concerned with financing ventures from startup to operations. Covers issues important to raising capital for starting a new business or internal operation and discuss financial markets, venture capital, leasing, time-value of money, cash budgeting and the accounting cycle. A formal business plan is developed. *Prerequisite:* admission into MBAM Program, MBAM 5150, MBAM 5151.

5200. Business Research Methods. 3. Provides methods and applications of business research, quantitative data analysis and interpretation. SPSS is the primary software applied. *Prerequisite:* admission into MBAM Program.

5220. Decision Sciences Modeling for Managers. 3. Students study selected computer-based models for solving problems in operations management. Typical tools include forecasting, mathematical programming, and Monte Carlo simulation. Based on Excel and its tools. *Prerequisite:* admission into MBAM program.

5235. Marketing Analysis & Strategy. 3. Understanding market orientation and the strategic marketing process. Uses various tools and secondary data sources to assess current market opportunities/threats. Discusses customer targeting and relationship development, as well as strategic issues of branding, integrated marketing communications, product management, pricing and distribution in various business exchanges. *Prerequisite:* admission into MBAM program.

5300. Seminar in Human Resource Management. 3. Introduces students to a wide range of human resource (HR), organizational behavior, and organizational design issues. Topics include designing organizations, the use of teams in organizational design, job design, and managing in a technology-driven environment. Leadership basics and supervision and the usage of electronic learning tools to demonstrate technology that is transforming HR. *Prerequisite:* admission into MBAM program.

5320. Operational Budget and Financial Statement. 3. Overview of basic concepts for operation/financial planning/budgeting. Financial statements and analytical techniques help determine a firm's strengths/weaknesses. Concerned with the coordination of business activities to achieve strategic objectives. Topics: performance models, balanced scorecard reporting, concepts in efficiency and effectiveness, and financial/nonfinancial performance measures. *Prerequisite:* admission into Executive MBA Program.

5321. Measuring and Evaluting Business Performance. 1.5. Concerned with the coordination of business activities to achieve strategic objectives. Topics include performance models, balanced scorecard reporting, concepts in efficiency and effectiveness, and financial and nonfinancial performance measures. Additionally, linkages between financial and process measures of performance are considered. *Prerequisite:* admission into MBAM program, MBAM 5320.

5330. Global Business Environment. 1.5. Introduction to global macroeconomics and the environment in which global business takes place. Focuses on interest and exchange rates; business cycles; fiscal and monetary policy; budget and trade balances; international organizations central to the functioning of the global economy; and global legal and ethical issues. *Prerequisite:* admission into the MBAM Program.

5331. International Business in Practice. 1.5. Introduces students to various aspects of international business. Areas covered include international business activity and theory, international organizations and the effects of culture on the customer and organizational environments. Product and information flows management for demand creation and fulfillment, ethical issues, and a variety of international business functions. *Prerequisite:* admission into the MBAM Program and MBAM 5330.

5345. Strategic Management in Dynamic Environments. 3. Helps students develop the skills for formulating and implementing business-level, corporate, and global strategies in dynamic environments. Students will master analytical and integrative tools to perform in-depth analyses of industries, firms, and competitors, predict competive behavior, and develop and implement strategies to achieve and sustain competitive advantage. *Prerequisites:* admission into MBAM Program.

5400. Marketing, Markets, and Society. 3. Introduction to the interplay between marketing, markets and society. Issues and controversies for business persons are discussed in an online environment; these are analyzed and synthesized. Developing a wide, long, and integrative viewpoint for forming plans and actions is a principle objective. *Prerequisite:* admission to MBA program.

5500. Professional Development. 1 (Max 3). Designed to bring students in contact with business professionals and provide information and assistance on job search and interview skills. Prerequisite: admission into MBAM Program.

5510. Financial Management. 3. Studies of environmental influences on corporate financial decision making and measurement devices useful in corporate financial management. *Prerequisite:* admission into MBAM program.

5810. Select Topics: Entrepreneurship. 3-9 (Max. 9). For MBA students; consists of an in-depth study of a selected area or areas of business. The specific area(s) to be considered in any given semester is printed in the class schedule. *Prerequisite:* admission into MBA Program.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

Executive Master of Business Administration (MBAX)

5151. New Ventures. 3. Explores and evaluates various intrapreneurial and entrepreneurial opportunities, including business plans. Also considers the dynamic business environment characterized by technology diversity and global enterprise. Students analyze a business opportunity and make a presentation to potential investors. *Prerequisite:* admission into MBAX program.

5200. Business Research Methods. 3. Provides methods and applications of business research. Quantitative data analysis and interpretation. SPSS is the primary software applied. *Prerequisite:* admission into MBAX program.

5225. Decision Science Modeling for Managers. 3. Students study selected computer-based models for solving problems in the areas of operations, finance and marketing. Tools include mathematical programming, Monte Carlo simulation and project management networks. Based on Excel and its tools and covers some of the models necessary to develop and manage successful supply chains. *Prerequisite:* admission into MBAX Program.

5235. Marketing Analysis and Strategy. 3. Understanding market orientation and the strategic marketing process is the goal of this course. Uses various tools and secondary data sources to assess current market opportunities/threats. Discusses customer targeting and relationship development, as well as strategic issues of branding, integrated marketing communications, product management, pricing, and distribution in various business exchanges. *Prerequisite:* admission into MBAX Program.

5300. Seminar in Human Resource Management. 3. Introduces students to a wide range of human resources (HR), organizational behavior, and organizational design issues. Topics include designing organizations, and the use of teams in organizational design, job design, and managing in a technology-driven environment. Leadership basics and supervision and the usage of electronic learning tools to demonstrate technology that is transforming HR. *Prerequisite:* admission into MBAX Program.

5320. Operational Budgeting and Financial Statement. 3. Overview of basic concepts for operation/financial planning/budgeting. Financial statements and analytical techniques help determine a firm's strengths/weaknesses. Concerned with the coordination of business activities to achieve strategic objectives. Topics: performance models, balanced scorecard reporting, concepts in efficiency and effectiveness, and financial/non-financial performance measures. *Prerequisite:* admission into Executive MBA Program.

5321. Measuring and Evaluating Business Performance. 1.5. Concerned with the coordination of business activities to achieve strategic objectives. Topics include performance models, balanced scorecard reporting, concepts in efficiency and effectiveness, and financial and non-financial performance measures. Additionally, linkages between financial and process measures of performance are considered. *Prerequisite:* admission into MBAX Program, MBAX 5320.

5330. The Global Business Environment. 1.5. Introduction to global macroeconomics and the environment in which global business takes place. Focuses on interest and exchange rates; business cycles; fiscal and monetary policy; budget and trade balances; international organizations central to the functioning of the global economy; and global legal and ethical issues. *Prerequisite:* admission into executive MBA Program.

5331. International Business in Practice. 1.5. Introduces students to various aspects of international business. Areas covered include international business activity, theory, and organizations and the effects of culture on the customer and organizational environments, product and information flows, management for demand creation and fulfillment, the international monetary system, and other business functions. *Prerequisite:* admission into MBAX Program, MBAX 5330.

5345. Strategic Management in Dynamic Environments. 3. Helps students develop the skills for formulating and implementing business-level, corporate, and global strategies in dynamic environments. Students will master analytical and integrative tools to perform in-depth analyses of industries, firms, and competitors, predict competive behavior, and develop and implement strategies to achieve and sustain competitive advantage. *Prerequisites:* admission into MBAM Program.

5350. Marketing, Markets, and Society. 3. Introduction to the interplay between marketing, markets and society. Issues and controversies for business persons are discussed in an online environment; these are analyzed and synthesized. Developing a wide, long, and integrative viewpoint for forming plans and actions are a principle objective. *Prerequisite:* admission to EMBA program.

5400. Enterprise Information Systems. 3. Employs various formats to examine the relationship between an organization's resources, events, and agents to create databases that form the centerpiece of ERP systems. Topics include enterprise system integration, representation, and patterns, value system and value chain modeling, information retrieval implementation, and controls. *Prerequisite:* admission into MBAX Program.

5510. Financial Management. 3. Studies of environmental influences on corporate financial decision-making and measurement devices useful in corporate financial management. Cross listed with FIN 5510 and MBAM 5510. *Prerequisite:* admission into MBAX Program.

College of Education

Kay A. Persichitte, Dean
9 Education Building
Phone: (307)766-3145 FAX: (307)766-6668
Web site: ed.uwyo.edu

The seven departments of the College of Education provide support for master's and doctoral degree programs. Faculty and staff work to deliver these programs by providing campus-based courses, courses taught through compressed video, courses taught on-site at different locations in Wyoming, courses taught online, and courses taught in hybrid formats.

The College of Education is dedicated to offering high quality graduate programs that will provide students with the necessary skills to become educational leaders within their areas of specialization and expertise. All graduate students in the College of Education are expected to become scholars, researchers, and practitioners. They must, therefore, be knowledgeable about the ever-changing literature and research in education, the characteristics and needs of learners, and methods for facilitating learning. They must also understand the process of change and how to facilitate changes in learning settings that reflect what is known about the teaching/learning process. These skills are important to all graduate students, regardless of their areas of specialization or major emphasis.

Degree Programs

College of Education programs fall under one of the following university approved degree titles:

- Master of Arts
- Master of Science
- Master of Science in Counseling
- Education Specialist
- Doctor of Education
- Ph.D. in Education
- Ph.D. in Counselor Education and Supervision

The departments in the college are approved to offer one or more of the above listed degrees with specialization in their particular areas. The specializations available are:

- Adult and Post-Secondary Education
- Counselor Education (Counselor Education and Supervision, Community Counseling, School Counseling, and Student Affairs in Higher Education Program)
- Curriculum and Instruction
- Curriculum and Instruction/ Early Childhood Development interdisciplinary concurrent major program
- Educational Leadership
- Instructional Technology
- Special Education

Master's Programs

Currently graduate programs in the college are outcome-based. Faculty in the various specializations work with students to develop individual competencies. Consult each department for current degree requirements and program expectations.

Doctoral Programs

Doctor of Education (Ed.D.)

The College of Education Ed.D. program prepares students for scholarly inquiry and professional leadership in education. The program consists of (1) applied research, (2) courses and professional experiences in education and related fields designed to develop a comprehensive academic basis for leadership roles in education, and (3) applied professional experiences tailored to individual needs and career goals. Each student works closely with an adviser and a supervisory faculty committee to select courses, topics of research, and professional opportunities.

Preparation in the above areas combine to:

- Convey deep scholarly knowledge of education and foster its application in practice;
- Promote a broad understanding of various methods of inquiry in education and foster its application in practice settings;
- Advocate practices that demonstrate a commitment to diversity in education;
- Foster ethical and professional research and practice in education;
- Promote excellence in applied professional practice.

The degree of Doctor of Education (Ed.D.) is offered to competent students who wish to pursue a program of studies and to participate in appropriate activities in preparation for professional service and leadership in education. The program is designed to meet the needs of those for whom intensive research is not a practical prerequisite to professional goals. Doctoral students are expected to participate not only in organized coursework but also in other activities that will ensure breadth of outlook and technical competence.

Options in the Ed.D. are:

- Adult and Post-Secondary Education
- Curriculum and Instruction
- Educational Leadership
- Instructional Technology

Ph.D. in Education

The College of Education Ph.D. program prepares students for careers of scholarly inquiry and teaching in higher education. The program consists of (1) continuous research or inquiry, (2) courses and professional experiences in education and related fields designed to develop a comprehensive academic basis for future work in research and teaching, and (3) teaching and other related experiences tailored to individual needs and career goals. Each student works closely with an adviser and a supervisory faculty committee to select courses, topics of research and inquiry, and teaching experiences.

All coursework in the Ph.D. in Education program addresses the following goals:

- To convey deep scholarly knowledge of education and related fields
- To promote a broad understanding of various methods of inquiry in education and develop competency in several of those methods
- To advocate practices that demonstrate a commitment to diversity in education
- To foster ethical and professional research and practice in education
- To promote excellence as a college teacher

Effective preparation for the Ph.D. stems from collaborative research and inquiry into topics of mutual interest by students and faculty scholars/ researchers. A major portion of the program consists of the individual student and selected faculty members(s) jointly engaged in research and inquiry. Successful Ph.D. applicants tend to have high aptitude for research and inquiry and express interest in general topics which the faculty of the college are actively inquiring and researching.

Options in the Ph.D. in Education are:

- Adult and Post Secondary Education
- Curriculum and Instruction
- Educational Leadership
- Instructional Technology
- Special Education
- Ph.D. in Counselor Education and Supervision

Visit the department's Website for program overview (www.uwyo.edu/cnsled)

Department of Adult Learning and Technology

318 Education Building, 766-3247
FAX: (307) 766-3237
Web site: www.uwyo.edu/alt
Department Head: John Cochenour

Professors:
MICHAEL J. DAY, B.A. University of Maryland (European Division) 1973; B.A. 1976; M.Ed. Wayne State University 1975; Ph.D. University of Michigan 1981; Professor of Adult Education 1993, 1982.

Associate Professors:
JOHN COCHENOUR, B.S. Oklahoma State University 1967; M. Ed. University of Oklahoma 1984; M.L.S. 1984; Ph.D. 1990; Associate Professor of Instructional Technology 1997, 1991.
CLIFFORD HARBOUR, B.A. Rhode Island College 1978; J.D. Ohio Northern University 1981; M.A. Duke University 1987; Ed.D. North Caroina State University 2000; Associate Professor of Adult Education 2008.

Assistant Professors:
DORIS BOLLIGER, B.S. Park University 1991; M.A. Bowie State University 1995; Ed.D. University of West Florida 2002; Assistant Professor of Instructional Technology 2006.
CRAIG SHEPHERD, B.S. Brigham Young University 2002; Ph.D. University of Georgia 2008; Assistant Professor of Instructional Technology 2008.
QI SUN, B.A. Harbin Teacher College 1984; M.Ed. Beijing Normal University 1990; Ed.D. Northern Illinois University 2001; Assistant Professor of Adult Education 2002.

Associate Lecturer:
STEVEN AAGARD, B.S. University of Wyoming 1989; M.A. Washington State University 1991; Ph.D. University of Wyoming 2006; Associate Lecturer 2005.

This nationally recognized program offers the following graduate degrees in education: master of arts (M.A.), master of science (M.S.), educational specialist (Ed.S.), and doctor of education (Ed.D.). The master of arts includes a specialization in adult and post-secondary education. The master of science includes a specialization in instructional technology. Each master's program requires 34 credit hours beyond the bachelor's degree and is available on campus, online, and through a variety of distance delivery systems. The Ed.S is currently under review.

The Ed.D. is the terminal professional degree in education designed for students who desire to improve their professional practice as educators. The Ed.D. requires a minimum of 80 to 82 semester hours beyond the bachelor's degree, of which 36 hours must be taken in the student's chosen field. Candidates may, with the approval of the faculty, transfer up to 30 semester hours from previous graduate level coursework. A bachelor's degree and a master's degree are required of all students to be admitted to an Ed.S. or Ed.D. program.

Program Specific Admission Requirements

Application deadlines and materials can be found on the Adult Learning and Technology Web page (www.uwyo.edu/alt/).

Program Specific Graduate Assistantships

Applicants interested in a Graduate Assistantship must submit a graduate assistantship application to the ALT department office no later than February 1 for fall term admission (see above).

Options Offered

Adult and Post-Secondary Education

The domain or field of adult education is vast and varied, extending from self-directed learning (educational activities initiated and largely conducted by the individual himself or herself) to more formal educational opportunities sponsored by institutions and agencies (such as adult basic education, higher education, enrichment, and professional development). Within the adult education graduate program at UW, this focus is generally narrowed to educational endeavors sponsored by institutions and agencies and specifically designed for adult participants. Areas of study include the following: adult development and learning theories; the social, historical, and global context of adult education; equity and access to continuing education opportunities for adults; and, the development and delivery of post secondary education (including distance education activities such as online courses). Graduate study in adult education addresses the challenges faced by institutions and agencies in the design and delivery of post-secondary education and the preparation of educators to meet these challenges.

Graduates of the program are employed specifically as faculty and administrators in community colleges and universities, human resource developers, adult literacy educators, military training specialists, training coordinators for government and social service agencies (such as the Department of Family Services, the Department of Labor, Family Planning Agencies, and the Eppson Center for Seniors), museum educators, adult learning consultants, and continuing professional educators in many fields including law, religion, nursing, and PK-12 teaching.

Instructional Technology

Instructional technology has been defined as "the systemic and systematic application of strategies and techniques derived from behavior and physical sciences concepts and other knowledge to the solution of instructional problems." This program is dedicated to the preparation of graduates as professionals to practice and lead in this dynamic field. The rapidly changing field of instructional technology demands a flexible program that can meet the needs of professionals interested in learning, designing and developing, training and teaching within a variety of educational settings. Therefore, the ITEC program development is an iterative process designed to keep pace with an eclectic and evolving field and the requests from students for diversity in course offerings and delivery systems.

The knowledge base for students within the program is grounded in the work of numerous researchers and theorists working in the fields of instruction, learning, communication, information and design and includes those who have proposed theoretical models of the connections between the external events of instruction and the internal events of cognition and learning. The theory, research, and resulting instructional principles are addressed in courses in the following areas: (a) instructional design, visual literacy, and change (b) instructional material development and production via different media, and (c) instructional management and implementation and technology integration.

Graduates of the instructional technology program have secured employment in K-12 classrooms; school media and technology centers and school district administrative offices; public, corporate, and governmental media, technology, and information centers and training agencies; college and university faculty and administrative positions; military training facilities; corporate design and development labs; corporate product support teams; and individually owned consulting firms.

Distance Education

The Distance Education option is no longer being offered.

Library Science

The library science specialization is no longer being offered. Please contact the Department of Adult Learning and Technology at (307) 766-3247 for further information.

Program Specific Degree Requirements

Master's Program

Master of Arts in Education, Option: Adult and Post-Secondary Education

Plan A (thesis)

Minimum of 34 hours of graduate credit
- 18 hours of department core graduate hours
- Approval of adviser
- 3 hours of EDRE 5530 Introduction to Educational Research
- 4 hours of thesis research

Plan B (non-thesis)

Minimum of 34 hours of graduate credit
- 4 hours of ITEC 5090 Masters Capstone
- 18 hours of department core graduate hours
- 3 hours of EDRE 5530 Introduction to Educational Research

Master of Science in Education, Option: Instructional Technology

Plan A (thesis)

Minimum of 34 hours of graduate credit
- 15 hours of department core graduate hours
- Approval of adviser
- 3 hours of EDRE 5530 Introduction to Educational Research
- 4 hours of thesis research

Plan B (non-thesis)

Minimum of 34 hours of graduate credit
- 4 hours of ADED 5090 Masters Capstone
- 15 hours of department core graduate hours
- 3 hours of EDRE 5530 Introduction to Educational Research

Education Specialist

This degree is currently under review. Departments are not accepting applications.

A previously earned master's degree, appropriate for the specific program selected, is required of all students admitted to pursue the educational specialist (Ed.S.)

The education specialist committee will consist of at least a member of the Graduate Faculty from that same department, and a member of the Graduate Faculty from outside the major department. The educational specialist's committee must have three members and will ordinarily not have more than five members.

Course work leading to the education specialist degree has been designed for persons who desire additional preparation beyond the master's level but are not interested in pursuing a doctorate.

The Program of Study must include a minimum of 30 semester hours, 15 of which must be in the student's area of specialization. Six of the required hours must be in the form of specifically designated professional activity in education (such as supervision, administration, research, classroom experimentation or technical assistance) and must be directed and supervised by the student's major professor or a designee. Approval of the Program of Study for an Ed.S. student is the admission to candidacy. In accordance with the academic unit's policy or decision of the candidate's graduate committee, the hours earned toward the Ed.S. degree may, under specified conditions, be used to meet the requirements for a doctorate.

Doctoral Programs

Doctor of Education (Ed.D.) in Education, Options: (1) Adult and Post-Secondary Education, or (2) Instructional Technology

Minimum of 80-82 hours of graduate credit beyond the Bachelor's degree is required. Candidates may, with the approval of the faculty, transfer up to 30 semester hours from previous graduate-level coursework. All coursework and degree requirements must be approved by the student's graduate committee. Each student must submit a program of study for approval. The program constitutes an agreement between the student, the student's committee, and the university wherein the minimum coursework requirements for the student's degree are listed. The program should be filed no later than the beginning of the student's second semester. Some summer attendance on campus is expected. Contact the department of your specialization for specific expectations. In addition to organized coursework, the doctoral student will be required to complete an approved applied project report or dissertation within the major field of professional specialization.

Adult Education (ADED)

5000. Trends In Adult Education. 3. Provides reading, discussion, research, and appraisal of new methods, materials, equipment, and experimental programs concerned with the improvement of education as it pertains to adult education. *Prerequisite:* graduate standing.

5020. Survey of Adult Education. 3. Designed as an introduction to the field of adult education; its focus is the general knowledge base upon which the practice of adult education rests; e.g. history and philosophy, adult learning and development, agencies and programs, and problems and issues. *Prerequisite:* graduate standing.

5050. Learning Theories for Education. 3. Learning and development theories are essential for educators who are designing and implementing educational applications and opportunities. Topics covered include orientations toward learning, motivation, life transitions, cognition, learning how to learn, self-directed learning, and strategies for improving learning in educational contexts. *Prerequisite:* graduate standing.

5090. Masters Capstone. 4. Capstone is designed to provide a forum in which to apply theories, principles, and skills to the kinds practice. It provides a vehicle to document the successful completion of general and degree specific competencies and to examine and critique current scholarship in adult education. Students complete the requirements of the Plan B process. Cross listed with ITEC 5090. *Prerequisites:* graduate standing consent of instructor and department head.

5100. Mountain Folk School. 2. Within residential and learning community, this course seeks to strengthen one's relationship with the natural world, increase understanding of cultural heritage, and heighten sensitivity for time and place. Participants explore ways of further developing keener ways of seeing, critiquing, and connecting to the setting and heritage surrounding them. *Prerequisite:* graduate standing.

5240. Teaching Adults. 3. Developed upon the premise that individuals teach as they would expect to be taught. Focuses on methods for teaching adults in formal as well as informal settings. The learning styles literature is reviewed and implications for instructional settings are analyzed. Participants also critique their teaching performance through videotaped sessions. *Prerequisite:* graduate standing.

5260. Educational Issues Race, Class, and Gender. 3. Designed to help participants examine the current issues and debates in the literature of race, class, and gender from theoretical and practical perspectives. Related areas of ethnicity, national origin, sexual orientation, language, physical appearance, body size, and other constructs of difference will also be addressed. *Prerequisite:* graduate standing.

5440. Information Technology. 3. Provides information to help learners efficiently access information electronically. Philosophical, ethical, and management issues as well as technical information on the various mechanisms for electronic access now and in the near future are presented. The analysis of needs combined with knowledge of electronic tools for the purpose of efficiently meeting the information needs of clientele is stressed, as well as knowledge of the appropriate use of electronic products for more specific problems/projects. Cross listed with LIBS 5440. *Prerequisite:* graduate standing and/or consent of instructor.

5450. Short Course In Adult Education. 1-2 (Max. 6). Used for special topics in adult education on the basis of need. *Prerequisite:* graduate standing.

5490. Directed Professional Study. 1-6 (Max. 6). It provides additional opportunity for a student to pursue advanced graduate work through independent research. Projects are done under the direction of a graduate faculty member. *Prerequisite:* graduate standing.

5510. Adult Education Movement in the United States. 3. Provides an opportunity to explore significant works and historical moments in the adult education and instructional technology literature, to analyze the emergence of an adult education movement in the United States, and to participate in local research into the history of Wyoming adult education and instructional technology activities. *Prerequisite:* graduate standing.

5610. Planning and Evaluation of Instructional Systems. 3. Participants investigate the concepts, issues, methods, and attitudes involved in the planning and evaluation of instructional systems. Topics covered include planning processes, theory and technique, promotion, evaluation, setting objectives, and trend analysis. *Prerequisite:* graduate standing.

5660. Community College. 3. Concerns the philosophy, organization, program, and administration of the community college. *Prerequisite:* graduate standing and consent of instructor.

5680. Issues in Higher Education. 3. Through examination of historical foundations and current trends, ADED 5680 delves into pressing issues in the academy, including but not limited to topics of tenure, governance, professional colleges, access and equity, curriculum and international needs. *Prerequisite:* graduate standing.

5710. International and Comparative Education. 3. Introduces foundations and theories of international and comparative education, explores education from global and comparative perspectives. Topics: Historical development, definitions and purposes, current practices and issues of international and comparative education; governmental and non-governmental roles, impact of globalization, technology, economic development, and cultural dimensions as applied to educational contexts. *Prerequisite:* graduate standing.

5880. Special Problems in Adult Education. 1-6 (Max. 9). Provides a broad perspective through selected reading material. Wherever possible, the student collects and uses original information from an adult education/instructional technology setting. All work is done independently under the direction of a faculty member. *Prerequisite:* graduate standing.

5890. Seminar in Adult Education. 1-6. (Max. 8). Advanced students in education work together intensively on current issues and problems relevant to adult education and participate in systematic, critical interpersonal evaluation. Eight hours are permitted on a doctoral program. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Instructional Technology (ITEC)

5010. Instructional Technology. 3. An introductory survey course in instructional technology. Covers psychological principles in communication theory, message design and instructional theory with emphasis on the application of technology toward achieving communications objectives. Includes hands-on experience with current presentation tools and techniques for a variety of instructional deliveries. Dual listed with ITEC 4010. *Prerequisite:* junior standing.

5020. Technology and Distance Education. 3. A survey of the uses of telecommunication systems and other technologies in distance education. Covers instructional strategies, management concerns, and special issues associated with distance learning programs. *Prerequisite:* graduate standing and consent of instructor.

5070. Trends In Instructional Technology. 1-3 (Max. 6). Provides reading, discussion, research and the opportunity to critically appraise potential methods, software, and hardware in the field of educational communications and technology. *Prerequisite:* 12 hours of education, graduate standing, and consent of instructor.

5090. Masters Capstone. 4. Capstone is designed to provide a forum in which to apply theories, principles, and skills to the kinds of situations adult educators may encounter in practice. It provides a vehicle to document the successful completion of general and degree specific competencies and to examine and critique current scholarship in adult education. Students complete the requirements of the Plan B process. Cross listed with ADED 5090. *Prerequisite:* graduate standing.

5120. Media Workshop. 1-6 (Max. 6). Specialized experience in selected areas such as computer technology, multi-image, slide/tape, audio and instructional design. Emphasizes experimental use of materials and development of learning software. The workshop is provided on demand and is flexibly organized and scheduled to meet prevailing needs. *Prerequisite:* ITEC 4220.

5160. Introduction to Instructional Design. 3. An introduction to theory and practice of instructional design. Intensive study of the instructional design process and application of the process to solve an instructional problem. *Prerequisite:* graduate standing.

5320. Visual Literacy. 3. Visual literacy refers to a group of vision-competencies a human being can develop by seeing, and at the same time, integrating with other sensory experiences. Concerned with techniques for developing these competencies and methods by which such development can be encouraged in others. *Prerequisite:* graduate standing.

5350. Photo Instrructional Materials. 3. An introduction to fundamental photographic procedures that teachers, administrators, and others can apply to solve communication problems. Includes the selection of cameras, films, and the appropriate utilization of these and other photographic equipment often found in today's schools and other social institutions. Laboratory time is expected to extend beyond scheduled class hours. A materials fee will be assessed. *Prerequisite:* ITEC 4120 and 4220.

5470. Instructional Video. 3. An introductory course for teachers, media specialists, administrators, and others interested in planning, producing, and using instructional video. *Prerequisites:* graduate standing and consent of instructor.

5480. Short Course. 3. Used to provide offerings in special topics in instructional technology on the basis of need. *Prerequisites:* graduate standing and consent of instructor.

5510. Instructional Telecommunications. 3. An introduction to the instructional applications of telecommunications in public schools, media centers, libraries, and post-secondary institutions. Covers the uses of voice, data, and video transmission for instructional application. *Prerequisites:* graduate standing and consent of instructor.

5550. Theory of Change. 3. Explores the literature and research base within the theories, models, and processes of change, the diffusion of innovations, and the human side of educational reform. Learners explore practical applications of theoretical and research findings to behavioral change, diffusion of innovations, and principles and practices of planned change. *Prerequisite:* graduate standing.

5560. Design and Development of Instructional Systems. 3. Advanced study in instructional systems theory and design. Study and application of instructional design models used in education and training. *Prerequisite:* ITEC 5160, graduate standing, and consent of instructor. Previous course work in educational psychology/learning theory is desirable.

5580. Supervised Internship. 1-8 (Max. 12). An internship experience may be required as part of the planned program in instructional technology. A maximum of eight hours may be counted in meeting the minimum requirements of a graduate degree, but additional credit may be taken beyond this limit for the recording of appropriate supervised experience. This course may not be substituted for practice public school teaching or vice versa. *Prerequisites:* 12 hours of ITEC, consent of instructor and graduate standing.

5660. Interactive Learning Systems. 1-3 (Max. 6). Covers all of the necessary elements to design and evaluate effective and efficient interactive learning systems. Prerequisites: ITEC 5160 or equivalent, graduate standing, and consent of instructor. Previous course work in educational psychology/learning theory is desirable.

5760. Instructional Design Applications. 3. Students engage in the application of principles of instructional design in a real-world setting. Students will be involved in classroom and field experience. *Prerequisite:* ITEC 5160 or 5560.

5850. Issues, Practices, and Research in Instructional Technology. 3. A survey course covering issues, practices, and associated research in instructional technology. *Prerequisite:* graduate standing.

5870. Seminar. 1-3 (Max. 6). Advanced students in education work together, intensively, on current issues and problems relevant to instructional technology, and participate in systematic, critical interpersonal evaluations. *Prerequisites:* graduate standing and consent of instructor.

5880. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and, wherever possible, the student collects and uses original information from a practical school situation. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisites:* graduate standing and consent of instructor and consent of department.

5890. Directed Professional Study. 1-6 (Max. 9). Similar to ITEC 5880 and provides additional opportunity for students to pursue advanced degree work through independent research. Projects are done under the direction of a graduate faculty member. *Prerequisites:* graduate standing and consent of instructor and consent of department.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for student whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). P*rerequisite:* graduate standing.

Library Science (LIBS)

5320. Selection of Instructional Materials. 3. A study of basic principles and practices in the selection of print and non-print materials for utilization in school and public libraries. Emphasis is given to the evaluation of materials in light of community needs and principles of intellectual freedom. Dual listed with LIBS 4320. P*rerequisite:* 20 hours of general education (liberal arts).

5340. Administration of the School Library/Media Center. 3. Deals with finance, housing, personnel, the collection, records, and services of the school library/media center. Instruction in the use of the library and publicity or educational interpretation concerning the library are also discussed. Dual listed with LIBS 4340. *Prerequisite:* LIBS 4320/5320, 4380/5380, or major in educational administration.

5360. Reference and Bibliography. 3. An introduction to the basic materials used in reference and information services. The philosophy of reference services is presented with particular attention to the needs of schools, community colleges and public libraries. Dual listed with LIBS 4360. *Prerequisite:* 20 hours of general education (liberal arts).

5380. Cataloging and Classification. 3. Introduction to the theories and practices of cataloging and classification. Emphasis is on the Dewey Decimal system; subject cataloging from the Sears headings; descriptive cataloging of monographs, serials, and nonprint materials; filing rules. Practice in cataloging and classification of materials. Dual listed with LIBS 4380. *Prerequisite:* 20 hours of general education (liberal arts).

5440. Information Technology. 3. Provides information to help learners efficiently access information electronically. Philosophical, ethical, and management issues as well as technical information on the various mechanisms for electronic access now and in the near future are presented. The analysis of needs combined with knowledge of electronic tools for the purpose of efficiently meeting the information needs of clientele is stressed, as well as knowledge of the appropriate use of electronic products for more specific problems/projects. Cross listed with ADED 5440. *Prerequisite:* graduate standing and/or consent of instructor.

5520. Teaching the Use of the Library. 2. Methods for teaching students basic techniques for effective use of library media center resources. Integration of library media center instruction with the total instructional program is emphasized. Relationship between stages of cognitive and other development and appropriate learning activities. *Prerequisite:* LIBS 4320/5320 and LIBS 4380/5380.

5870. Seminar. 1-3 (Max. 6). Advanced students in Library Science work on current issues and problems in library service, management, literature, or uses of technology in library settings in a critical context. Prerequisite: Course work in library science at the 4000/5000 level; graduate status and/or consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* Advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes. *Prerequisite:* graduate standing.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Intership. 1-12 (Max. 24). Prerequisite: Graduate standing.

Department of Counselor Education

332 Education Building, 766-2366
FAX: (307) 766-3720
Web site: www.uwyo.edu/cnsled
Department Head: Mary Alice Bruce

Professors:
MARY ALICE BRUCE, B.S. Purdue University 1971; M.S. Iowa State University 1989; Ph.D. 1991; Professor of Counselor Education 2007, 1991.

Associate Professors:
KENT W. BECKER, B.S. Oklahoma State University 1982; M.A. University of Northern Colorado 1990; Ed.D. 1994; Associate Professor of Counselor Education 2003, 1998.

Assistant Professors:
SERENA LAMBERT, B.A. Linfield College 1991; M.A. University of Montana 1999; Ph.D. Idaho State University 2005; Assistant Professor of Counselor Education 2005.
DEBORAH MCGRIFF, B.S. University of Nebraska—Lincoln 1976; M.S.W. University of Nebraska—Omaha 1981; Ph.D. University of Wyoming 1999; Assistant Professor of Counselor Education 2002.
MICHAEL M. MORGAN, B.S. Brigham Young University 1993; M.S. Auburn University 1995; Ph.D. Purdue University 2003; Assistant Professor of Counselor Education 2003.
JANE WARREN, B.A. University of Wyoming 1974; M.A. 1979; Ph.D. 1987; Assistant Professor of Counselor Education 2007.

Degrees Offered

- M.S. in Counseling, Option: Clinical Mental Health Counseling
- M.S. in Counseling, Option: School Counseling
- M.S. in Counseling, Option: Student Affairs and College Counseling
- Ph.D. in Counselor Education and Supervision

Counselor education offers a two-year (61-65 semester hours) master's degree program for practice in schools, colleges, universities, and community agencies. The Council for Accreditation of Counseling and Related Educational Programs (CACREP), the national accrediting body recognized by the Council for Higher Education Accreditation, has conferred accreditation to the following M.S. specializations in counseling: school counseling, clinical mental health counseling, as well as student affairs and college counseling. The Ph.D. program is also CACREP accredited. Some courses are offered for undergraduates interested in school counseling, group work, leadership, and student affairs work. Undergraduates interested in preparing for entry into graduate work in counseling are invited to consult with program faculty prior to graduation. Program information is available on the Web site.

Program Specific Admission Requirements

For master's applicants:

Summary of academic background
Professional resume
Self-statement
Three letters of recommendation

For doctoral applicants:

Professional resume
Self-statement
Program information form
Three letters of recommendation
Counseling session video recording

Background check. Applicants are asked to sign a release form allowing program representatives to complete the background check. Because of the personal nature of counseling as a profession, a background check may be undertaken to assist the faculty in determining the appropriateness of the candidate for the field of counseling.

Program Specific Graduate Assistantships

Assistantships are usually available for doctoral students. Master's students sometimes qualify for assistantships. Please contact the department at (307) 766-2366 for assistantship opportunities.

Program Specific Degree Requirements

Master's Programs

Plan A (thesis)

Minimum requirements: same for all options
65 hours of graduate credit to include 40 hours of core courses, 21 hours of graduate coursework specific to chosen option, and 4 hours of thesis research
Planning, development, and production of a Plan A thesis guided by the committee chair and graduate committee
Students must complete the CAPP program in lieu of a program of study

Plan B (non-thesis)

Minimum requirements: same for all options
61 hours of graduate credit to include 40 hours of core courses and 21 hours of graduate coursework specific to chosen option
Planning, development, and production of a Plan B portfolio project guided by the committee chair and graduate committee
Students complete the CAPP program in lieu of a program of study

Program Core Requirements

Core Courses

CNSL	5310	3
CNSL	5210	1
CNSL	5060	3
CNSL	5650	3
CNSL	5170	3
CNSL	5350	3
CNSL	5110	3
CNSL	5180	3
CNSL	5200	3
CNSL	5140	3
CNSL	5320	3
CNSL	5873	3
CNSL	5150	3
EDRE	5530	3
CNSL	5640	3
	Core Subtotal	***43***

School Counseling

CNSL	5120	3
CNSL	5330	3
CNSL	5340	3
CNSL	5610	3
CNSL	5580	6
	Subtotal	***18***

Student Affairs and College Counseling

CNSL	5250	3
CNSL	5620	3
MGT	4410	3
CNSL	5580	6
ADED	5680 or	3
ADED	5660	3
	Subtotal	***18***

Clinical Mental Health Counseling

CNSL	5130	3
CNSL	5610	3
CNSL	5880	3
CNSL	5580	6
CNSL	5330	3
	Subtotal	***18***

Thesis

CNSL	5960	4

Minimum Total Credit Hours

Plan A	***65***
Plan B	***61***

Program Core Requirements: Core Courses

Doctor of Philosophy in Counselor Education and Supervision

Doctoral students are required to have completed a minimum of a 48-hour Master's degree from a program of study equivalent to a CACREP accredited Masters program in Counselor Education. These requirements are based upon the 2009 CACREP Standards.

Learning Outcome Areas

Advanced Foundations

Ph.D. students with a 48-hour CACREP equivalent Master's degree are required to complete 12 semester hours of courses beyond their Master's preparation (in consultation with their adviser and committee). Ph.D. students with a 60-hour CACREP equivalent Master's program can petition up to 12 hours of their Master's coursework to fulfill this requirement.

Counseling and Supervision

CNSL	5860	6
CNSL	5865	3
CNSL	5875	3

Teaching, Leadership and Advocacy

CNSL	5880	12
CNSL	5900	3
CNSL	5990	6

Research and Scholarship

12 credits chosen from the following (or equivalent) in consultation with major adviser and graduate committee.

EDRE	5600	3
EDRE	5610	3
EDRE	5620	3
EDRE	5630	3
EDRE	5640	3
EDRE	5650	3

Dissertation

EDRE	5660	3
CNSL	5890	12
	Total	***72***

Counseling (CNSL)

5010. Introduction to Addictions. 2. Introduces students to the many faces of addictions by providing a general overview of the impact alcohol, drugs, and other addictions issues have on individuals seeking counseling. *Prerequisite:* graduate standing.

5020. Workshop. 1-4 (Max. 99). Usually offered only during summer sessions, this course provides an opportunity for special consideration on particular areas of counseling or pupil personnel services. *Prerequisite:* graduate standing, nine hours of education or behavioral science.

5030. Short Course. 1-2 (Max. 12). Provides opportunities for intensive study of some specific topic or set of topics in personnel work, to meet the special needs of a group of students with common interests. No more than six hours may be applied to any one degree program. *Prerequisite:* graduate standing and 6 hours in education and/or behavioral sciences.

5040. Relationship Skills. 3. Designed to help students and administrators develop their human relation skills to improve interpersonal effectiveness and communication as related to generic life skills. Dual listed with CNSL 4040. *Prerequisite:* 12 hours of education and/or psychology.

5060. Counseling Ethics and Professional Issues. 3. Designed to provide students with a philosophical base for making ethical decisions in the professional situations they encounter. In addition, it involves a chance to discuss many specific ethical and professional issues that are commonly encountered in the profession. *Prerequisite:* program admission or consent of instructor.

5100. Addictions and Diversity. 3. Focuses on increasing students' understanding of diversity issues in the prevention and treatment of alcohol, drug abuse, and other addictions. *Prerequisite:* six hours in administration of justice, psychology, sociology, or social work at the 4000 or 5000 level.

5110. Group Procedures. 3. Designed as an introduction to group work used in various organizational settings. Basic group techniques and procedures are covered using lecture/discussion methods, video, observation, and participation in practicing group leadership skills. Participation in a group experience during the course is required. *Prerequisites:* CNSL 4520/5520, six semester hours of education and/or psychology, consent of instructor, and graduate standing.

5120. School Counseling. 3. Provides specialized training for individuals preparing to be school counselors at levels K-12. *Prerequisite:* graduate standing.

5130. Mental Health Counseling. 3. Encompasses specific counseling and professional development issues encountered by licensed counselors working in mental health agencies or private practice. Understanding the nature of the clientele and the issues, strategies for resolving client difficulties, collaborative practice, ethics, advocacy, knowledge and skills related to diversity and social justice are considered. *Prerequisites:* enrollment in Counselor Education program, successful completion or enrollment in CNSL 5060, 5650 and 5310.

5140. Counseling & Addictions. 3. Focuses on students acquiring specialized knowledge of assessment and multi-disciplinary treatment of chemical and other addictions. *Prerequisite:* six hours in administration of justice, psychology, sociology, or social work at the 4000 or 5000 level.

5145. Dual Diagnosis: Counseling Implications. 3. Designed to prepare counselors to assess, diagnose, and treat co-morbid substance abuse/dependence and other Axis 1 mental health problems for persons seeking counseling. Offered satisfactory/unsatisfactory only. *Prerequisite:* graduate standing or mental health practitioner.

5150. Organizational Leadership and Consultation. 3. Focuses on providing participants with an understanding of the role of the consultant and program management in working with schools, families and community organizations. Emphasis is on principles, methods, and models of consultation and management. Student application within a chosen professional area will be encouraged. *Prerequisite:* graduate standing, eight hours in counseling and consent of instructor.

5160. Etiology of Alcohol and Drug Dependency. 3. An introduction to issues pertaining to the etiology of alcohol and drug dependency. Emphasis is on genetic, psychological and sociocultural causes of chemical addiction. Cross listed with PSYC 5160. *Prerequisite:* PSYC 2210, CNSL 4520/5520 or equivalent.

5170. Career Lifespan. 3. Offers an overview of human lifespan functioning with a primary focus on psychosocial development and counseling and career development across the lifespan. Additionally, this course presents the opportunity to examine the role of career and its influences on personal development. *Prerequisites:* none.

5180. Assessment in CNSL. 3. Emphasis is on counselor development for facilitating client self-understanding through the application of various assessment procedures and knowledge about educational information systems and tools. *Prerequisite:* graduate standing, 15 hours in education and/or behavioral sciences.

5200. Couple and Family Theory. 3. Provides students with a foundation in conceptualizing and working with couple and family systems. Areas to be addressed include the history of couple and family counseling, ethical issues, professional orientation and an introduction to major systems theories. Participants are expected to explore their own family of origin. *Prerequisite:* admission to program.

5210. Group Experience. 1. Designed to provide a structured growth group experience through both in-class experience and reading. It is designed for students involved in human relationship fields. In-class groups are led by advanced group counseling students under the supervision of the faculty instructor. *Prerequisites:* graduate standing and consent of instructor.

5250. Theories of Student Development. 3. Philosophical views, theories and models for the design, structuring and development of comprehensive programs of college student personnel services are investigated. Roles, functions and contributions are studied as are institutions context and environment in which student personnel services function. *Prerequisite:* graduate standing or permission of instructor.

5300. Couple and Family Ethics. 1. Provides in-depth exploration of ethical issues in working with couples and family systems. Designed to complement 5060 which provides a foundation in ethics. *Prerequisite:* graduate standing.

5310. Pre-Practicum. 3. The first semester of a one-year sequence focused on learning, developing and practicing the fundamental process of counseling. Students do role-playing and have supervised experience with clients in a laboratory setting. Individual supervision is provided. Individual, live and observation of supervision is extensive. *Prerequisite:* graduate standing, program approval.

5320. Practicum. 3. Second course in a two semester sequence which includes class work, supervised counseling with clients in laboratory, extensive individual, group, live and observational supervision. *Prerequisites:* graduate standing, CNSL 5310, program approval.

5330. Counseling Children and Adolescents. 3. Students increase knowledge and skills in the processes of counseling children and adolescents. *Prerequisite:* six hours in education and/or behavioral sciences.

5340. Play Therapy. 3. Provides students with an overview of the field of play therapy. The historical roots of play therapy and the importance of play in child development will be explored. Various play therapy theories and techniques for assessment and intervention and professional issues will be surveyed. *Prerequisite:* CNSL 5330.

5350. Multicultural Counseling. 3. Increases counselor competency and skills with diverse clients. Prerequisite: admission to the UW counseling program.

5400. Advanced Methods in Couple and Family Therapy. 3. Provides advanced training in couple and family counseling, with an emphasis on the linkage between prominent systemic and non-systemic theories/models and relevant, effective and innovative intervention techniques. Serves as a link between theory (CNSL 5200) and practice (CNSL 5600). *Prerequisites:* graduate standing and CNSL 5200.

5410. Elementary and Middle School Guidance. 2. An introduction primarily for teachers, teachers-in-training and counselors, covering individual and group guidance and counseling techniques in the elementary and middle school. Emphasis is placed on the role of teachers and counselors in providing guidance, counseling, and experiences for children to promote their social, emotional, and psychological growth. Dual listed with CNSL 4410. *Prerequisites:* 6 hours of education and/or behavioral sciences and graduate standing.

5490. Individual Problems. 1-6 (Max. 6). Provides flexible credit for students who wish to undertake intensive study of a special problem identified in a regular classroom or area of study not currently covered by a regular class. *Prerequisites:* consent of instructor and department, and graduate standing.

5500. Couples and Marriage Therapy. 3. Provides participants with knowledge and skills specific to working with couples and partners in the areas of relationship and marital therapy. A variety of methods are used to support participants in becoming more effective in working with both "traditional" and "non-traditional" relationships in addressing issues of intimacy. *Prerequisite:* CNSL 5200.

5510. Trends and Issues. 1-4 (Max. 4). This course is used from time to time as a systematic means for students to explore a developing trend or issue related to personnel services. Students make in-depth studies of one or more issues, trends, practices, and applications, under the supervision of one or more instructors. *Prerequisite:* graduate standing, and 15 hours in education and/or behavioral sciences.

5520. Fundamentals of Counseling. 3. Beginning course in the basis and process of counseling. Exposes students to some of the skills of counseling and enables them to develop an understanding of the elementary principles of counseling theory as well as a better understanding of themselves in relation to other people. Dual listed with CNSL 4520. *Prerequisite:* 6 hours of education or psychology and graduate standing.

5580. Supervised Internship. 1-6 (Max. 16). Provides a capstone clinical experience, preparing graduates to enter the practice of counseling PK-12 schools, mental health settings, and student affairs services in higher education. Students engage in professional counseling activities at approved placement sites. *Prerequisites:* graduate standing, CNSL 5310, 5320 and consent of the designated field setting authority.

5610. Advanced Practice in Group and Family Counseling. 3. Designed to provide a theoretical framework for understanding group dynamics and family systems, as well as offer intervention guidelines, best practices, and supervised experience in group leadership and family counseling. *Prerequisites:* program admission and consent of instructor.

5620. Organization and Administration in Student Affairs. 3. An introduction to college student affairs practice, specifically exploring issues related to the organization and administration of student personnel services. Explores the history, the philosophy, and the skills utilized in student personnel services within the context of various higher education institutions and settings. Dual listed with CNSL 4620. *Prerequisite:* department consent.

5640. Diagnosis and Developmental Psycopathology. 3. Introduction to college student affairs practice, specifically exploring issues related to the organization and administration of student personnel services. Explores the history, the philosophy, and the skills utilized in student personnel services within the context of various higher education institutions and settings. *Prerequisites:* department consent.

5650. Counseling Theories. 2-3 (Max. 3). Designed to increase understanding of major counseling theories, with an emphasis on the integration of theoretical and philosophical assumptions with personal viewpoints. *Prerequisites:* previous or concurrent enrollment in CNSL 4520/5520 or equivalent, admission to counseling program, consent of instructor.

5655. Advanced Counseling Theories. 2. Designed to stimulate in-depth examination and research into existing counseling theories essential to developing a personal theoretical orientation to counseling. *Prerequisite:* advanced graduate standing.

5740. Field Studies in Counselor Education. 1-12 (Max. 12). Offered only through college extension services. It is flexible and is utilized to meet local needs in the state. Credit in this course is not applicable toward advanced degrees in counseling. *Prerequisites:* graduate standing, permission of instructor and program director.

5860. Doctoral Practicum in Counselor Education. 1-8 (Max. 8). Enrollment is limited to five graduate students per instructor. In this practicum, advanced graduate students are given an intensive supervised experience in counseling students over an extended period of time. The actual counseling experience is supplemented by input and evaluation seminars for all enrollees and by supervisory conferences designed to improve sensitivity and skill in counseling. *Prerequisites:* admission to the doctorate program in counseling, mastery of basic interviewing and counseling skills, and consent of instructor.

5865. Supervision Theory. 3. Provides students with the theoretical, knowledge and research base of clinical supervision as it relates to the counseling profession. *Prerequisite:* CNSL 5860.

5870. Seminar. 1-6 (Max. 12). Advanced students work together intensively on current issues and problems and participate in systematic, critical interpersonal evaluation. Seminars are organized with various patterns of emphasis and provide for a variety of small group experiences related to curricular areas within the department. *Prerequisites:* consent of instructor and graduate standing.

5873. Research in Counselor Education. 3. Study of research in the field, including development of knowledge and skills in analyzing, designing and conducting research in typical field settings. *Prerequisite:* graduate standing, and 15 hours in education and/or behavioral sciences.

5875. Doctoral Practicum in Supervision. 1-6 (Max. 6). Designed to provide the prospective counseling educator or supervisor with an understanding of the learning process in counseling and the supervisory behaviors requisite for improving the competencies and professional growth of counselors. Specialized knowledge, skills, and attitudes related to the act of supervising are supplemented by various methods and techniques such as videotape, films, filmtape synchronization, simulation material, role-playing, group dynamics, communication games, interpersonal recall, interaction and content analysis, and micro-counseling. *Prerequisites:* CNSL 5860, graduate standing, and consent of instructor.

5880. Special Problems. 1-9 (Max. 9). Provides a broad perspective through selected reading material. Wherever possible the student collects and uses original information from a practical work situation. All work is done independently under the direction of a faculty member. A minimum of three conferences are held as necessary to assure successful completion of the project. *Prerequisites:* consent of instructor and department head, and graduate standing.

5890. Directed Professional Study. 1-9 (Max. 9). Similar to CNSL 5880. Provides additional opportunity for students to pursue advanced graduate work through independent research. Projects are done under the direction of a graduate faculty member. *Prerequisites:* consent of instructor and department head, and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 16). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Curriculum and Instruction

Educational Studies
213 McWhinnie Hall, 766-3130
Phone: (307) 766-3130
Web site: www.uwyo.edu/edstudies

Elementary and Early Childhood Education
313 McWhinnie Hall
Phone: (307) 766-6366
Web Address: www.uwyo.edu/elemed

Secondary Education
114 McWhinnie Hall
Phone: (307) 766-3275
Web Address: www.uwyo.edu/seced

Curriculum and Instruction Offerings

The master of arts and doctor of education in education with an option in curriculum and instruction are offered by three departments in the College of Education that collaborate to deliver the degrees: Educational Studies, Elementary and Early Childhood Education, and Secondary Education. A doctor of philosophy is being offered through the College of Education. These degree programs consist of required courses in curriculum and in research with a choice of electives chosen for their curricular emphasis. A graduate student in curriculum and instruction may choose a curricular emphasis in any of the following areas: agriculture, art, early childhood education, early childhood special education, English, English as a Second Language (ESL), literacy, mathematics, modern languages, music, science, and social studies.

Master of Arts in Education, Option: Curriculum and Instruction with an Emphasis in Teacher Certification

This program provides a post baccalaureate student the opportunity to earn a teaching certification while taking hours that lead to a master's degree. The intent is to provide distance learning opportunities required for this master's program after the certification is earned.

Master of Arts in Education, Option: Curriculum and Instruction

Educators wishing to broaden their theoretical understanding of curriculum and instruction, to increase their knowledge and skills in their content areas, and to develop new strategies and materials for their classrooms should consider this specialization.

Ed.D. in Education, Option: Curriculum and Instruction

Advanced graduate students in professional education who wish to become leaders in early childhood, elementary, or secondary education should consider the Ed.D. degree in education with an option of curriculum and instruction.

Program Specific Requirements

Applicants for the master of arts degree in curriculum and instruction must have a teaching certificate and one year of successful teaching experience at the PreK-12 level in addition to the general requirements of the university.

Applicants for the doctor of education (Ed.D.) degree with an option of curriculum and instruction must have a teaching certificate, three years of successful teaching experience at the K-12 level, composite score of 900 (for Ed.D.) on the verbal and quantitative sections of the Graduate Record Examination (note: GRE scores are valid for five years from the test date), and meet the general requirements of the university.

Program Specific Degree Requirement

Master's Degree

The master of arts requires a total of 32 credit hours minimum.

Master of Science in Education, Option: Curriculum and Instruction/Early Childhood Development

Please refer to Early Childhood Development section of this bulletin for degree requirements.

Doctoral Program

There is a minimum of 80 credit hours required for completion of the Ed.D.

Prerequisites for Program/transfer credits/ electives
- A minimum of 30 hours of courses, or equivalents, may already be completed in master's
- Master's degree (required)
- 3 years teaching experience (required)
- EDRE 5530 (required) Introduction to Research

Program knowledge base/core courses (15 hours)
- EDCI 5600 (required) Diversity in Education
- EDCI 5730 (required) ..... Learning Theories: Research & Praxis
- EDAD 5720 (required) Educational Leader as Change Agent
- EDAD 5650 (required) Educational Leader as Communicator
- EDRE 5660 (required) Proposal Writing

Advance research courses (minimum 9 credit hours advanced research coursework; suggestions in menu below; some course work in both qualitative and quantitative research is required; research courses, with, with doctoral committee approval, can be taken outside the College of Education)

EDRE 5600 Ed Research 1: Descriptive
EDRE 5610 Ed Research 2: Group Comp.
EDRE 5620 Ed Research 3: Correlational
EDRE 5630 Ed Research 4: Multivariate
EDRE 5550 Action Research
EDRE 5640 Intro to Qual Research
EDRE 5650 Advanced Qual Res Methods

Practicum/Internship (2 hours, to be determined with doctoral committee)
EDCI 5580 (required) Internship

C & I Specialization (minimum 18 credit hours/ approved by doctoral committee)
EDCI 5800 (required) Curriculum Development
EDCI 5790 (required) Advanced Instructional Strategies

Problem based dissertation (6 credit hours)
EDCI 5980 (required) Dissertation Research

Certificates

Teachers of American Indian Children

In this graduate program the, University of Wyoming certifies that those who complete its five specialized courses possess the attitudes, knowledge, and competence necessary to effectively teach American Indian Children. Upon completion, students will receive official recognition of their achievement on their University of Wyoming transcripts and an official certificate.
Required program courses:
EDCI/AIST 5450 – Issues in Multicultural Education
EDCI/AIST 5110 – Educational Foundations of American Indian Education*
EDCI/AIST 5121 – History and Philosophy of American Indian Education*
EDCI/AIST 5130 – Cultural Foundations of American Indian Education*
EDCI/AIST 5141 – Instructional Methods in American Indian Education*

(The pattern of course offerings that begins in 2009 will be continued in semesters through 2012.)
*Cross-listed with American Indian Studies (AIST) Department

Literacy

The University of Wyoming Curriculum & Instruction Program, with the support and cooperation of the University of Wyoming's Outreach School, will offer the required courses in the graduate literacy program via compressed video. Compressed video sites will be determined at time of class registration. The program is designed to serve graduate level K-12 teachers in Wyoming who wish to obtain the Wyoming Reading Endorsement, and those who choose to apply the course work toward a master's or doctoral degree in Curriculum & Instruction. Graduate degree course numbers and full graduate tuition apply.

The required courses total 15 credits, with 3 additional credits chosen from a list of electives for a total of 18 credits. The required courses are offered according to an established schedule and will follow a similar format with compressed video sessions and one or two intensive weekends. They will be offered in continuous rotation as long as demand exists. Students will be responsible for meeting and documenting the state standards in literacy for the level of endorsement chosen.

Required Courses

EDCI 5710 [5070]: Advanced Content Area Reading (3 credits)
EDCI 5720: Literacy Assessment and Practices (3 credits)
EDCI 5750: Research in Reading and Writing Instruction (3 credits)
EDCI 5750: Research in Reading and Writing Instruction(3 credits)
EDCI 5760 [5870]: Social Literacies (3 credits)
EDEC 5320 [4320]: Advanced Oral & written Language Development (3 credits)

Elective

EDCI 5870: Seminar: Beginning Reading - Research, Instruction and Intervention (3 credits)

Endorsements

Literacy Program Leading to Reading Endorsement

The K-12 Literacy Program leading to a Wyoming Reading Endorsement at the University of Wyoming is designed to meet the state's 12 approved reading program standards and to support teachers as they help K-12 students read, write, and speak in meaningful ways. The literacy program content totals 18 credits and includes language, literacy, and assessment as they are understood in a sociocultural context. Contact the Department of Elementary and Early Childhood Education at (307) 766-6366 for more information on specific courses and their rotation.

English as a Second Language Endorsement

The English as a Second Language (ESL) endorsement is designed to meet the ten state of Wyoming standards for teaching second language learners. It is offered in conjunction with departments in the College of Arts and Sciences. For information about the endorsement program (course requirements, practicum, course offerings, etc.), visit the ESL Web site at: ed.uwyo.edu/endorse_cert/esl/.

Early Childhood Education

Early childhood education is an emphasis within the curriculum and instruction option for master's and doctoral programs of study. Courses specific to this area are EDEC 4320 and 5210 and others may be applicable.

Early Childhood Special Education

State certification in early childhood special education is offered through an interdisciplinary program that is supported by the colleges of Education, Agriculture, Arts and Sciences, and Health Sciences. The curriculum reflects a multidisciplinary approach and is competency based, developed according to both national and state standards for certification. The certification program is offered at a graduate level to persons already possessing a bachelor's degree in education or any other field supportive of the certification. There are a total of 28 credits required for program completion. Students may apply for a master of arts in curriculum and instruction and use these certification courses as their electives. Courses specific to this area are EDEC 4320, 4350, 5220, 5230, 5240, and 5250. Please refer to the above mentioned colleges for further course options.

Curriculum and Instruction (EDCI)

5000. Principles of Curriculum. 3. Provides an overview of general understandings fundamental to the study of all aspects of curriculum to include pre-school, kindergarten thru high school. Consideration is given to the various factors, institutions and societal issues that impinge on and affect the decision making processes of curriculum developers. *Prerequisite:* graduate standing in education.
5010. Supervision of the School Music Program. 2-4 (Max. 4). Two sections: vocal; instrumental. Designed for graduate students who have a background in music education and for other interested graduate students in education. *Prerequisite:* 12 hours of education and graduate standing.
5020. Curriculum Workshop. 1-4 (Max. 4). Two sections: vocal; instrumental. Designed for graduate students who have a background in music education and for other interested graduate students in education. *Prerequisite:* 12 hours of education and graduate standing..
5070. Educational Trends. 1-6 (Max. 6). Provides reading, discussion, research, and appraisal of new methods, materials, equipment, and experimental programs concerned with the improvement of education as it pertains to curriculum and instruction. The maximum allowable credit applies to the total offerings under this number. *Prerequisite:* 12 hours of education courses.

5110. Foundations of American Indian Education. 3. Examines cultural, geographical, linguistic, spiritual, political and societal factors before, during and after colonization of the Americas. Definitions and day-to-day realities of terms like ethnocentrism, cultural relativism, assimilation, acculturation, and institutional racism. Development of insights into positive teacher-pupil-community relationships that honor culture and language differences and enhance achievement. Dual listed with EDCI 4110; cross listed with AIST 5110. *Prerequisites:* AIST 1001 and 15 credit hours of AIST or EDST.

5120. Literature For Young Adults. 3. Designed for prospective and working library media specialists and teachers who wish to strengthen their backgrounds in the utilization of literature with young adults in classrooms and libraries. Involves reading and critiquing literature. Dual listed with EDCI 4120. *Prerequisite:* senior level or graduate standing.

5121. History and Philosophy of American Indian Education. 3. Addresses the history of Indian education in the U.S. and Canada, examination of missionary initiatives, government programs, and tribal efforts. Review of documentary accounts of Native education, review autobiographical accounts of Native teachers and children. We will develop insight necessary for development of appropriate teaching methods and materials. Cross listed with AIST 5121. *Prerequisites:* Post-Baccalaureate standing.

5130. Cultural Foundations of American Indian Education. 3. In-depth study and analysis of the educational experiences of American Indians, focusing on contemporary educational issues and experiences, examining the impacts of cultural orientations, stereotypes, bias and other issues on the educational attainment of American Indian students. Critique instructional practices and programs developed addressing the needs of American Indian students. Cross listed with AIST 5130. *Prerequisites:* Post-Baccalaureate status.

5140. Storytelling. 3. An investigation of storytelling as an art and as an aid to instruction. Emphasis is on literature for preschool and elementary age children. Dual listed with EDCI 4140. *Prerequisite:* junior standing or EDCI 4120 is recommended.

5141. Instructional Methds in American Indian Education. 3. Addresses culturally responsive methodologies for teaching American Indian students, review of documentary accounts of Native education and autobiograhical accounts of Native teachers and children as students develop appreciation of the complexity and difficulties of Native education. Students acquire insight necessary for development of appropriate teaching methods and materials. Cross listed with AIST 5141. *Prerequisites:* Post-Baccalaureate status.

5160. Recent Trends in Children's Literature. 2. Important new developments in the subject matter, settings and style of children's books are identified and studied. Students in this course are expected to have a strong basic knowledge of children's literature. Dual listed with EDCI 4160. *Prerequisite:* EDCI 4120.

5205. Methods of Teaching Middle-Level Mathematics. 3. Research based pedagogy and pedagogical content knowledge for teaching middle-level mathematics. Designed for practicing teachers of middle-grades mathematics. Cross Listed with NASC 5205. *Prerequisites:* admission to the SMTC program.

5215. Using Instructional Technology for Middle-Level Mathematics. 3. Covers the use of technology appropriate to middle-level mathematics teaching, such as microworlds, geographic information systems, spreadsheets, and other content appropriate technologies. Cross Listed with NASC 5215. *Prerequisites:* admission to the SMTC Program.

5225. Assessment for Middle-Level Mathematics. 3. Middle-level Mathematics Initiative teacher participants examine, analyze, and implement a variety of assessments that are aligned with standards and instruction appropriate to the middle level math learner. Cross listed with NASC 5225. *Prerequisites:* admission to the SMTC program.

5250. Advanced Topics in Pedagogy. 3. A graduate level seminar to be taken concurrently with undergraduate methods courses in specific content areas (EDSE 425X-4260, EDEL 4309) EDCI 5250 is restricted to students pursuing teacher certification leading to a Master of Arts in Curriculum and Instruction. *Prerequisite:* Successful completion of EDCI 5550, EDST 3500, EDCI 5870, Seminar in Assessment, earned Bachelor's degree from an accredited institution.

5270. Seminar for Early Career Teachers. 3. Provides an opportunity to engage in critical issues facing beginning teachers as well as to address pressing challenges faced. Provides an opportunity for mutual support and academic engagement around these critical issues as well as propel the beginning teacher further into the teaching profession. *Prerequisite:* teaching credentials required.

5300. Perspectives In Reading Instruction. 3. Designed to provide an intense examination of reading instruction for the large number of students in typical classrooms. The teaching and learning of basic reading skills is analyzed and discussed. Reading materials, alternative approaches to reading instruction, and classroom organization schemes are examined. A major thrust of the class is the application of current developments in reading to classrooms.

5310. Reading Comprehension Processes and Instruction. 3. Designed to acquaint the student with recent developments, research findings, and newer practices. Viewpoints expressed by experts are compared, and an emphasis is given to the objectives of knowledge and to an understanding of attitude and skills. *Prerequisite:* graduate standing.

5320. The Writing Process in the Classroom. 3. Designed to acquaint the student with recent developments, research findings, and newer practices in the area of composition. Viewpoints expressed by experts are compared and an emphasis is given to the objectives of knowledge and to an understanding of attitudes and skills. *Prerequisite:* graduate standing.

5350. Introduction to Second Language Acquisition. 3. Addresses theoretical and conceptual foundations of working with second language learners. Classroom applications of this theoretical base to interactions with English language learners, curriculum, instruction, assessment and evaluation, classroom organization, and school-community relations. Native American language revitalization issues are featured. Dual Listed with EDCI 4350. *Prerequisite:* graduate standing.

5390. Literature and Reading/Writing Instruction. 3. Links the use of literature for children with instruction and practice in reading, writing, spoken language, and critical thinking skills. Students are expected to have a strong background knowledge of literature for children before taking this course. Dual listed with EDCI 4390. *Prerequisite:* EDEL 2280, or basic children's literature course work.

5400. Midpoint Portfolio Reflection. 1. Allows students to reflect, self-assess, and receive guidance related to their progress in the C&I Master's Program. Requirements include: self assessment of progress toward the C&I program outcomes, completion of a series of research abstracts, formation of the students' graduate committees and approval of programs of study. *Prerequisites:* admission to the Curriculum and Instruction Master's Program and completion of at least 12 hours of EDCI coursework.

5430. Theory and Methods of ESL I. 3. Provides an overview of theoretical and practical considerations in the teaching of English as a second/foreign language; acquaints students with different approaches, methods and procedures in TESL/TEFL; examines issues in the profession; requires a teaching/tutoring component. *Prerequisite:* EDCI 5350.

5440. Theory and Methods of ESL II. 3. Continues the theoretical and practical considerations in the teaching of ESL. Emphasis on Specifically Designed Academic Instruction in English (SDAIE) and literacy development for intermediate and advanced English language learners. Application of different approaches, methods, and procedures in TESL/TEFL. Development of curriculum. Issues in the profession. Requires teaching/tutoring component. *Prerequisites:* EDCI 5430.

5450. Issues in Multicultural Education. 3. Provides future and inservice teachers and other interested students with a better understanding of current issues and social foundations of multicultural America. Enables more accurate educational decisions related to utilizing strengths and diversity of each cultural group. Additional assignments are required of students completing this course for graduate credit. Dual listed with EDCI 4450. *Prerequisite:* 12 credit hours of education classes.

5480. Short Course. 1-6 (Max. 6). Provides offerings in special topics in curriculum and instruction on the basis of need. The maximum allowable credit is six semester hours. *Prerequisite:* 6 hours of education courses.

5490. Individual Problems. 1-6 (Max. 6). Provides flexible credit for seniors who may need the credit for graduation, or for students who wish to undertake intensive study of a special problem identified in a regular class. *Prerequisite:* 12 hours of education courses and consent of instructor.

5500. Classroom Assessment. 3. Provides reading, discussion, and research examining a variety of classroom-based assessments with a focus on the alignment of teaching, learning, and classroom assessment at the P-12 level. *Prerequisite:* graduate status.

5510. Improvement of Instruction In:. 1-3 (Max. 12). This series of courses is designed to acquaint the student with recent developments, research findings, and newer practices in each of the fields listed. Viewpoints expressed by experts are compared, and an emphasis is given to the objectives of knowledge and to an understanding of attitudes and skills. *Prerequisite:* graduate standing and consent of instructor.

5515. National Board Certification Seminar. 1-3 (Max. 12). Provides information and support for teachers in the National Board Certification process. Content includes: reviewing, understanding, and applying best practice research; development of differentiated instruction; integration of formative assessment and reflective practice; understanding problem solving across the curriculum; and focuses on writing strategies for National Board Certification success. *Prerequisites:* graduate student standing.

5550. The Art and Science of Teaching. 4. Students will engage in a variety of experiences related to teacher decision making. Students research a variety of curriculum and instruction topics to discern the range of theories and associated models and develop personal theories and methods they plan to employ in their classrooms. *Prerequisite:* successful completion of EDST 4000 and earned Bachelor's degree from an accredited institution.

5560. Seminar in Assessment. 1. One credit hour course is designed for students in the (post baccalaureate) teaching credential program with master's option. Covers important concepts of assessment such as teachers as graders, self- and peer-assessment techniques, standardized assessment instruments, challenges facing new teachers, using assessment for planning/modifying instruction to improve learning experiences, and differentiated assessment in diverse classrooms. *Prerequisites:* successful completion of (grade C or higher) or concurrent registration in EDST 3550 or EDST 3500.

5580. Internship. 1 - 8. (Max 12). An internship experience may be required as part of the planned program in curriculum and instruction. A maximum of eight hours may be counted in meeting the minimum requirements of a graduate degree, but additional credit may be taken beyond this limit for the recording of appropriate supervised experience. *Prerequisite:* 15 hours of education, consent of department head, and graduate standing.

5600. Diversity in Education. 3. Provides practicing teachers and graduate level students with an understanding of the macrolevel influences on diversity in education. Includes an examination of competing models of diversity in education as well as reviews critical scholarly work in the field (including alternative methodological frameworks for engaging in this research). Includes competencies for developing advocacy-oriented skills and dispositions. Prerequisite: graduate level students only.

5650. Early Childhood Secondary Education Curriculum. 3. Graduate students specializing in curriculum and instruction work intensively on key issues, questions, and/or themes pertaining to early childhood through secondary school curriculum and participation in systematic, critical, interpersonal evaluation. *Prerequisite:* EDCI 5000 or concurrent enrollment in EDCI 5000.

5700. Institute In Reading. 2-6 (Max. 6). *Prerequisite:* graduate standing.

5710. Advanced Content Area Reading. 3. Designed to provide educators with a knowledge of reading factors as they relate to various disciplines. The content of the course includes reading comprehension development, writing and oral language strategies as learning tools, techniques for vocabulary development, questioning strategies and development of study skills. *Prerequisite:* at least one year of successful classroom teaching experience in a recognized K-12 school setting.

5720. Literary Assessment and Practices. 3. Takes a socio-linguistic perspective on language, literacy, and methods of literacy documentation: The constructs of assessment and evaluation are critically examined in terms of their social contexts and the cultural space in which they operate. *Prerequisite:* at least one year of successful teaching experience in a recognized K-12 school setting.

5750. Research in Reading and Writing Instruction. 3-6 (Max. 6). Critically examines reading-writing research for the express purpose of recognizing fundamentals of superior studies. Students are encouraged to select and pursue a topic in reading-writing research for intensive examination. Students may pursue areas of emphasis in elementary, secondary, or higher education. *Prerequisite:* EDEC 4320 or EDCI 4330, 5310 or 5320 or graduate standing in education.

5760. Social Literacies. 3. Orients students toward an ethnographic and linguistic perspective on literacy. It is designed to refocus attention from schooled literacy and to understand the literacies that children bring to school from their own sociocultural contexts. *Prerequisite:* at least one year of successful classroom teaching experience in a recognized K-12 school setting.

5790. Advanced Instructional Strategies. 3. Designed to allow graduate students and other educators to explore in depth the various instructional strategies that are available to them, research behind the development of these strategies, learning theories and the philosophy upon which they are based, curriculum standards that have encouraged their development, and assessment techniques that effectively measure student's learning. *Prerequisite:* graduate standing and classroom teaching experience.

5800. Curriculum Development. 3. The process of developing an early childhood through grade 12 curriculum are learned. Factors involved in initiating, developing, and evaluating curricula are studied. *Prerequisite:* EDCI 5000 and 5650.

5810. Writing for Professional Publications. 3. Designed to give students a structured experience with writing to publish in professional journals. Students will be expected to have written and submitted a publishable article by the end of the course. Satisfactory/unsatisfactory only. *Prerequisite:* 8 hours of graduate coursework completed.

5870. Seminar. 1-6 (Max. 8). Advanced students in curriculum and instruction work intensively on current issues and problems and participate in systematic, critical interpersonal evaluation. Students may pursue areas of emphasis in elementary, secondary, or higher education in the seminar. Only six hours may be allowed in the curriculum and instruction program on a student's program under this number. P*rerequisite:* consent of instructor and graduate standing.

5880. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and, wherever possible, the student collects and uses original information from a practical school situation. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisite:* consent of instructor and department head, and graduate standing.

5890. Directed Professional Study. 1-6 (Max. 9). Provides additional opportunity for the student to pursue advanced graduate work through independent research. Projects are done under the direction of a graduate faculty member. Offered in the areas of business education and distributive education. *Prerequisite:* consent of the instructor, the department head and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Early Childhood Education (EDEC)

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing and psychology. Cross listed with FCSC, NURS, PSYC, HLED, SPPA 5115. *Prerequisite:* graduate standing.

5210. Early Childhood Education. 2-3 (Max. 3). An advanced professional course for students interested in current practices, curriculum, and research in the field of early childhood education. *Prerequisite:* B. A. in elementary education.

5220. Children with Disabilities: Birth to Five 3. Purpose is to introduce students to the effects of a disability on the development of the young child. Recent research in the area of early childhood special education will be examined. Educational implications will be emphasized. *Prerequisite:* Bachelor's degree in education.

5230. Curriculum and Materials: Children with Disabilities. 3. Involves the study and development of curriculum strategies appropriate for the child with disabilities from birth through age five. *Prerequisite:* graduate standing.

5240. Evaluating Young Children with Disabilities. 3. Prepares students to select, administer, and interpret evaluation tools appropriate for planning with young children with disability. *Prerequisite:* graduate standing.

5250. Legal Issuues in Special Education. 2. Introduces students to the legal issues surrounding the education of young children with disabilities. The intent and implications of P.L. 99457 will be explored and examined to better assist the specialist in serving children with disabilities and their families. *Prerequisite:* EDEC 5220.

5320. Advanced Oral and Written Language Development. 3. Focuses on how humans come to know language structure (written and oral) and language use as a part of a social, cultural, and personal experience during their histories from birth through adolescence. The course involves students in work showing that language development is a lifelong process. *Prerequisite:* at least one year of successful classroom teaching experience in a recognized K-12 school setting.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Elementary Education (EDEL)

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Industrial Education (EDIE)

5070. Educational Trends. 2. Designed to provide reading, discussion, research, and the appraisal of new methods, materials, equipment, and experimental programs concerned with the improvement of education as it pertains to industrial education. Each department in the college may make offerings under this number; the maximum allowable credit for each department is 6 semester hours. *Prerequisite:* 12 hours of education.

5540. Technology and Society. 2. Designed for industrial arts teachers and teacher education students (however, it should be of equal value to all who teach and live in this technological society). The purpose of the course is to develop an understanding of the dynamic interaction between technology and society and responsibility in directing the changes of our future. Emphasis will be on the problems and promises of technology as related to the social problems of today and tomorrow. *Prerequisite:* graduate standing.

5880. Special Problems. 1-6 (Max. 9). Designed to provide a broad perspective through selected readings and, wherever possible, the student collects and uses original information for a practical school situation. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. Offered in the area of industrial education. *Prerequisite:* graduate standing.

5890. Directed Professional Study. 1-6 (Max. 9). Similar to EDIE 5880. Provides additional opportunity for the student to pursue advanced graduate work through independent research. Projects are done under the direction of a graduate faculty member. Offered in the area of industrial education. Prerequisite: consent of department head and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). *Prerequisite:* advanced degree candidacy.

5980. Dissertation Research. 1-12 (Max. 48). *Prerequisite:* advanced degree candidacy.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Secondary Education (EDSE)

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Agricultural Education (EDAG)

5320. Workshop in Vocational Education. 2.
5360. Seminar in Vocational Education. 3.
5410. Short Course. 1-2 (Max. 6).
5760. Seminar in Fresch Vocational Education. 3.
5870. Seminar. 1-6 (Max. 8).
5880. Special Problems. 1-6 (Max. 12).
5890. Directed Professional Study. 1-6 (Max. 9).
5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.
5960. Thesis Research. 1 - 12. (Max 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.
5980. Dissertation Research. 1 - 12. (Max 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.
5990. Internship. 1 - 12. (Max 24). *Prerequisite:* graduate standing.

Department of Educational Leadership

316 Education Building, 766-5649
FAX: (307) 766-5638
Web site: www.uwyo.edu/edleadership
Department Head: Suzanne Young

Professor:
WILLIAM G. BERUBE, B.S. Mayville State College 1973; M.S. North Dakota State University 1980; Ed.D. University of Wyoming 1985; Professor of Educational Leadership 2003, 1996, 1990.
SUZANNE YOUNG, B.S. Metropolitan State College 1978; M.S. University of Northern Colorado 1990; Ph.D. 1995; Professor of Educational Leadership 2007, 1996.

Assistant Professors:
HEATHER DUNCAN, B.Sc. University of Aberdeen, Scotland 1975; M.Ed. Brandon University, MB 2000; Ph.D. University of Saskatchewan, SK 2004; Assistant Professor of Educational Leadership 2005.
MARK STOCK, B.S. Wright State University 1979; M.S. 1985; Ed.S. Ball State University 1995; Ed.D. 2002; Assistant Professor of Educational Leadership 2007.

The Department of Educational Leadership offers a master of arts and a doctor of education with an option in educational leadership. The department also offers programs leading to a Certificate of Principal Endorsement (K-12). A graduate certificate in School Principalship is offered through the Principal Endorsement Program.

Program Specific Admission Requirements

Candidates for a master's degree in education with a specialization in educational leadership, in addition to the admission requirements of the university, must complete a selection process which may include assessment in the following areas: teaching experience, a writing sample, and faculty interview.

Candidates for the doctor of education degree, in addition to the admission requirements of the university, must complete a selection process which may include the following prerequisites and assessment in the following areas: hold a master's degree, writing sample, and faculty interview.

Candidates for the University Graduate Certificate in School Principalship offered through the Principal Endorsement Program must file a university application with the Admissions Office, if not concurrently enrolled in a graduate program at the University of Wyoming. In addition, candidates must complete a selection process which may include assessment in the following areas: master's degree in an education related area from an accredited institution, writing sample, and faculty interview.

Program Specific Degree Requirements

Students must follow Graduate minimum requirements.

The endorsement is 21 credits which includes the four core classes, 3 credits each: EDAD 5010, EDAD 5020, EDAD 5030, EDAD 5040, an internship, EDAD 5580, 6 credits, and EDRE 5530 Intro to Research, 3 credits.

Educational Administration (EDAD)

5010. Leadership for Curriculum Development. 3. The main learning outcome is curriculum development with topics including educational and cultural foundations, curricular outcomes, K-12 alignment, standards and community values, developing, managing, and evaluating curriculum, multicultural education, equal access (special education, gifted and talented, ESL, poverty, sex ed., character ed., etc.), academic freedom, and censorship. *Prerequisite:* graduate standing.
5020. Leadership for School Organization. 3. Focus is on school organization with topic areas including school culture, community building, models for strategic planning, school governance/operations, site-based management, ethics and morality, budgeting and resource allocation, scheduling, school buildings and facilities, student rights, religious expression, and equal access. *Prerequisite:* graduate standing.
5030. Leadership for Communication and Personal Development. 3. Focus is on communication and personnel development. Topics include recruitment, selection, induction, supervision, and evaluation of staff, models of supervision, staff development and models of professional development, conflict management, politics, power and policy, public relations and communication, and employment law related to teachers and classified staff. *Prerequisite:* graduate standing.
5040. Leadership for Instruction. 3. Focus is on teaching and learning with topic areas including mission, vision, and goal development, improvement of instruction, school improvement, research in school improvement, assessment and testing, models of instruction, integrating technology in the classroom, and privacy and confidentiality issues. *Prerequisite:* graduate standing.
5050. Leadership for Democratic Schools. 3. Designed to increase awareness of future school leaders of the principles of equity and excellence in education focused on democratic practices. Topics include democratic educational practices, ethical leadership, renewal of public schools, and educational leadership in urban, suburban, and rural communities, and in ethnically and socio-economically diverse settings. *Prerequisite:* graduate standing.

5060. Capstone in Educational Leadership. 3. Designed to assist the student in the creation of their master's program final project, which will be used as the written demonstration of mastery of the course outcomes as well as meeting the educational leadership (ELCC) standards. *Prerequisite:* complete Core (EDAD) courses.

5070. Educational Trends. 1-6 (Max. 8). Provides reading, discussion, research, appraisal of new methods, materials, equipment procedures, and experimental programs concerned with the improvement of professional education as it pertains to educational administration. The maximum allowable credit applies to the total offerings under this number. *Prerequisites:* graduate standing, teaching experience, 12 semester hours in education.

5100. Human Relationships in Educational Leadership. 6. Designed to encourage students to gain a deeper understanding of their own beliefs and an understanding of leadership issues through concentrated study as members of a cohort group with a team of faculty. *Prerequisites:* admission to Principal Preparation Program and graduate study.

5150. Assessment, Accountability, and Student Learning. 3. Focuses on the knowledge and skills necessary to lead schools in the alignment of standards, assessment, and instruction. Topics include analysis and interpretation of assessment results and educational data, recent history and current context of educational accountability in Wyoming, role of assessment and accountability in improving student learning. *Prerequisite:* graduate standing.

5200. Educational Leadership and Organizational Management. 3. Designed to encourage students to gain a deeper understanding of the principal as an organizational manager. Topics include school law, budgeting, facilities planning, climate and policy development. *Prerequisites:* admission to Principal Preparation Program and graduate standing.

5300. Educational Leadership and Personal Development. 3. Designed to encourage students to gain a deeper understanding of the principal as a personnel developer. Topics include empowerment, staff development, supervision of instruction, evaluation and team building skills. *Prerequisites:* admission to Principal Preparation Program and graduate standing.

5400. Instructional Leadership. 6. Designed to develop instructional leadership in aspiring principals. Topics include situational leadership, quality schools, outcome-based education, curriculum development, assessment of learning and instruction, technology, change and effective schools. *Prerequisites:* admission to the Principal Preparation Program and graduate standing.

5410. Short Course in Educational Administration. 1-6 (Max. 6). Used for special topics in educational administration on the basis of need. *Prerequisites:* six hours of education and/or consent of instructor.

5420. School Administration Workshop. 1-5 (Max. 5). Workshop designed mainly for the experienced school administrator who desires to acquire the latest information about developments in various areas of education. It is devoted to the intensive study of major problems and issues confronting school administrators. *Prerequisites:* 12 hours of educational administration and graduate standing and/or consent of instructor.

5490. Directed Professional Study. 1-6 (Max. 9). Similar to EDAD 5880 and provides additional opportunity for a student to pursue advanced graduate work through independent research. Projects are done under the direction of a graduate faculty member. *Prerequisite:* consent of instructor and department, and graduate standing.

5500. Communication in Educational Leadership. 3. Designed for students to attain the knowledge and skills and to develop the attitudes congruent with the principal as an effective communicator. Topics include inter- and intra-personal communication skills, school and community relations, analysis of school and community power bases and group process skills. *Prerequisites:* admission to Principal Preparation Program and graduate standing.

5580. Supervised Internship in Educational Administration. 1-8 (Max. 12). An internship experience may be required as part of the planned program in educational administration for the elementary principalship, the secondary principalship, and the superintendency. A maximum of four hours may be counted in meeting the minimum requirements of a graduate degree, but additional credit may be taken beyond this limit for the recording of appropriate supervised experience. *Prerequisites:* 8 hours of education administration courses, 15 hours of education, consent of department, and graduate standing.

5600. Educational Leader as Manager of Human Resources. 3. Focuses on linking theory related to organizations (including Bureaucracy Theory), decision-making and organizational effectiveness with effective practices in management of organizational personnel. *Prerequisite:* graduate standing.

5650. Educational Leader as Communicator. 3. Focuses on inter- and intra-personal communication skills; group facilitation; organization and community public relations; parent and community involvement; negotiation; and conflict management. *Prerequisite:* graduate standing.

5700. Educational Leader For Instruction. 3. Focuses on the study of curriculum development and implementation, instructional practice, assessment and staff development. *Prerequisite:* graduate standing.

5720. Educational Leader as Change Agent. 3. Focuses on the study of change theory, change processes, change dynamics, decision-making models, and implementation of change in the organization setting. *Prerequisite:* graduate standing.

5750. Educational Leader for the Board and Community. 3. Concentrates on the administrator as the leader of an organization's board and community. *Prerequisite:* graduate standing.

5800. Educational Leader as Resource Manager. 3. Focuses upon the successful management and operation of the organizations fiscal resources, facilities, and support services. Includes work in the areas of transportation, food service, funding and budget, compensation, facilities, legal issues, calendar, special education, and policy influence. *Prerequisite:* graduate standing.

5820. Educational Leader as Developer of Human Resources. 3. Focuses on linking the literature and theory of motivation, decision-making, team building, and organizational effectiveness to the implementation of effective practices in the areas of personnel empowerment. *Prerequisite:* graduate standing.

5850. Educaitonal Leader as Direction Setter. 3. Investigates how the educational leader can effectively create a futuristic vision and mission for the organization after assessing the existing culture and climate, and organizational readiness for change. *Prerequisite:* graduate standing.

5870. Seminar in Legal Issues. 1-6 (Max. 8). Advanced students in education work together intensively on current issues and problems relevant to educational administration and participate in systematic, critical interpersonal evaluation. Eight hours are permitted on a doctoral program. *Prerequisite:* consent of instructor and graduate standing.

5880. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and wherever possible the student collects and uses original information from a practical school situation. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisite:* consent of instructor and department, and graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes. Prerequisite: advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12. (Max 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

Educational Research (EDRE)

5000. Educational Research. 3.

5530. Introduction To Research. 3. Purpose is to develop graduate students into intelligently critical consumers of research through their understanding of both qualitative and quantitative methodologies employed in educational research and analysis of existing research of both types. *Prerequisites:* 15 hours of education courses and consent of instructor.

5550. Action Research. 3. Introduces experienced classroom teachers to action research methodology. Action research studies will be reviewed and critiqued. Students will learn to plan, implement, and write up an action research study conducted in a classroom setting. *Prerequisite:* graduate standing.

5580. Supervised Internship. 1-8 (Max. 12).

5600. Educational Research I: Descriptive Research. 3. Covers basic concepts of educational research design, statistics, and measurement. The focus is on univariate descriptive statistics. Students learn to develop survey instruments and questionnaires, plan survey studies, and conduct appropriate statistical analyses. *Prerequisite:* graduate standing.

5610. Educational Research II: Group Comparison Research. 3. Covers intermediate concepts of educational research design, statistics, and measurement. The focus is on bivariate descriptive statistics and inferential statistics. Design and analysis of results from group comparison studies. Construction of attitude scales and cognitive assessment instruments used in research. *Prerequisite:* EDRE 5530 and 5600.

5620. Educational Research III: Correlational Research. 3. Advanced educational research, statistics, and measurement course. Focus is on the design and analysis of results from correlational studies with several independent variables. Statistical topics include nonparametric statistics, multiple regression, factorial ANOVA, and factor analysis. Includes advanced topics in classical measurement theory. *Prerequisite:* EDRE 5530, 5600, and 5610.

5630. Educational Research IV: Multivariate Research. 3. An advanced educational research, statistics, and measurement course. Design and analysis of results from studies with several dependent and independent variables. Includes multivariate statistics such as MANOVA, discriminant analysis, canonical correlation, multidimensional scaling, structural equation modeling, logit regression. Measurement topics include generalizability theory, item response theory, equating, and standard setting. *Prerequisites:* EDRE 5530, 5600, 5610, and 5620.

5640. Introduction to Qualitative Research. 3. Research methods course provides an introduction to the use of qualitative or interpretive research methods in the collection and analysis of data. Students will examine primary research as well as secondary research sources which represent a variety of theoretical and methodological viewpoints. *Prerequisites:* graduate standing and EDRE 5530.

5650. Advanced Qualitative Research Methods. 3. Students examine the role of theory in qualitative research; develop expertise in particular qualitative research designs; study and practice data collection and analysis methods; examine and practice writing reports of results. Students engage in a fieldwork project. *Prerequisites:* EDRE 5530 and 5640.

5660. Research Proposal Writing. 3. Designed to prepare graduate students to plan, develop, and write research proposals suitable for thesis/dissertation, or for submission to funding agencies. Students will focus on their own problem for research, conduct a literature review, choose appropriate methods for investigating the problem, and write a research proposal. *Prerequisites:* graduate standing, 6 credit hours of research methods.

5870. Seminar. 1-8 (Max. 8).

5880. Special Problems. 1-6 (Max. 9).

5890. Directed Professional Study. 1-6 (Max. 9).

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Department of Special Education

113 McWhinnie Hall, 766-6325
FAX: (307) 766-4064
Web site: www.uwyo.edu/sped
Department Head: Martin Agran

Professors:

MARTIN AGRAN, B.A. City College of New York 1969; M.A. University of Rochester 1971; M.S. Oregon College of Education 1974; Ph.D. University of Illinois 1982; Professor of Special Education 2005.

JOHN STELLERN, B.A. University of California-Berkeley 1955; M.A. California State University-Los Angeles 1961; Ed.D. University of Northern Colorado 1966; Professor of Special Education 1973, 1969.

Associate Professor:

DOROTHY JEAN YOCOM, B.A. Whitworth College 1978; M.S. University of Oregon 1980; Ph.D. Oregon State University 1991; Associate Professor of Special Education 1997, 1991.

Assistant Professor:

ELIZABETH S. SIMPSON, B.A. University of Wyoming 1984; Ph.D. Auburn University 2000; Assistant Professor of Special Education 2001.

Senior Lecturer:

KAY COWIE, B.S. Northern State University 1968; M.S. 1970; Associate Lecturer 2004, 2000, 1997.

Professor Emeritus:

Ace Cossairt

The Department of Special Education offers a master of arts in education with a specialization in special education, and alternative master of arts in education with a specialization in special education, a K-12 Certification in special education, and a doctor of philosophy in education with a specialization in special education.

Program Specific Admission Requirements

Current resume is required.

A copy of current Wyoming Teaching Certificate.

Undergraduate and graduate transcripts. Official transcripts from all post-secondary institutions sent to the Admission office. A bachelor's degree from an accredited school is required. Schools must be accredited by the Council for Higher Education, or equivalent. A cumulative minimum GPA of 3.25 on previous coursework is required for full admission We do not require official transcripts from UW. Undergraduate GPA is used as a measure of academic ability.

A three to four full page single-spaced writing sample.

Submission of a three page writing sample discussing the applicant's academic goals and philosophy of education.

Three letters of recommendation from qualified references. One letter is requested from a current or former professor, who can comment on the applicant's potential to benefit from a graduate-level certification program. (Only one of these letters may be from a University of Wyoming Special Education faculty member.)

On campus interview is required. The department will schedule interviews once a year.

Signed Prospectus- the Prospectus must be reviewed and signed. Students will be responsible for being aware of the information listed in the Prospectus.

Program Specific Degree Requirements

Special Education Masters Program course progression

There are three tracks that a student may chose to earn a master's degree. Track I is for full-time students only. Track II is for students who cannot dedicate 15 hours per semester to their academics. Track III is for students who wish to take only one course per semester. All Special Education courses are offered either online or through compressed video within Wyoming only.

Track I

Track I is recommended for full-time students. The Special Education Department requires that courses be taken in the following sequence. Courses may not be taken out of sequence.

Fall

EDEX	5071	3
EDEX	5080	3
EDEX	5720	3
EDEX	5355	3
EDEX	5100	3

Spring

EDEX	5000	3
EDEX	5110	3
EDEX	5120	3
EDEX	5150	3
or		
EDEX	5530	3
EDEX	5200	3

Summer

EDEX	5250	3

Track II

Track II is recommended for part-time students. The Special Education Department requires that courses be taken in the following sequence:

Fall I

EDEX	5355	3
EDEX	5070*	3
or		
EDEX	5080*	3

Spring I

EDEX	5110	3
EDEX	5120	3

Summer I

EDEX	5250	3
EDRE	5530	3
EDRE	5150	3

Fall II

EDEX	5720	3
EDEX	5070*	3
or		
EDEX	5080*	3
EDEX	5100	3

Spring II

EDEX	5000	3
EDEX	5200	3
EDEX	5150	3

*Pick either EDEX 5070 or EDEX 5080

If a student chooses to write a Plan A paper, both research classes (EDEX 5150, EDRE 5530) will be required plus the 4 additional credit thesis hours and the program is 40 total hours. * If a student chooses to write a Plan B paper, EDEX 5150 will be optional and the program is 33 total hours. Twelve credit hours of credit can be used toward a degree program at a later date, upon approval of the student's graduate committee members. A student may choose between EDEX 5150 Classroom Research or EDRE 5530 Intro to Research. EDEX 5150 is offered each spring semester.

Master's Degree in Education Option: Special Education

Track III

(One class per semester)

Track III is recommended for part-time students - one class per semester. The Special Education Department requires that courses be taken in the following sequence. Please note that all requirements for the master's degree must be completed by the end of the summer semester in the sixth year.

Fall 1

EDEX	5071	3

Spring 1

EDRE	5530	3
EDRE	5150	3

Summer 1

EDEX	5250	3

Fall 2

EDEX	5355	3

Spring 2

EDEX	5110	3

Fall 3

EDEX	5080	3

Spring 3

EDEX	5120	3

Fall 4

EDEX	5720	3

Spring 4

EDEX	5000	3
EDEX	5150	3

Fall 5

EDEX	5100	3

Spring 5

EDEX	5200	3

Fall 6

EDEX	5490	1

Spring 6

EDEX	5490	1

Summer 6

EDEX	5490 (if needed)	1

Master's Programs

Plan A

Students may elect to pursue a Plan A option in their master's program. The Plan A option involves writing a research thesis, employing either quantitative or qualitative research methodology (Note: The choice of research methodology will depend on the nature of the investigation and the questions posed). Additionally, the Plan A option requires that the student enroll in both EDEX 5150, Classroom Research Application, and EDRE 5530, Introduction to Research; the student is also required to take EDEX 5890, Directed Professional Study. The Plan A option is designed for students interested in learning more about research methodology and the relationship between research and effective teaching, as well as students interested in contributing new information and insight to the field of special education. Although the Plan A will be of value for all master's students, it is strongly recommended for students who wish to continue their education toward a Ph.D or Ed.D degree. Research projects involving quantitative analysis may include, but are not limited to: group comparisons employing statistical analysis, an investigation of the effects of an educational procedure or behavioral intervention using a single-subject design (e.g., multiple baseline design), survey investigation, program evaluation, or a correlational analysis. Qualitative or interpretive research investigations may include: participant observation studies, interviews, or ethnographic analyses. In either case, the following components are required for the thesis: a rationale and justification for the study, a review of the literature relevant to the study, a description of the proposed research or research methodology to be employed, an analysis and evaluation of the findings, and a discussion of the implications of the findings. Students will be required to have both a written and an oral defense.

Plan B

Culminating Activity Options:

Students may elect to pursue a Plan B non thesis option in their master's program. The Plan B option involves completing a culminating activity that emerges from practice, when a student finds a problem or topic of interest within a school classroom, clinical, or work setting. The intent of the Plan B option is for the student to engage in a culminating activity that requires the student to retrieve and apply content acquired in the department's coursework; and to use research, information finding and processing, and synthesis skills as appropriate to develop and conduct an activity that will contribute to the student's professional development and knowledge and skills as an educator. The Plan B option requires that the student enroll in EDEX 5150, Classroom Research Application, or EDRE 5530, Introduction to Research (Note: If EDRE 5530 is taken, the student may also elect to take EDEX 5150 but

is not required to do so). Students who select the Plan B non thesis option will consult with their advisors and committee members to select one of the following formats: (a) a topical paper, (b) a case study or action research investigation, (c) a grant application, (d) an oral examination, or (e) product development. Selection of a format will be based on the student's interests and professional concerns, required resources, and manageability of the project. As these projects differ in purpose, intent, and structure, evaluative criteria vary for each, and standardized evaluative rubrics for each of these formats are included in this prospectus. However, the following components need to be included for all projects:

- A prospectus which overviews the project;
- A rationale for the selection of a particular format;
- A review of the literature relevant to the topic;
- A description of the procedures to be used to execute the activity, acquire information, or synthesize available information/data; and
- An evaluation and defense of the outcomes/findings of the project, and a discussion of its implications for professional development, student learning, or educational policy or practice.

Exceptional Children (EDEX)

5000. Collaboration and Professional Interdisciplinary Relationships. 3. (Max 6) Represents an opportunity for students to examine and explore a range of consultant concepts in the field of Special Education. *Prerequisite:* graduate standing and permission of instructor.

5070. Trends In Special Education. 1-8 (Max. 8) Designed to provide experience with timely special education issues. *Prerequisite:* consent of instructor and graduate standing.

5071. Teaching Students with Mild and Moderate Disabilities. 3. Relates the theoretical, research, and practical aspects of high incidence mild-moderate disabilities to the teacher, classroom, parents, paraprofessionals, other school personnel, and community agencies, all in the effort to help resolve student presenting problems. *Prerequisite:* consent of Instructor.

5080. Teaching Students with Severe and Low Incidence Disabilities. 3. Designed to provide teachers with the repertoire of instructional, curricular, and behavior analytic skills needed to effectively serve students with severe and low-incidence disabilities. An emphasis on inclusive education and promoting access to the general curriculum will be stressed. *Prerequisites:* consent of instructor.

5100. Special Education Practicum I. 3. Designed to allow the student to practice skills and competencies reflected in the Council for Exceptional Children standards. The activities are designed to follow the Wyoming Teaching Standards for Special Education Certification. *Prerequisite:* consent of the Instructor.

5110. Positive Behavior Support and Management. 3. Relates the theoretical, research, and practical strategies for the teachers, parents, paraprofessionals, by which to develop, implement, and evaluate behavior change. *Prerequisites:* graduate Standing and consent of instructor.

5120. Academic Instruction in General Education for Students with Disabilities. 3. Offers teachers appropriate practices and procedures for accommodating children with disabilities in their general education classrooom. The focus is on moving from academic and non-academic assessments to appropriate teaching and learning in the general education classroom environment. *Prerequisite:* consent of instructor.

5150. Research Applications in the Classroom. 3. Methodology for conducting applied research projects in classroom settings will be discussed. he relationship of applied research to best practices in teaching students with disabilities will be examined. In particular, the value of conducting single-subject research to evaluate educational programs and apply scientifically-based research to evaluate educational programs and apply scientifically-based research are discussed. *Prerequisite:* admission to special education program.

5200. Special Education Practicum II. 3. Designed to allow the student to practice skills and competencies reflected in the Council for Exceptional Children standards. The activities are designed to follow the Wyoming Teaching Standards for Special Education Certification. *Prerequisite:* consent of the instructor.

5250. Assistive Technology and Transition. 3. Addresses assistive technology information for students with disabilities. Also, the class will examine the transition and post-high school options available for students. *Prerequisites:* none.

5300. Foundations Of Special Education. 3. Part of the graduate Diagnostic-Prescriptive Teaching training program. Course content involves the application of prescriptive teaching and programming strategies which permit formal and informal assessment of, and the systematic intervention with, learning or behavior problems. *Prerequisite:* graduate standing.

5355. Assessment. 3. Involves the interpretation of selected formal psycho-educational tests, informal tests, the relationship to eligibility standards, and the application to the practical remediation of the student's presenting problem. *Prerequisite:* graduate standing.

5370. Improvement of Instruction in Special Education. 1-8 (Max. 8). Designed to enhance problem solving ability regarding special education practices. *Prerequisite:* consent of instructor.

5410. Short Course. 1-12 (Max. 12). Provides the opportunity for intensive study of specific topics in special education. *Prerequisite:* consent of instructor and graduate standing.

5490. Individual Problems. 1-6 (Max. 6). Provides flexible credit for students who wish to study a special problem related to prescriptive intervention. *Prerequisite:* 12 hours of education and consent of instructor.

5550. Supervised Internship. 1-8 (Max. 12). An internship experience may be required as part of the planned program in special education for the master's, education specialist, or doctoral degrees. *Prerequisite:* 8 hours of graduate level special education courses in the College of Education, consent of department head, and graduate standing.

5680. Prescriptive Teaching Practicum. 1-8 (Max. 8). Graduate practicum/internship, the content of which involves supervised education experience in a special education classroom. *Prerequisites: graduate status and consent of instructor.*

5720. Special Education Law. 3. Provides prospective special education teachers and support personnel with overview of important case and statutory law in special education. *Prerequisites:* 3 semester hours of graduate course work in special education; 3. 0 graduate GPA, and consent of instructor and department head; and EDEX 3470 or equivalent.

5730. Severe and Profound Handicaps. 3. Relates current research and practice to the systematic assessment, education and management of individuals who are severely and/or profoundly disabled. *Prerequisites:* 3 semester hours of graduate course work in special education, 3.0 graduate GPA, and consent of instructor and department head.

5790. Administration of Special Education. 3. Relates current research and practice to the administration of special education programs. *Prerequisites:* 3 semester hours of graduate course work in special education, 3.0 graduate GPA, and consent of instructor and department head.

5870. Seminar. 1-6 (Max. 6). Represents an opportunity for students to examine and explore advanced concepts of prescriptive teaching. *Prerequisites:* consent of instructor and graduate standing.

5880. Special Problems. 1-6 (Max. 9). *Prerequisite:* consent of instructor and graduate standing.

5890. Directed Professional Study. 1-9 (Max. 9). Represents an opportunity to explore a wide range of special problem topics within the scope of diagnostic-prescriptive teaching. *Prerequisites:* consent of instructor and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1 - 12 (Max 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

5980. Dissertation Resch. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

College of Engineering and Applied Science

Robert Ettema, Dean
2085 Engineering Building
Phone: (307)766-4253 FAX: (307)766-4444
Web site: wwweng.uwyo.edu

The College of Engineering offers coursework and research opportunities leading to the following master's degrees: master of science in atmospheric science, chemical engineering, civil engineering, computer science, electrical engineering, environmental engineering, mechanical engineering, and petroleum engineering. Candidates for the various master's degrees in engineering are required to do a full year's study in residence either under Plan A or Plan B.

Only graduates with satisfactory GPAs in programs accredited by the Accreditation Board for Engineering and Technology (ABET) are granted full admission to graduate study. In addition, graduates with satisfactory GPAs in undergraduate disciplines of meteorology, physics, mathematics, or related fields can be granted full admission to graduate studies in atmospheric science. Other engineering graduates can be admitted on a provisional basis.

The College of Engineering offers coursework and research opportunities leading to the following doctoral degrees: Ph.D. in atmospheric science, chemical engineering, civil engineering, computer science, electrical engineering, mechanical engineering, and petroleum engineering. Interdisciplinary programs of study and research leading to one of the above disciplinary degrees can be developed.

Department of Atmospheric Science

6034 Engineering Building, 766-3245
FAX: (307)766-2635
Web site: www.atmost.uwyo.edu
Department Head: Alfred R. Rodi

Professors:

TERRY DESHLER, B.A. University of Wyoming 1969; M.S. 1975; Ph.D. 1982; Professor of Atmospheric Science 1999, 1991.

ROBERT D. KELLY, B.A. University of Wyoming 1973; M.S. 1978; Ph.D. University of Chicago 1982; Professor of Atmospheric Science 1990, 1984.

THOMAS R. PARISH, B.S. University of Wisconsin 1975; M.S. 1977; Ph.D. 1980; Professor of Atmospheric Science 1990, 1980.

ALFRED R. RODI, B.S. University of Chicago 1967; M.S. 1969; Ph.D. University of Wyoming 1981; Professor of Atmospheric Science 1993, 1981.

JEFFERSON R. SNIDER, B.S. University of Oregon 1979; M.S. University of Arizona 1982; Ph.D. University of Wyoming 1989; Professor of Atmospheric Science 2004, 1990.

Associate Professors:

BART GEERTS, Licenciaat Physical Geography Katholieke University, Belgium 1984; Engineer in Irrigation Sciences 1986; Ph.D. University of Washington 1992; Associate Professor of Atmospheric Science 2005, 1999.

DEREK C. MONTAGUE, B.Sc. University of Southampton (UK) 1964; Ph.D. 1967; Associate Professor of Atmospheric Science 1988.

Assistant Professor:

ZHIEN WANG, B.S. Anhui Normal University (China) 1990; M.S. Chinese Academy of Sciences 1994; Ph.D. University of Utah 2000; Assistant Professor of Atmospheric Science 2004.

Professors Emeritus:

John D. Marwitz, Gabor Vali

Adjunct Professors:

W.A. Cooper, D.J. Hofmann, C.A. Knight, W.R. Sand, C.P.R. Saunders

The Department of Atmospheric Science offers degree programs leading to the master of science (Plan A only) and doctor of philosophy degrees.

The department has strong research programs in the following areas: cloud physics and dynamics; tropospheric aerosols and clouds; stratospheric aerosol and ozone; boundary layer processes; remote sensing; and airborne- and balloon-borne instrumentation. The department's observational facilities are: 1) the King Air research aircraft (UWKA); 2) the Wyoming Balloon Launch Facility; 3) the Elk Mountain Observatory at 11,000 ft altitude; 4) the Wyoming Cloud Radar (WCR) for the study of cloud structure and composition; and 5) the Keck Aerosol Laboratory. The UWKA and the WCR are designated Lower Atmospheric Observing Facilities by the National Science Foundation (NSF).

Please refer to the departmental homepage at www.atmos.uwyo.edu for programmatic updates, or contact the department directly.

Program Specific Admission Requirements

Admission based on the university minimum requirements. Admissions are competitive.

Program Specific Graduate Assistantships

Assistantships are offered for both the M.S. and Ph.D. tracks.

Program Specific Degree Requirements

Master's Program

Approval of research plan by the graduate committee (at the end of year one)
Colloquium and oral defense of M.S. thesis
Approval of M.S. thesis by the graduate committee
Requires a minimum of 26 hours of acceptable graduate coursework and four hours of thesis research and a thesis (final written project).
21 in-residence coursework hours

Doctoral Program

Qualifying assessment exam
Approval of research plan by the graduate committee
At least one colloquium presentation per year
Preliminary exam (at least 15 weeks before dissertation defense)
Oral defense of Ph.D. dissertation
Approval of Ph.D. dissertation by the graduate committee
Ph.D. requires a minimum of 72 graduate hours, but at least 42 hours must be earned in formal coursework.
42 hours of formal graduate coursework including appropriate coursework from a master's degree.
Additional credits toward the 72 credit hour requirement may include dissertation research hours, internship hours, or additional coursework.
24 in-residence coursework hours

Required Courses

These courses are required for both master's and doctoral programs.

ATSC 5001. Atmospheric Energetics. 2.
ATSC 5002. Atmospheric Radiation. 3.
ATSC 5003. Problems in Energetics and Radiation. 1.
ATSC 5100. Atmospheric Dynamics I. 3.
ATSC 5004. Problems in Dynamic Meteorology. 1.
ATSC 5005. Microphysics. 2.
ATSC 5006. Problems in Microphysics. 1.
ATSC 5160. Synoptic Meteorology. 2.
ATSC 5007. Problems in Synoptic Meteorology. 1.
ATSC 5008. Mesoscale Meteorology. 2.
ATSC 5020. Physical Meteorology Lab. 1.
ATSC 5210. Cloud and Precipitation Systems. 3.
UW Elective(s) to be determined by committee. 3 minimum
ATSC Elective(s). To be determined by committee. 3 minimum

Atmospheric Science (ATSC)

5001. Atmospheric Energetics. 2. First and second laws of thermodynamics applied to energy transformations in the atmosphere. Investigated are: air saturating processes, conserved temperatures, dry air entrainment into clouds, and first and second law applications in atmospheric models. *Prerequisites:* MATH 2210, PHYS 1310 and 1320 (or equivalent).

5002. Atmospheric Radiation I. 3. Covers the principles of atmospheric radiative transfer. Conceptual and theoretical frameworks are provided for the understanding of radiative measurement systems (e.g., satellite, lidar and radar), blackbody radiation, the planetary radiative budget, and the propagation of both longwave and shortwave radiation. *Prerequisites:* MATH 2210, PHYS 1310 and 1320 (or equivalent).

5003. Problems in Energetics and Radiation. 1. Proficiency in the use of tools for assimilation, analysis and presentation of quantitative information is fostered. Also considers solutions to problems developed theoretically in ATSC 5001 and 5002. These consist of solution to thermodynamic and radiative transfer governing equations. *Prerequisites:* ATSC 5001 and 5002, or concurrent enrollment in each.

5004. Problems in Dynamic Meteorology I. 1. Focuses on computational solutions to problems developed theoretically in ATSC 5100. In addition, students gain proficiency in interpretation and analysis of weather data, including surface and upper level maps, and sounding data, which will be used to understand static stability. Data visualization software is also introduced and used to develop understanding of dynamical processes. *Prerequisite:* ATSC 5100 or concurrent enrollment in ATSC 5100.

5005. Microphysics. 2. Microphysical observations of clouds and precipitation are first briefly surveyed. Thermodynamic equilibria in multiphase microphysical systems are then examined, as are homogeneous and heterogeneous nucleation, and diffusional and collisional processes leading to time-dependent changes in hydrometeor size. Embedded in these discussions are elementary considerations of single particle mechanics and hydrodynamics. *Prerequisites:* ATSC 5001, 5002 and 5003.

5006. Problems in Microphysics. 1. Atmospheric processes altering the hydrometeor size distribution are examined using computer algorithms developed by the student. Condensational and collisional growth processes, in warm and cold clouds, are examined. Data from hydrometer size spectrometers are used to initialize the problems. *Prerequisite:* ATSC 5005 or concurrent enrollment.

5007. Problems in Synoptic Meteorology. 1. Laboratory supplement to ATSC 5160. Analysis of weather systems using operational observations and numerical model output. Real-time weather briefings. Numerical simulation of select weather phenomena. *Prerequisite:* ATSC 5160 or concurrent enrollment.

5008. Mesoscale Meteorology. 2. Mesoscale energy sources, including symmetric instability. Fronts, frontogenesis, and frontogenetic circulation. Surface fronts and cold fronts aloft. Orographically modified flow and boundary-layer circulations. Shallow and deep convection and mesoscale organized convection. Effects of bouyancy, shear and cold pool-shear interaction on the structure and longevity of thunderstorms. *Prerequisites:* ATSC 5160 and ATSC 5007.

5020. Physical Meteorology II Lab. 1. Laboratory course concerned with physical processes in the atmosphere. Approximately eight experiments are conducted examining phenomena related to atmospheric radiation, gas expansions, phase transitions, and nucleation. *Prerequisites:* ATSC 5005, ATSC 5006 or concurrent enrollment.

5100. Atmospheric Dynamics I. 3. Development and interpretation of the atmospheric equations of motion, scales of motion, horizontal atmospheric winds, thermal wind equation, circulation and vorticity. Introduction to planetary boundary layer flows. *Prerequisite:* MATH 2210, PHYS 1310 and 1320 (or equivalent).

5160. Synoptic Meteorology. 2. Structure and evolution of the extratropic cyclone, identification and development of fronts, jet streams and associated weather features; theories of cyclogenesis; role of topography. Climatology of formation and movement of a cyclone. Mesoscale circulation features; ingredients of severe weather. *Prerequisite:* ATSC 5001, 5003, 5100 and 5004.

5210. Cloud and Precipitation Systems. 3. Types of clouds and precipitation systems, and the precipitation mechanisms in those systems; structure of convective, orographic, and frontal systems and severe storms. Schematic and numerical models of clouds and storms with emphasis on hailstorms. *Prerequisite:* ATSC 5005 and 5100.

5310. Atmospheric Dynamics II. 3. Introduction to the dynamic energetics of the atmosphere, wave motions, atmospheric instabilities. Introduction to numerical modeling, applications. *Prerequisite:* ATSC 5100.

5320. The Ocean Environment. 3. Focuses on the ocean as a system. Objective is the development of interdisciplinary understanding of marine processes, especially those processes occurring along coastal margins. Emphasis is on the development of quantitative models and their use in understanding anthropogenic impact on ocean resources. Dual listed with ATSC 4320. *Prerequisite:* MATH 2310, PHYS 1310, CHEM 1030, ES 3060 (or ES 3070), LIFE 1010, senior standing or higher.

5330. Boundary Layer Meteorology. 3. A quantitative and descriptive study of the thermodynamics and dynamics of the planetary boundary layer, including budgets (heat, moisture, momentum, turbulent kinetic energy, radiation), stability, turbulence and turbulent fluxes, convection, terrain effects, phenomenology, and measurement and analysis techniques. *Prerequisite:* ATSC 5001, 5100.

5340. Radar Meteorology. 3. The theory of radar and the application of radars to studies of the atmosphere, including basic radar design, distributed targets, attenuation, polarization, Doppler velocities, analysis techniques, and examples of radar studies of clear air, clouds, and precipitation. *Prerequisite:* ATSC 5002 and 5005.

5350. Atmospheric Chemistry. 3. Origin and composition of the atmosphere. Sources, lifetimes, transport of gases and aerosols. Cycles of C, S, N and trace elements. Removal processes: precipitation, and dry deposition. Homogenous and Heterogeneous kinetics. Anthropogenic influences: effect of air pollution on radiation balance and cloud processes. *Prerequisite:* graduate standing in a physical science or engineering.

5370. Meteorological Instrumentation. 3. Physical principles of instruments, their response characteristics and their proper use. Error analysis and interpretation of data. Classical instruments. Introduction to modern methods and instrumentation. Remote sensing, such as by radar and lidar. Instrument systems, such as on aircraft, and remote platforms, such as satellites and buoys. Laboratory experience with a large variety of instruments will be part of the course. *Prerequisite:* graduate standing in a physical science or engineering.

5400. The Physical Basis of Climate. 3. Global atmospheric and oceanic circulations, radiation balance, water balance and hydrologic cycle, energy balance, energy and moisture transport, evaporation and evapotranspiration, energetic processes, and theories of climate change. Dual listed with ATSC 4400. *Prerequisite:* MATH 2200, PHYS 1310, and CHEM 1020.

5500. Atmospheric Radiation and Optics. 3. Overview of atmospheric radiation, basic definitions, and basic laws of radiation. Nature of solar and terrestrial radiation, and atmospheric transmission. Derivation and analytic solutions to the equation of radiative transfer. Radiative transfer models at solar and terrestrial wavelengths, net radiation, and effects of polarization. Radiative properties of molecules, aerosols, and clouds (Rayleigh and Mie scattering). Inadvertent climate modification. Atmospheric refraction, diffraction and polarization phenomenon. *Prerequisite:* ATSC 5002.

5600. Advanced Cloud Micophysics. 3. Analysis of the processes involved in cloud and precipitation formation. Detailed treatments of the condensation, ice nucleation, vapor growth, and collection processes. Emphasis is on reviewing the current state of knowledge in the field and on surveying directions of research. *Prerequisite:* ATSC 5005.

5880. Atmospheric Science Problems. 1-3 (Max. 6). A special course for graduate students in atmospheric science only, designed to make possible the study and investigation of problems or phases of atmospheric science selected to fit the needs of students.

5890. Atmospheric Science Seminar. 1-3 (Max. 6). A seminar-type class furnishing motivation for advanced study of current problems by means of library research, study of current literature, and carefully guided class discussions. *Prerequisite:* consent of department head.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12. (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Chemical and Petroleum Engineering

4055 Engineering Building, 766-2500
FAX: (307) 766-6777
Web site: wwweng.uwyo.edu/chemical
Department Head: Morris D. Argyle

Professors:

H. GORDON HARRIS, B.S. University of Texas 1961; M.S. 1962; Ph.D. University of California 1968; Professor of Petroleum Engineering 1984.

NORMAN R. MORROW, B.Sc. University of Leeds, England 1959; Ph.D. 1962; Professor of Petroleum Engineering 1992.

MACIEJ RADOSZ, M.S. Cracow University of Technology 1972; Ph.D. 1977; Professor of Chemical Engineering 2000; Department Head 2000.

MRITYUNJAI P. SHARMA, B.Sc. B.I.T.T. in Dhanbad, India 1967; M.Tech. I.I.T. in Kampur, India 1970; Ph.D. Washington State University 1977; Professor of Petroleum Engineering 1992, 1982.

BRIAN F. TOWLER, B.E. University of Queensland 1972; Ph.D. 1978; Professor of Petroleum Engineering 2006, 1988; Department Head, Chemical and Petroleum Engineering 2004.

Associate Professors:

MORRIS D. ARGYLE, B.S. Brigham Young University 1990; Ph.D. University of California at Berkeley 2003; Associate Professor of Chemical Engineering 2008, 2003.

DAVID A. BELL, B.S. University of Washington 1976; M.S. Rice University 1979; Ph.D. Colorado State University 1992; Associate Professor of Chemical Engineering 2000, 1993.

MAOHONG FAN, B.S. Wuhan University of Science and Engineering 1984; M.S. Beijing University of Science and Tech., 1992; Ph.D. Chinese Academy of Sciences 1997; Ph.D. Iowa State University 2000; Ph.D. Osaka University 2003; Associate Professor of Chemical Engineering 2008.

GUAN QIN, B.S. Tsinghua University 1984; M.E. Research Institute for Petroleum Exploration and Development, China National Petroleum Corporation 1987; Ph.D. University of Wyoming 1995; Associate Professor of Petroleum Engineering 2009.

Assistant Professors:

HERTANTO ADIDHARMA, B.Sc. Institute of Technology, Surabaya 1987; Ph.D. Louisiana State University 1999; Assistant Professor of Chemical Engineering 2005.

VLADIMIR ALVARADO, B.Sc. Universidad Central de Venezuela 1987; M.S. Institut Francais du Pétrole 2002; Ph.D. University of Minnesota 1996; Assistant Professor of Petroleum Engineering 2006.

LAMIA GOUAL, B.Sc. Ecole Nationale Polytechnique 1993; M.Sc. Imperial College London 1998; Ph.D. 2003; Assistant Professor of Chemical and Petroleum Engineering 2007.

PATRICK JOHNSON, B.S. Lehigh University 1992; M.S. University of Virginia 1994; Ph.D. Columbia University 2004; Assistant Professor of Chemical Engineering 2006.

MOHAMMAD PIRI, B.Sc. Azad University, Arak 1995; M.Sc. Azad University, Tehran 1998; M.Sc. Imperial College, London 2000; Ph.D. 2004; Assistant Professor of Petroleum Engineering 2006.

SHUNDE YIN, B.S. Shijiazhuang Railway University, China 1999; M.S. Chinese Academy of Sciences 2003; Ph.D. University of Waterloo 2008; Assistant Professor of Petroleum Engineering 2008.

Assistant Lecturer:

John Myers

Adjunct Professors:

John Ackerman
Michal Banaszak
Jill Buckley
Geoffrey Mason
Koichi Takamura

Professors Emeriti:

Chang Yul Cha
Harry A. Deans
Jack Evers
Henry W. Haynes

The Department of Chemical and Petroleum Engineering offers graduate programs leading to the M.S. and Ph.D. degrees in chemical engineering and in petroleum engineering. The M.S. degree is offered under Plan A and Plan B. In addition, an environmental engineering program, run jointly by the Department of Chemical and Petroleum Engineering and the Department of Civil and Architectural Engineering, offers graduate programs leading to an M.S. in environmental engineering under either Plan A or Plan B.

Program Specific Admission Requirements

Admission is open to students with a bachelor's degree and who meet the general requirements set forth in the admissions section of this bulletin. A minimum GPA of 3.0 (A=4), or equivalent, and a class rank in the upper 20 percent are normally required for admission to our graduate program. Complete transcripts of all prior college-level coursework must be submitted as part of the application process. Recommendations from three personal references must also be submitted.

The Department of Chemical and Petroleum Engineering prefers a minimum TOEFL score of 600 and Section I greater than 58 from international applicants whose native language is not English. Applicants are required to take the GRE general test. The GRE subject test is not required.

The department requires a minimum GRE score of 1,150 (combined verbal and quanitative sections). ETS only reports GRE scores taken within five years of the date of request.

Program Specific Graduate Assistantships

With some exceptions first time graduate students usually receive financial assistance, which generally pays a monthly stipend plus tuition and fees.

Program Specific Degree Requirments

Master's Program

Plan A (thesis) CHE

At least four classes from the following list (all are 3 credit courses):

CHE/PETE 5010 Transport Phenomena or CHE 5160 Biomedical Engineering - Transport Processes
CHE/PETE 5020 Thermodynamics
CHE 5030 Reaction Kinetics or CHE 5170 Polymeric Materials Synthesis
CHE/PETE 5100 TPCS; Math Methods for Chemical & Petroleum Engineers

	Credit Hours
Total (from above)	12
A graduate level course in mathematics, statistics, or computing	3
CHE/PETE 5960 Thesis Research	4
Electives	11
Total	30

Plan A (thesis) PETE

At least four classes from the following list (all are 3 credit courses):

PETE 5060 Flow in Porous Media
PETE/CHE 5100 TPCS: Math Methods for Chemical & Petroleum Engineers
PETE 5100 Adv. Tpcs Pete/GEOL
PETE 5310 Fundamentals of EOR
PETE 5300 Reservoir Simulation
CHE/PETE 5010 Transport Phenomena

	Credit Hours
Total (from above)	12
A graduate level course in mathematics, statistics, geology, or computing	3
CHE/PETE 5960 Thesis Research	4
Electives	11
Total	30

Plan B (non-thesis)

The coursework requirements are the same as the M.S. Plan A requirements except that Thesis Research (CHE, PETE 5960) is not required. Plan B students take an additional 4 hours of elective course credits (total of 30 hours required).

M.S. Plan B students must write a paper on a topic assigned by the adviser. This paper must be submitted to the student's graduate committee for approval.

Doctoral Program

	Credit Hours
M.S. Plan A list (except CHE, PETE 5960); petitions allowed	26
Dissertation Research (CHE or PETE 5980)	30
Electives (no internship 5990)	16
Total	72

Ph.D. Preliminary Examination

Ph.D. students must pass a preliminary examination. The examination should be scheduled about a year before the final dissertation defense. The university requires at least 15 weeks between the preliminary examination and the dissertation defense. Students must complete at least 30 hours of coursework and file a program of study prior to the examination.

The examination consists of an oral presentation to the student's graduate committee. At least one week before the presentation, the student must provide each member of the graduate committee with a written document; its format is at the discretion of the adviser, but it should be at least a copy of the slides used for the presentation. Both the paper and the presentation must describe the student's research progress and plans to complete the research. A form sent by the student's adviser to the Office of the Registrar reports the results of the examination.

M.S. and Ph.D. Seminar Requirements

All chemical and petroleum engineering graduate students must enroll in CHE/PETE 5890, Chemical and Petroleum Engineering Seminar, every semester. All seminars, including the required presentations described below, must be scheduled by the seminar coordinator.

M.S. (Plan A) candidates must present at least one seminar (thesis defense) before they graduate. Ph.D. candidates must present the following seminars before they graduate:

Program of study seminar (an outline of research goals and status described in the program of study, usually given in the second or third semester)
Preliminary examination (admission to candidacy, at least 15 weeks prior to the final examination), and
Final examination (dissertation defense).

If the research goals are changed between the program of study and preliminary examination, the research adviser should ask the student to give an additional seminar. A student who presents a paper at a conference is encouraged to present this same work as a CHE/PETE 5890 seminar. The seminars should be attended and evaluated by the committee members with input from the faculty. A satisfactory evaluation qualifies the student to retain the Ph.D.-candidate status. At least one week before the presentation, the student must provide each member of the committee and faculty with a written document; its format is at the discretion of the adviser, but it should be at least a copy of the slides used for the presentation. Registered off-campus graduate students can be exempt from having to enroll in CHE/PETE 5890, but not from having to give the required seminars.

M.S. Thesis or Ph.D. Dissertation Defense

M.S. Plan A and Ph.D. students must orally defend their thesis or dissertation at a public final examination. The defense time and room must be scheduled by the seminar coordinator. A copy of the M.S. thesis must be delivered to each member of the graduate committee at least two weeks before the examination. A copy of the Ph.D. dissertation must be delivered to each member of the graduate committee and faculty at least three weeks before the defense. Thesis and dissertation students must give a defense announcement to their department. The defense must be advertised by bulletin board postings, e-mail, or other means. The results of the examination are reported on the completion of requirements form. Often, graduate committee members request changes in the thesis or dissertation, and they may postpone signing the form until they are satisfied that those changes have been made.

Publication of Thesis or Dissertation

After the defense, an electronic copy (in PDF format) of the thesis or dissertation must be uploaded in accordance with the directions provided on the Graduate Student Resources Web site. This copy will be rejected if the format standards specified by the Thesis and Dissertation Format Guide are not met. This guide allows for a publication-ready format. If required by the department and/or committee additional copies should be delivered to the University Bookstore for binding. A third, bound copy must be submitted to the Department of Chemical and Petroleum Engineering for the departmental library. Most students will want one or more copies for their own use. Students should consult with their adviser to determine if the adviser wants a copy of the thesis, dissertation, or other research documentation.

Chemical Engineering (CHE)

5010. Transport Phenomena. 3. Examines the modeling of momentum, heat and mass transport. Cross Listed with PETE 5010. *Prerequisite:* ES 2330, MATH 2310, and graduate standing in Chemical or Petroleum Engineering.

5020. Thermodynamics. 3. Examines molecular thermodynamics of pure materials and mixtures, including phase equilibria and the use of equations of state. Cross listed with PETE 5020. *Prerequisite:* ES 2310 or CHEM 4505.

5030. Reaction Kinetics. 3. An analysis of reactions involving phase boundaries, heterogeneous catalysis, gas-solid systems, and gas-liquid systems. Cross listed with PETE 5030. *Prerequisite:* CHE 4060.

5045. Reactor Design. 3. Examines reactor design techniques, including the use of thermodynamics, kinetics, heat transfer, and mass transfer. Cross listed with PETE 5045. *Prerequisite:* CHE 4060.

5050. Structure and Properties of Porous Media. 3. Introduction to porous materials, pore structure and mineralogy of reservoir rocks. Fundamentals of porosity, permeability, and capillary properties of porous materials. Application to hydrocarbon reservoirs. Cross listed with PETE 5050. *Prerequisite:* graduate standing.

5060. Flow Thru Porous Media. 3. Review of properties of porous media. Relationships of permeability to porosity. Formulation of the Fundamental Flow equation. Constant Rate Solutions. Constant Pressure Solutions. The Principle of Superposition. Transient well testing of oil and gas reservoirs, including drawdown, build-up faulted systems, interference, drillstem tests, and isochronal test analysis. Dual listed with PETE 5060. *Prerequisite:* PETE 4010 and graduate standing.

5070. Multiphase Flow. 3. A thorough background in the methods of analysis and current developments in gas-liquid, gas-solid, liquid-solid, and gas-liquid-solid flows. Introduction to multiphase flow instrumentation. Identical to PETE 5070. *Prerequisite:* CHE 3020 or ES 4360.

5080. Interfacial Phenomena. 3. Introduction to surface and colloid chemistry, coagulation and flocculation, surface energy and thermodynamics of surfaces, adsorption at interfaces, surface tension, capillarity and wetting, spontaneous imbibition, applications to hydrocarbon reservoirs and oil recovery. Cross listed with PETE 5080. *Prerequisite:* graduate standing.

5100. Biochemical Engineering. 3. Applies chemical engineering principles to the analysis and design of biological processes widely used in the pharmaceutical, food and environmental remediation industries. Topics include kinetics of enzyme-catalyzed reactions, cellular growth and metabolism, bioreactor design and mass transfer considerations. Dual listed with CHE 4100. *Prerequisite:* MOLB 2210 or concurrent enrollment and CHE 4060 or concurrent enrollment.

5130. Staged Operations. 3. Thermodynamic and mathematical analysis of stagewise mass transfer operations. Distillation, absorption, and extraction are discussed. *Prerequisite:* CHE 3030, CHE 5040 or concurrent enrollment.

5140. Computational Methods I. 3. First semester of a three-semester computational methods series. Review of iterative solutions of linear and nonlinear systems of equations, polynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Identical to COSC 5310 and MATH 5310. Cross listed with PETE/ME/CE 5140. *Prerequisite:* MATH 3310, COSC 1010.

5150. Topics in Chemical Engineering. 1-3 (Max. 12). Selected topics in chemical engineering. Cross listed with PETE 5150. *Prerequisite:* consent of instructor.

5160. Biomedical Engineering - Transport Processes. 3. Focuses on chemical and physical transport processes with applications toward the development of drug delivery systems, artificial organs, bioartificial organs and tissue engineering. This will involve topics covering body fluids, capillary solute transport, physical and flow properties of blood, tissue oxygen transport, pharmacokinetic models and cell physiology. Dual listed with CHE 4160. *Prerequisite:* consent of instructor and grade of C or better in at least 3 courses counting no more than 2 from CHEM 1020, CHEM 1030, CHEM 1050, LIFE 1010, LIFE 1020 and at least one from LIFE 2020, MATH 2200, KIN 2040, MOLB 2240, CHE 3000, ES 2310, graduate standing.

5170. Polymeric Materials Synthesis. 3. An introduction to the polymer technology, with emphasis on the synthesis of polymeric materials and on the polymerization processes. Applications will cover commodity polymers such as polyolefins, and advanced materials, such as nanomaterials, aerospace materials and biomaterials for drug delivery, artificial skin and organs. Dual Listed with CHE 4170. *Prerequisite:* CHEM 2340 or CHEM 2440, graduate standing.

5180. Molecular Biophysics. 3. Organized into five sections that cover 1) Confrontation of biopolymers 2) Dynamics of biopolymers 3) Hydration of biopolymers 4) Biopolymers as poly-electrolytes and 5) Association between molecules with topics to include equilibrium studies and ligand/receptor binding and linkage. *Prerequisite:* MOLB 4600/5600 or CHEM 4507.

5190. Polymetric Materials: Characterization and Properties. 3. Intended for science and engineering students, is an introduction to the characterization and properties of polymeric materials. Introduces synthesis, architecture, microstructure analysis, molecular weight determination, solution properties, thermal properties and mechanical properties of polymeric materials. Dual listed with CHE 4190. *Prerequisite:* CHEM 4507.

5440. Fluid Mechanics. 3. Lagrangian and Eulerian coordinates, Navier-Stokes equations, momentum balance, fluid statics, strain rate and vorticity, irrotational flow, and laminar viscous flow including exact solutions and boundary layers. Cross listed with ME 5440. *Prerequisites:* none.

5442. Advanced Fluid Mechanics. 3. Introduction to inviscid and viscous hydrodynamic stability; closure in turbulent flows; vorticity and vortex dynamics; theoretical aerodynamics; numerical simulations of viscous flows; experimental methods in fluid flows. *Prerequisite:* ME 5440.

5530. Advanced Mass Transfer. 3. Consideration of diffusional phenomena and processes. Topics include flux laws, diffusion coefficient prediction, steady and unsteady state diffusion in non-flowing systems (with and without chemical reaction), convective diffusion, and diffusion-based separation processes.

5700. Fundamentals of Coal Utilization. 3. Following introduction to coal structure, constituents and classification, fundamental principles of coal utilization technologies will be examined. The topics to be covered include behavior of coal stockpiles, drying, pyrolysis, combustion/gasification of coal. Reactor models for utilization of coal will be discussed with reference to current environmental issues and remediation. *Prerequisite:* graduate standing.

5710. Advances in Fluidization Technology. 3. Covers particle classification, hydrodynamics, advanced modeling strategies, and technical applications of fluidization. *Prerequisite:* graduate level.

5870. Mathematical Modeling of Processes. 3. Introduction to techniques in the process of constructing mathematical models. Application of the techniques to areas such as petroleum reservoir simulation, chemical process industry operations and plant start-up. Identical to MATH 5320. *Prerequisite:* CHE/PETE 5140 and graduate standing.

5880. Problems in Chemical Engineering. 1-6 (Max. 6). A special course designed to make possible the study and investigation of problems or phases of chemical engineering selected to fit the needs of the student. *Prerequisite:* graduate standing in engineering.

5890. Chemical and Petroleum Engineering Seminar. 1 (Max. 9). Departmental seminar on current research with formal training for student presentation of technical papers. Satisfactory/unsatisfactory only. Cross listed with PETE 5890. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Petroleum Engineering (PETE)

5010. Transport Phenomena. 3. Examines the modeling of momentum, heat and mass transport. Cross listed with CHE 5010. *Prerequisite:* ES 2330, MATH 2310, and graduate standing in Chemical or Petroleum Engineering.

5015. Secondary Recovery. 3. Conventional secondary recover practices, including: flood patterns, gas injection, waterflooding, and water treatment for water flooding. *Prerequisite:* PETE 4010.

5020. Thermodynamics. 3. Examines molecular thermodynamics of pure materials and mixtures, including phase equilibria and the use of equations of state. Cross listed with CHE 5020. *Prerequisite:* ES 2310 or CHEM 4505.

5030. Reaction Kinetics. 3. An analysis of reactions involving phase boundaries, heterogeneous catalysis, gas-solid systems, and gas-liquid systems. Cross listed with CHE 5030. *Prerequisite:* CHE 4060.

5045. Reactor Design. 3. Examines reactor design techniques, including the use of thermodynamics, kinetics, heat transfer, and mass transfer. Cross listed with CHE 5045. *Prerequisite:* CHE 4060.

5050. Structure and Properties of Porous Media. 3. Introduction to porous materials, pore structure and mineralogy of reservoir rocks. Fundamentals of porosity, permeability, and capillary properties of porous materials. Application to hydrocarbon reservoirs. Cross listed with CHE 5050. *Prerequisite:* graduate standing.

5060. Flow in Porous Media. 3. Review of properties of porous media. Relationships of permeability to porosity. Formulation of the Fundamental Flow equation. Constant Rate solutions. Constant Pressure Solutions. The Principle of Superposition. Transient well testing of oil and gas reservoirs, including drawdown, build-up, faulted systems, interference, drillstem tests, and isochronal test analysis. Dual listed with PETE 4060; cross listed with CHE 5060. *Prerequisite:* PETE 4010 and graduate standing.

5070. Multiphase Flow. 3. A thorough background in the methods of analysis and current developments in gas-liquid, gas-solid, liquid-solid, and gas-liquid-solid flows. Introduction to multiphase flow instrumentation. Identical to CHE 5070. *Prerequisite:* ME 3360 or CHE 3020.

5080. Interfacial Phenomena. 3. Introduction to surface and colloid chemistry, coagulation and flocculation, surface energy and thermodynamics of surfaces, adsorption at interfaces, surface tension, capillarity and wetting, spontaneous imbibition, applications to hydrocarbon reservoirs and oil recovery. Cross listed with CHE 5080. *Prerequisite:* graduate standing.

5100. Topics. 1-3 (Max. 12). Selected topics in petroleum engineering. *Prerequisite:* consent of instructor.

5140. Computational Methods I. 3. First semester of a three-semester computational methods series. Review of iterative solutions of linear and nonlinear systems of equations, polynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Identical to ME 5140, CE 5140, CHE 5140, COSC 5310 and MATH 5310. *Prerequisite:* MATH 3310, COSC 1010.

5150. Topics in Chemical Engineering. 1-3 (Max. 12). Selected topics in chemical engineering. Cross listed with CHE 5150. *Prerequisite:* consent of instructor.

5200. Problems in Petroleum Engineering. 1-3 (Max. 6). Selected topics in petroleum engineering. *Prerequisite:* doctoral student and consent of instructor.

5255. Advanced Drilling Engineering. 3. Principles and practices of advanced topics in oil and gas drilling engineering including advances in directional and horizontal drilling, drilling fluid hydraulics and cuttings transport. Non-Newtonian Fluid Flow Analysis, pore pressures and fracture resistance estimation methods. Application of modern computer-based analysis and design methods. *Prerequisites:* PETE 3250.

5300. Reservoir Simulation. 3. Simulation of petroleum reservoirs, formulation of equations, finite difference methods of solution, data preparation and input, history matching case studies. Dual listed with PETE 4300. *Prerequisite:* PETE 3200 MATH 4440, 2210.

5310. Fundamentals of EOR. 3. The application of physical principles to increasing the recovery from reservoirs. Miscible fluid flooding in-situ combustion, and thermal recovery. Dual listed with PETE 4310. *Prerequisite:* PETE 3200.

5600. Air Pollution Control. 3. Coverage includes science and engineering of air pollution sources, formation mechanisms, and removal of pollutants including discussion on air pollution effects. Cross listed with CHE 5600. *Prerequisite:* CHEM 1060 or CHEM 1030, MATH 2310.

5810. Unconventional Gas Production. 3. Study of resource base, drilling, completion and production technology, and reservoir characteristics for tight gas sands. Devonian shales, coalbed methane, geopressured aquifers, and hydrates. Case histories and economics are presented in each of these. *Prerequisite:* graduate status or consent of instructor..

5830. Thermal Recovery. 3. Objective of this course is to examine and explore in depth the theoretical and applied aspects of thermal recovery process of producing hydrocarbons including state-of-the-art review. *Prerequisite:* PETE 4010.

5840. Miscible Processes. 3. Objective is to examine and explore in depth the theoretical and applied aspects of miscible processes of producing hydrocarbons including state-of the-art review. *Prerequisite:* PETE 4010, 5310.

5850. Chemical Enhanced Oil Recovery Processes. 3. Objective is to examine and explore in depth the theoretical and applied aspects of the classification of enhanced oil recovery processes called chemical processes. *Prerequisite:* consent of instructor.

5890. Chemical and Petroleum Engineering Graduate Seminar. 1 (Max. 9). Departmental seminar on current research with formal training for student presentation of technical papers. Cross listed with CHE 5890. *Prerequisite:* graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.
5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.
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5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Civil and Architectural Engineering

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Web site: wwweng.uwyo.edu/architectural; wwweng.uwyo.edu/civil
Department Head: David M. Bagley

Professors:

DAVID M. BAGLEY, B.S. Colorado School of Mines 1984; M.S. Cornell University 1989; Ph.D. 1993; Professor of Civil Engineering 2008, 2005; Department Head 2007.
MICHAEL G. BARKER, B.S. Purdue University 1983; M.S. 1987; Ph.D. University of Minnesota 1990; Professor of Civil Engineering 2003.
CHARLES W. DOLAN, B.S. University of Massachusetts 1965; M.S. Cornell University 1967; Ph.D. 1989; H.T. Person Chair 2002; Professor of Civil Engineering 1994, 1991.
MOHAN REDDY JUNNA, B.S. Andhra Pradesh Agricultural University (India) 1974; M.S. Utah State University 1976; Ph.D. Colorado State University 1980; Associate Professor of Agricultural Engineering 1988; Professor of Civil Engineering 1993, 1985.
KHALED KSAIBATI, B.S. Wayne State University 1984; M.S. 1986; Ph.D. Purdue University 1990; Professor of Civil Engineering 2001; Director of the Wyoming Technology Transfer Center 2003, 1990.
FRED L. OGDEN, B.S. Colorado State University 1987; M.S. 1989; Ph.D. 1992; Professor, Cline Distinguished Chair in Engineering, Environment, and Natural Resources 2006.
JAY A. PUCKETT, B.S. University of Missouri 1978; M.S. Colorado State University 1980; Ph.D. 1983; Vincent O. Smith Professor of Civil Engineering 2005, 1992, 1983.
RICHARD J. SCHMIDT, B.S. University of Kansas 1977; M.S. 1982; Ph.D. 1986; Professor of Civil Engineering 1998, 1985; Associate Dean of the College of Engineering and Applied Science 2005.
JOHN P. TURNER, B.S. James Madison University 1976; B.S. University of Wyoming 1981; M.S. 1982; Ph.D. Cornell University 1986; Professor of Civil Engineering 1997, 1986.

Associate Professors:

PATRICIA J.S. COLBERG, B.S. North Dakota State University 1975; M.S. University of Idaho 1977; Ph.D. Stanford University 1983; Associate Professor of Zoology and Physiology 1998; Associate Professor of Civil Engineering 2009.
THOMAS V. EDGAR, B.S. University of Colorado 1972; M.S. Colorado State University 1976; Ph.D. 1983; Associate Professor of Civil Engineering 1989, 1983.
AHMED C. MEGRI, B.S. Institute of Building and Civil Engineering of Constantine 1988; M.S. INSA, Lyon, France 1990; Ph.D. INSA 1995; Associate Professor of Architectural Engineering 2008.
DAVID J. MUKAI, B.S. University of Hawaii 1983; M.S. 1985; Ph.D. University of Washington 1991; Associate Professor of Civil Engineering 2005, 2001.
MICHAEL A. URYNOWICZ, B.S. Michigan State University 1990; M.S. University of Wisconsin 1995; M.S. Colorado School of Mines 1998; Ph.D. 2000; Associate Professor of Civil Engineering 2008, 2002.
RHONDA KAE YOUNG, B.S. Oregon State University 1992; M.S. University of Washington 1999; Ph.D. 2002; Associate Professor of Civil Engineering 2008, 2002.

Assistant Professors:

JONATHAN A. BRANT, B.S. Virginia Military Institute 1991; M.S. University of Nevada 2000; Ph.D. 2003; Assistant Professor of Civil Engineering 2008.
ANTHONY S. DENZER, B.A. University of California, Berkeley 1991; M.Arch. University of Kansas 1998; Ph.D. University of California, Los Angeles 2005; Assistant Professor of Architectural Engineering 2005.
GI-HYEON PARK, B.S. Seoul National University 1991; M.S. 1993; M.S. University of Arizona 2000; Ph.D. University of California, Irvine 2006; Assistant Professor of Civil Engineering 2008.
JENNIFER E. TANNER, B.A. Eastern College 1994; B.S. Oklahoma State University 1995; M.S. University of Costa Rica 1998; Ph.D. University of Texas 2003; Assistant Professor of Civil Engineering 2003.

Academic Professionals:

ROBERT ERIKSON, B.S. North Dakota State University 1988; M.S. University of Idaho 1997; Ph.D. University of Wyoming 2003; Academic Professional 2003.
STEPHEN T. GRAY, B.S., University of Tulsa 1994; M.S. 1998; Ph.D. University of Wyoming 2003; Associate Research Scientist, Director of WRDS 2006; State Climatologist 2006.
KEITH E. HEDGES, B.S. University of Illinois 1987; M.S.S.E. Iowa State University 1997; M.Arch. 1997; Academic Professional 2005.
GREG KERR, B.S. University of Wyoming 1975; M.S. 1978; Academic Professional 2002; Director, Office of Water Programs 2005.

LECTURERS:

ROD SKAGGS, B.S. Colorado State University 1980; M.S. University of Wyoming 1992; Lecturer in Civil Engineering 1985.

Adjunct Faculty:

Bruce Brinkman, William Gorman, Jere Hamilton, Michael Heller, James Kladianos, Duncan Kline

Professors Emeriti:

Leonard B. Baldwin, Jr., Arthur P. Boresi, Robert L. Champlin, K. James Fornstrom, David H. Foster, Victor R. Hasfurther, Michael Humenick, Don Lamb, Anton Munari, Larry O. Pochop, Paul Rechard, James L. Smith, Eugene M. Wilson

The Department of Civil and Architectural Engineering offers programs leading to the degrees of master of science and doctor of philosophy. Areas of study in the M.S. and Ph.D. programs include: building mechanical systems engineering, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering. The department also offers a master of science in environmental engineering in cooperation with the Department of Chemical and Petroleum Engineering. Additional information is available from the department or from the Web page.

Program Specific Admission Requirements

Admission is open to all students holding a bachelor's degree with at least a B average from an accredited engineering curriculum.

Students who do not meet the GRE requirement may be admitted on a provisional basis upon the additional presentation of a written letter of intent and three reference letters for consideration to the departmental graduate studies committee, and department head.

Ph.D. applicants are reviewed with regard to stated interests, objectives, and the ability of the department to provide a quality experience for the applicant.

International students must achieve a TOEFL score of 550 on the paper-based, a minimum of 76 on the internet-based, or a minimum of 60 on the IELTS.

MSCE Quick Start Program

The MSCE Quick Start program in Civil and Architectural Engineering (CAE) is designed to present highly qualified UW students with the opportunity to begin graduate study while they complete their bachelor of science (B.S.) degree in civil engineering or architectural engineering. These students may apply for admission to the Quick Start program during the second semester of their junior year or during their senior year.

This program allows for early planning of the graduate portion of a student's education and provides more flexibility in the number of required courses and the order in which they are taken. The more efficient and better-planned use of time should result in reduction of the time required for obtaining the master of science in civil engineering (MSCE) degree. Students who enter the Quick Start program must accept the primary responsibility for actively planning their programs of study to assure timely completion of their coursework and research programs.

The Quick Start program contains two essential elements:

Qualified students may receive provisional admission to the civil engineering graduate program prior to completing the normal application process. This provisional admission will permit students to make their long-term educational plans earlier in their studies, thus providing enhanced opportunities for course selection and involvement in research.

Students in the program may apply up to 6 credit hours of 5000-level courses toward both the B.S. and M.S. degree programs. By completing successfully up to 6 credit hours of graduate classes during their senior year, these students will have demonstrated their ability to do graduate-level coursework as undergraduates, easing their transition to the civil engineering graduate program.

For additional information and an application form, please contact the CAE graduate program coordinator at (307) 766-2390 or stop by 3074 Engineering Building.

Program Specific Degree Requirements

Master's Program

Areas of study in the master of science program include: building mechanical systems engineering, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering. The master of science degree in each of these areas requires completion of 12 to 18 hours of engineering courses related to the particular program area.

Plan A (thesis)

The degree of master of science, Plan A, requires a minimum of 26 hours of coursework and a minimum of 4 hours thesis research in addition to the minimum requirements set forth in this bulletin.

Early in the program, the student must submit a program of study listing coursework for approval by the departmental graduate studies committee (CEGS), and the department head. The Office of the Registrar will load the approved prgram into CAPP.

Plan A is required of all state or contract supported graduate assistants.

Plan B (non-thesis)

Requires a minimum of 30 hours of coursework and a Plan B paper, in addition to the minimum requirements set forth in this bulletin.

Early in the program, the student must submit a program of study listing coursework and the course number that the Plan B paper covers for approval by the CEGS, the department head, and subsequently, the Office of the Registrar.

Doctoral Program

Areas of study in the doctor of philosophy program include: building mechanical systems engineering, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering.

Minimum of 56 hours of coursework beyond the baccalaureate, 44 hours of which must be 5000-level (graduate-level) courses or the equivalent, and concentrated independent research leading to an acceptable dissertation.

In addition to expertise in the specific dissertation topic, the candidate must demonstrate competence in two or more research areas that will help to insure a high-quality dissertation acceptable to the student's graduate committee.

Subject to department and university requirements, the student's coursework is arranged by consultation between the student, his/her adviser, and his/her committee, and must also be approved by the CEGS and by the department head.

Coursework is defined in a program of study that should be filed by the end of the second semester of the Ph.D. program.

At a time near the completion of formal coursework, the student is required to take and pass a preliminary examination on the Ph.D. coursework and, as a part of the examination, is required to present a written and oral dissertation proposal to his/her committee for approval.

Finally, the student must demonstrate research competence in an oral defense of the dissertation and must submit an acceptable written version of the dissertation to his/her graduate committee in a timely manner to meet deadlines. In addition, the student is to meet the minimum requirements set forth in this bulletin.

Civil Engineering (CE)

5000. Solid Mechanics I. 3. The first in a sequence of two introductory courses in solids mechanics. It includes elements of continuum mechanics, in addition to the introduction of elasticity theory (limited to plane problems), as well as elements of viscoelasticity and plasticity. Cross listed with ME 5000. *Prerequisites:* CE 3200 or ME 3010 and MATH 2310.

5010. Advanced Mechanics of Materials. 3. Elements of elasticity, unified approach to strength of structural members design and failure criteria; basic concepts of fracture mechanics; stress concentration factors; treatment of torsion, bending, axial and shear in structural members including plastic effects; bending of flat plates. *Prerequisite:* ME 3010 or CE 3200, MATH 2310.

5020. Finite Element Analysis. 3. Introduction to the Finite Element Methods for analysis of problems in structural engineering and solid mechanics. Strain-displacement and stress-strain relationships, potential energy and virtual work. Problems in plane elasticity, plate bending, shells, three-dimensional stress states. Computer implementation, high-order elements, individual term projects. *Prerequisite:* MATH 2310 and CE 4200 or ARE 4200 or ME 3010.

5140. Computational Methods in Applied Sciences I. 3. First semester of a three-semester computational methods series. Review of iterative solutions of linear and nonlinear systems of equations, polynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Identical to ME 5140, PETE 5140, CHE 5140, COSC 5310 and Math 5310. *Prerequisite:* Math 3310, COSC 1010.

5200. Advanced Structural Analysis. 3. Analysis of framed structures with stiffness-based matrix methods including plane trusses, frames, and grid systems and space trusses and frames. Column, beam, beam-column and frame stability. Geometric and material nonlinearities of framed structures. Plastic analysis and moment-curvature relationships. Computer applications are emphasized. *Prerequisite:* CE 4200 or equivalent.

5220. Structural Dynamics. 3. Introduction to general structural dynamics, general dynamic loading, generalized coordinated and nonlinear structural response, linear and nonlinear response spectra, multiple degree of freedom systems, continuous systems, and discretization of continuous systems. Introduction to seismic load specifications. *Prerequisite: CE 4200 or equivalent and MATH 2310.*

5230. Advanced Materials. 3. The objective of this course is to introduce the graduate student to the behavior of various materials found in typical structural engineering applications and to the mechanics of obtaining materials properties and structural response. *Prerequisite:* CE 4260.

5240. Structural Systems Design. 1-5 (Max. 6). A comprehensive design course for steel and reinforced concrete building structures. Topics include preliminary design, selection of framing systems, braced and unbraced frames, stability effects and nonlinear behavior. Students use case studies to develop design alternatives. *Prerequisite:* CE 4200, 4250, 4260.

5260. Prestressed Concrete Design. 3. This is a classical course on prestressed and precast concrete. The subject focuses on the principles, behavior and performance of prestressed and precast concrete. Topics include flexure, shear, and axial load, construction and fabrication issues, and applications. The course complements CE 4260. *Prerequisite:* CE 4260.

5270. Highway Bridge Engineering. 3. A study of the analysis, design and rating of highway bridges, including consideration of dead and vehicular loads, analysis of typical systems, service, fatigue and ultimate strength behavior, rating of existing bridge design, and bridge operations. Composite and non-composite steel and concrete bridges are considered. Includes investigations that require field trips outside the schedule class times. Contemporary issues are routinely discussed. Prerequisites: CE 4250 and 4260.

5280. Behavior of Reinforced Concrete. 3. Broad-based coverage of the behavior of concrete, both at the member and structure level. The course will have no assigned text, although students will be expected to have an undergraduate concrete design textbook and a current ACI Code. Readings will include a number of technical papers in each area covered. Emphasis will be on the background of the code, code development, and investigative techniques. *Prerequisite:* CE 4200 and 4260.

5300. Open-Channel Hydraulics. 3. Analysis and design of steady, uniform, gradually varied and spatially varied flow in open channels. Emphasis on basic fluid flow equations associated with natural and man-made open channels. *Prerequisite:* CE 3300.

5310. Hydraulics of Closed Conduits. 3. Pipe transmission and distribution systems design including flow control, flow measurement, energy dissipation, pump selection, transients, and cavitation. *Prerequisite:* CE 3300.

5330. Design of Hydraulic Structures. 3. Basic hydraulic principles and design of man-made channels. Analysis and design of control and regulating devices and measurement devices used in water resources systems. *Prerequisite:* CE 3300.

5400. Water Treatment. 3. Advanced theory and practice of collection, purification, and distribution of potable water; special emphasis on purification techniques, and plant requirements and design. *Prerequisite:* CE 4400.

5410. Advanced Biological Wastewater Treatment. 3. Theory and practice of advanced biological treatment processes for municipal and industrial wastewaters, sludges, groundwater bioremediation and solid waste. Emphasis is on fundamental principles applied to the design and control of existing processes and the development of innovative systems. *Prerequisites:* consent of instructor.

5425. Environmental Engineering Microbiology. 3. Development of microbiology for environmental engineering applications. Introduction to bacteria, fungi, protozoa and viruses with particular focus on pathogenicity and practical metabolic capabilities for waste treatment and remediation. Also examines the basis and pathways of important biochemical reactions including nitrification, hydrogen fermentation, dehalogenation and methanogenesis. *Prerequisite:* consent of instructor.

5435. Environmental Transport Processes. 3. Designed for graduate students and engineering seniors interested in the principles of mass transport and their application to environmental systems. Deals with the hydrodynamics of mixing and transport, as well as the interaction of mixing and various reaction rate processes. Applications include water and wastewater treatment, groundwater pollution, and transport and mixing in rivers, lakes and reservoirs. *Prerequisite:* MATH 2310 and ES 2330.

5440. Hazardous Waste Management Engineering. 3. A general treatment of the hazardous waste management problem and the regulatory climate surrounding the storage, transportation, treatment and disposal of hazardous waste is presented. The relationship between risk assessment and treatment/disposal facility design is covered. Design of landfills and incinerators is emphasized while waste minimization and resource recovery methods are reviewed using case studies. Cross listed with ENVE 5440. *Prerequisite:* CE 3400, consent of instructor.

5445. Hazardous Waste Site Remediation. 3. The contamination of soil, air, and groundwater by improper disposal of hazardous wastes is covered. Control and cleanup of contaminated groundwater plumes, treatment of polluted soils and soil gases is emphasized. Case studies are extensively used. Prerequisite: CE 3400 and consent of instructor.

5450. Advanced Physical-Chemical Treatment. 3. A study of physical and chemical processes for treatment of water and waste water. Cross listed with ENVE 5450. *Prerequisite:* CE 4400.

5455. Project Management for Environmental Engineering. 3. Covers the fundamentals of project management as applied to the environmental remediation field. Emphasis will be placed on project organization, work breakdown structures, life cycle management project implementation and control, and the integration of individual projects into the overall project management framework. *Prerequisite:* CE 3400.

5460. Industrial Waste Treatment. 3. A critical study of the sources and treatment of various industrial wastewaters is covered, including the regulatory framework establishing treatment goals. Case studies of various industries are used to illustrate methods of volume and strength reduction. Design of unit operations and processes peculiar to industrial waste treatment is emphasized. *Prerequisite:* CE 5410.

5510. Pavement Design for Airports and Highways. 3. Designing flexible and rigid pavements for highways and airports. Topics include pavement materials and common uses, soil stabilization, quality control of materials and pavement design procedures. Dual listed with CE 4510. *Prerequisite:* CE 3500 or 3600.

5530 [5520]. Traffic Engineering: Operations. 3. Basic characteristics of traffic, such as drivers, vehicles, volumes, speeds, delay, origins and destinations, intersection performance, capacity, termination and accidents; techniques for making traffic engineering investigations; traffic laws and ordinances, regulations, design and application of signal systems; curb parking control; enforcement and traffic administration; and public relations. Dual listed with CE 4530. *Prerequisite:* CE 3500.

5535. Engineering Decision Making. 3. A study of engineering decision-making techniques based on monetary and non-monetary criteria. Includes benefit-cost analysis, sufficiency ratings and sensitivity and risk analysis; mathematical programming and optimization models; multi-attribute and multi-objective decision-making methods; and management systems. *Prerequisite:* CE 3900.

5540. Traffic Control. 3. Planning, designing, and operating transportation facilities to optimum efficiency using traffic control devices. Topics included are traffic flow theory; pavement markings, signing, and signal design; computer design of signal systems using linear and network models; traffic control in construction areas. *Prerequisite:* CE 3500 and ES 2110.

5555. Geometric Design of Highways. 3. Criteria controlling geometric design of highways including design speed, design volume, vehicle requirements and capacity design standards for different highway types; design of sight distance, alignment, grade; cross-section design; access control, frontage roads; intersection design elements; and design of intersections and interchanges. CE 5555 students are required to do an additional integrated design term project using design software. Students may not receive credit for both CE 4555 and CE 5555. Dual listed with CE 4555. *Prerequisites:* CE 3500.

5560. Traffic Safety. 3. Safety design and operational practices for streets and highways including safety improvement programs, design of barrier systems, bicycle and pedestrian consideration; access control; safety evaluation; and measures of effectiveness. *Prerequisite:* CE 3500 and STAT 4220.

5570. Transportation Planning. 3. Short and long-range transportation planning; land-use planning, travel behavior and transportation studies including demand forecasting; parking and transit studies; highway and street planning; and freight transportation and multi-model planning. *Prerequisite:* CE 3500.

5575. Intelligent Transportation Systems. 3. The use of Intelligent Transportation Systems (ITS) to improve the safety, efficiency, reliability, and/or security of transportation systems. Covers ITS applications, technologies, deployment issues, and system performance in both urban and rural environments. *Prerequisites:* CE 3500.

5585. Pavement Management Systems. 3. A study of the systems that a transportation agency may utilize to manage the pavement in their road network. History and purpose of pavement management are studied as well as hot to make objective pavement management decisions. The distinction between project-level and network-level management concerns is explored and the implementation of a pavement management system is studied. Finally, methods for utilizing the information from the management system is studied. *Prerequisite:* CE 3500.

5590. Pavement Materials. 3. Selecting materials for highway construction, testing aggregates and bituminous materials, designing and testing asphalt mixtures; and recommending maintenance and rehabilitation strategies for deteriorated pavements. *Prerequisite:* CE 3500.

5620. Earth Retaining Structures and Slope Stability. 3. Earth pressure theories. Design of rigid and flexible earth retaining walls and braced excavations. Analysis, design, and control of natural and man-made slopes. *Prerequisite:* CE 3600.

5700. Civil Engineering Problems I. 1-3 (Max. 6). A special course, designed to make possible the study and investigation of problems or phases of civil engineering selected to fit the needs of the students. *Prerequisite:* consent of instructor.

5710. Civil Engineering Seminar I. 1-3 (Max. 6). A seminar type class furnishing motivation for advanced study of current problems in broad field of civil engineering by means of library research, study of current literature, and carefully guided class discussion. *Prerequisite:* consent of instructor.

5720. Civil Engineering Problems II. 1-3 (Max. 6). A special course designed to make possible the study and investigation of problems or phases of civil engineering selected to fit the needs of the student. *Prerequisite:* consent of instructor.

5730. Civil Engineering Seminar II. 1-3 (Max. 6). A seminar-type class furnishing motivation for advanced study of current problems in the broad field of engineering by means of library research, study of current literature, and carefully guided class discussions. *Prerequisite:* consent of instructor.

5785. H.T. Person Seminar. 3. Special topics in engineering as presented by the H.T. Person distinguished professor. *Prerequisite:* graduate standing.

5810. Groundwater Hydrology. 3. Laws governing the movement, recharge, and production of underground water with special emphasis on techniques and methods for analysis and modeling for development of groundwater resources. *Prerequisite:* CE 4800.

5820. Design of Small Earth Dams. 3. Develop understanding, analysis, design and construction techniques for all components considered in small earth dam design. integration of hydrology, hydraulics and soil mechanics into a sound dam design. Dam design will be emphasized from foundation through embankment. *Prerequisite:* CE 3300, 3600 and 4800 or concurrent enrollment.

5830. Flow in Porous Media. 3. Examines fluid (liquid, gas, vapor) and heat flow in porous media and its effects specifically in soil. Near surface effects (impibation, infiltration and evaporation) is emphasized. Analytic and numerical solution techniques will be developed. *Prerequisite:* CE 5810.

5860. Soil Erosion and Conservation. 3. Physical principles of soil erosion by wind and water, computer simulations of erosion, selection and design of erosion control practices and structures. *Prerequisite:* CE 4300, CE 4800.

5870. Water Resources Engineering. 3. Study in water resource planning and design and problem solving applying engineering principles and procedures. Western United States water problems are emphasized, including user completion, reallocation, consumptive use, water development, conservation, conveyance losses, and return flows. *Prerequisite:* CE 3300.

5880. Advanced Hydrology. 3. Advanced hydrologic analysis of floods, sediment, water utilization, flow routing, and the application of special hydrologic problems. *Prerequisite:* CE 3300 and CE 4800.

5885. Hydrometeorology. 3. Global radiation budget, global hydrologic cycle, precipitation formation, occurrence and remote sensing, snow melt, evapotranspiration, interception, infiltration and runoff generation mechanisms, overland flow, land surface modeling, stream routing. *Prerequisite:* CE 3300.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* Enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Architectural Engineering (ARE)

5400. Building Energy Management. 3. A rigorous treatment of issues related to the judicious use of energy in the design and use of buildings is provided. Energy-efficient HVAC systems and system control, energy-conscious building design, building energy analysis, auditing, building envelope, energy-efficient lighting design, energy management programs, energy sources and conservation, rate schedules, waste-heat recovery, passive solar heating/cooling and daylighting. *Prerequisites:* ARE 3430, 4460.

Department of Computer Science

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Web site: www.cs.uwyo.edu
Department Head: Jerry Hamann

Professors:
THOMAS A. BAILEY, JR., B.S. Alma College 1964; M.S. University of Colorado 1969; Ph.D. Michigan State University 1978; Professor of Computer Science 1998, 1980.
JOHN R. COWLES, B.A. University of Wyoming 1968; M.A. University of Nebraska 1970; Ph.D. Pennsylvania State University 1975; Professor of Computer Science 1992, 1978.
JEFFREY VAN BAALEN, B.S. University of Wyoming 1977; M.S. 1980; Ph.D. Massachusetts Institute of Technology 1988; Head of the Department of Computer Science 2000; Professor of Computer Science 2002, 1991.

Associate Professors:
JAMES L. CALDWELL, B.S. State University of New York 1984; M.S. 1988; M.S. Cornell University 1995; Ph.D. 1998; Associate Professor of Computer Science 2004, 1998.
RUBEN GAMBOA, B.S. Angelo State University 1984; M.S. Texas A&M University 1986; Ph.D. The University of Texas 1999; Associate Professor of Computer Science 2007, 2002.
JERRY C. HAMANN, B.S. University of Wyoming 1984; M.S. 1988; Ph.D. University of Wisconsin-Madison 1993; Associate Professor of Electrical and Computer Engineering 1999, 1993.

Assistant Professors:
JOHN M. HITCHCOCK, B.S. Iowa State University 1999; M.S. 2001; Ph.D. 2003; Assistant Professor of Computer Science 2003.
LIQIANG WANG, B.S. Hebei Normal University 1995; M.Eng. Sichjan University 1998; M.S. SUNY Stony Brook 2003; Ph.D. 2006; Assistant Professor of Computer Science 2006.

Lecturers:
Anderson, Buckner, Ward

Professor Emeritus:
Henry R. Bauer III

Lecturer Emeritus:
Jeri R. Hanly

The Department of Computer Science offers graduate work leading to the master of science degree in computer science and the doctor of philosophy in computer science.

Program Specific Admission Requirement

Applicants must meet the minimum standards of the university.

Acceptance will be based on the student's academic records.

For the master's degree and the Ph.D. program, the following courses or their equivalent are considered preparatory for graduate work in computer science: COSC 3020, COSC 4100 or 4200, COSC 4740, and COSC 4780 or 4785. Students admitted to the program must show proficiency in these courses.

An applicant whose previous studies are in a field significantly removed from computer science may be admitted to the regular master's degree or the Ph.D. program on the condition that he or she take additional courses to remove deficiencies in his or her computer science background.

Admission to the master's degree program or the conferring of a master's degree will not constitute a de facto admission to the Ph.D. program.

The curriculum is divided into four areas of study. These areas represent current areas of interest and expertise on the part of the faculty and are subject to change.

Computer Theory includes the theoretical and structural study of algorithms, automata, computability, computational complexity, information, formal languages, models, mathematical logic, recursive functions and sequential machines.

Parallel Computing and Systems includes the design, development and evaluation of computing machines, computing languages, language processors, operating systems and special purpose systems. It is further concerned with the analysis of complex problems into subparts that can be handled by multiple processors located at one or more sites and coordinated so as to produce a complete solution.

Mathematical Computation and Modeling includes numerical solution of algebraic equations and systems of equations, numerical differentiation and integration, interpolation, optimization and linear programming, matrix computation, eigenvalues and eigenvectors, numerical solution of differential equations and approximation theory.

Machine Intelligence is concerned with endowing machines with such manifestations of human intelligence as vision, spoken language recognition, knowledge representation, task planning, the application of search procedures to problem solving, question answering, inference, and the dispensing of expert knowledge and advice.

Program Specific Degree Requirements

All students must complete COSC 5050 (Research Writing for Computer Science).

At least 15 hours applied to the degree program must be in courses offered by the computer science department, not including the 14 hours of courses considered preparatory and not including seminars, individual projects, COSC 5050 or reading courses. Courses cross listed with computer science department courses will be considered computer science department courses.

No more than 6 hours from the 4000 level preparatory coursework may be counted toward the total credit requirement. At most 2 hours from the 4000 level preparatory coursework may be counted toward an area requirement. All required preparatory coursework will be listed on the program of study with the corresponding increase in total hours required.

The student must complete at least one 5000-level computer science course, not including seminars, individual projects or reading courses, offered by the computer science department in the following areas: a) Computer Theory and b) Parallel Computing and Systems.

The student must complete at least 8 hours of courses in each of two areas of study. These two areas will be called major areas. The 8 credit hours in each of two areas of study must be completed from the current list of courses designated to satisfy the area of study requirements. "Current list" is defined to mean the list in effect when the student enters the graduate program or any succeeding list.

The graduate examination, which serves as the Ph.D. qualifying examination, will also be administered to Plan B master's students, who will be required to pass two areas in order to receive their degrees. Passing criteria will be determined by the student's graduate committee. In addition, both Plan A and Plan B students are required to formally defend their papers before their graduate committees. Plan A students must give a public colloquium on their research prior to their formal defense. All defenses must be open and announced three weeks in advance.

Master's Program

Plan A (thesis)

The student must complete a minimum of 29 hours of courses, including at least two COSC 5000 seminars.

The student must complete a minimum of 4 hours of 5960, Thesis Research.

At least two-thirds of the coursework (20 hours) must consist of computer science department courses.

Plan B (non-thesis)

The student must complete a minimum of 33 hours of courses, including at least two COSC 5000 seminars, and present a paper as described in the general requirements for Plan B.

Doctoral Program

Each doctoral student will have a supervising committee of five members appointed. The primary functions of this committee are to suggest coursework, to administer the preliminary and final examinations, and to oversee and evaluate the research of the candidate. The committee will consist of at least three members of the computer science department faculty and at least one non-COSC graduate faculty member. The standards that this committee should consider when recommending programs of study are outlined in the following sections.

A total of at least 72 credit hours must be completed. A minimum of 42 of these credit hours must be taken as coursework. At least 21 hours must be taken at the 5000 level (COSC 5050 may not be applied to this requirement). Each doctoral student must participate in at least four graduate seminars. A minimum of 12 hours of dissertation research must be taken.

A program of original and innovative research will be undertaken by the candidate. At the end of this program, the candidate will document this research in a dissertation. The dissertation will present the details and results of the candidate's research in addition to providing a critical comparison with related published works.

Each successful doctoral student must pass three examinations. These include a qualifying examination, a preliminary examination, and a final (dissertation) defense.

The departmental graduate examination will serve as the Ph.D. qualifying examination. This examination will be given once each year during the spring semester, and should be taken during the fourth semester of graduate study. The graduate examination will test knowledge and reasoning skills based on the upper-division preparatory courses as well as on graduate courses in the core areas. Ph.D. students will be required to answer questions from the undergraduate core courses but will be given greater flexibility to select questions from the graduate courses.

A preliminary examination will consist of a presentation and defense of the proposed dissertation research. This examination is intended to motivate the candidate to review relevant literature extensively prior to pursuing the original and innovative portions of the research. If the nature of the proposed research and methodology are deemed to be both appropriate and significant by the supervisory committee, then the committee will approve the research direction after having administered this examination.

The final examination (dissertation defense) will consist of an oral presentation by the candidate of his/her research and the results that were derived. At this examination, the candidate is expected to defend the research as being original and contributory to the discipline of computer science.

All Ph.D. candidates must satisfactorily complete COSC 5050 (Research Writing for Computer Science).

Information concerning timeline and deadlines for meeting doctoral degree requirements is available from the department office.

Academic Dishonesty

For cases in which a graduate student has admitted to an act of academic dishonesty or has been found culpable through university procedures according to University Regulation 6-802, the graduate committee will meet with the student and faculty member(s) involved to assess the severity of the act. Both the faculty member(s) and the student will be afforded the opportunity to present views and information relevant to the act. The graduate committee may then take action by recommending that the student be terminated from graduate study in the department (for flagrant violations) or that a letter of reprimand be sent to the student with a copy sent to the Office of the Registrar.

Computer Science (COSC)

5000. Seminar in Computer Science. 1-3. (Max. 10). One or more current research areas in computer science are investigated. *Prerequisite:* consent of instructor.

5010. Graduate Topics in Computer Science. 1-6 (Max. 12). Individual or small group pursuit of computer science research areas. (Max. of 12 hours from COSC 4010 and COSC 5010 may be applied to graduate study). *Prerequisites:* graduate standing and consent of instructor.

5020. Advanced Topics in Computer Science. 1-6 (Max. 12). Advanced topics in computer science. (A maximum of 12 hours may be applied to graduate study.) *Prerequisites:* graduate standing and consent of instructor.

5050. Research Writing in Computer Science. 3. Instruction in methods for performing and reporting research in the field of computer science. The primary task is preparation of a research paper; to that end, the class covers how to collect and analyze previously published work, generate and develop a research topic, and present research results in acceptable written form. *Prerequisite:* graduate standing, consent of instructor.

5110. Analysis Of Algorithms. 3. Analysis of algorithms to determine their time and space requirements. Beginning with data structures such as lists, stacks, trees, and sets and their implementations. The class then analyzes specific algorithms for internal sorting, hashing, and string search. Offered fall semester of even numbered years. *Prerequisites:* COSC 3020 or equivalent and consent of the department.

5120. Theory Of Computation. 3. Models of computation, the Church-Turing thesis, computable functions, decidable and enumerable sets, unsolvable problems, correctness of programs, and complexity of computation. The theory of computation provides precise answers to the fundamental questions of computer science: Which problems can be solved by machine computation and which can be solved using a reasonable amount of computer resources. *Prerequisite:* COSC 4100.

5200. Computational Complexity. 3. Study of efficient computation and computational intracability. Time and space complexity; P, NP, and the polynomial-time hierarchy; reductions and completeness; randomized complexity; non-uniform complexity; approximation algorithms and inapproximability. *Prerequisite:* COSC 4100 or COSC 4200.

5220. Languages and Automata. 3. The study of regular, context-free, and context-sensitive languages and their relations to finite-state, pushdown and linear-bounded automata. Context-free language recognition. The halting problem and decidability results. *Prerequisite:* COSC 4100.

5310. Computational Methods in Applied Sciences I. 3. First semester of a three-semester computational methods series. Review of iterative solutions of linear and nonlinear systems of equations, polynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Cross listed with MATH 5310. *Prerequisites:* MATH 3310, COSC 1010.

5340. Computational Methods in Applied Sciences II. 3. Second semester of a three-semester computational methods series with emphasis on numerical solution of differential equations. Topics include explicit and implicit methods, methods for stiff ODE problems, finite difference, finite volume and finite element methods for time-independence PDEs, semi/fully discrete methods for time-dependent PDEs. Cross listed with MATH 5340. *Prerequisite:* MATH/COSC 5310.

5345. Computational Methods in Applied Sciences III. 3. Third semester of a three-semester computational methods series with emphasis on numerical solution of problems displaying sharp fronts and interfaces (nonlinear conservation laws, Hamilton-Jacobi equations. Cross listed with MATH 5345. *Prerequisite:* MATH/COSC 5340.

5350. System Simulation. 3. Introduces simulation and comparison with other techniques. Studies discrete simulation models, and introduction to, or review of, queuing theory and stochastic processes. Compares discrete change simulation languages. Examines simulation methodology including generation of random numbers and variates, design of simulation experiments for optimization, analysis of data generated by simulation models and results. Selected applications of simulation. Dual listed with COSC 4350. *Prerequisite:* COSC 3020, MATH 4250 or STAT 2010. Additional work is assigned for those enrolled for graduate credit.

5450. Computer Graphics. 3. Introduction to computer graphics, an increasingly important area of computer science. Computer graphics, together with multimedia and the world-wide web, offers exciting new possibilities for the design of human-computer interfaces. Presents the principles, techniques, and tools that enable these advances. Dual listed with COSC 4450. *Prerequisites:* COSC 3020, MATH 2250.

5540. Computer Vision. 3. Provides students with an understanding of applying computer methodologies to process two-dimensional and three-dimensional images. Primary areas of investigation are image preprocessing, knowledge representation, pattern recognition and motion understanding. Prerequisites: COSC 3020, MATH 2205, MATH 2250.

5550. Introduction to Artificial Intelligence. 3. A computational study of intelligent behavior. The focus is on intelligent agents, which could be software agents or robots. Covers how agents sense, reason, and act within their environment. Includes problem-solving, search, knowledge representation, planning, game playing, learning, and neural and belief networks. Dual listed with COSC 4550. *Prerequisite:* COSC 3020.

5555. Machine Learning. 3. To program machines to learn and improve their performance on their own, based on experience and/or data. The first part covers machine learning techniques. The second part covers applications. Dual listed with COSC 4555. *Prerequisite:* COSC 3020.

5560. Modern Robots and Softbots. 3. Begins with a presentation of popular agent designs: logic-based, biomimetic, and physicomimetc. Presents foundational issues on internal robot and softbot knowledge representations. Planning and control are then covered, followed by issues of how agents can reason and plan under real-world conditions of environmental uncertainty. Concludes with discussions about papers on modern robot and softbot applications, as well as invited lectures by graduate students and faculty in the UW COSC and ECE departments. Dual listed with COSC 4560. *Prerequisites:* none.

5640. Automated Reasoning. 3. Study of programs, such as automated theorem provers, which require the use of "intelligence" to solve problems. Topics include resolution, unification, proof strategies, induction based theorem provers, expert systems, and Prolog. *Prerequisite:* COSC 4100.

5700. Computer Architecture. 3. A study of the interaction between computing and computer architecture. Memory hierarchies: segmentation, paging, and caches. CPU organizations: pipelining, array processors, parallelism. IO: channels, DMA, auxiliary CPU's. Interprocessor communication in multi-CPU systems. *Prerequisites:* COSC 4740 and 4700.

5740. Advanced Operating Systems. 3. Advanced course in operating systems design and implementation. Emphasis on multiprocessing and distributed systems and study of mechanisms for their control. Topics include concurrency control, deadlock memory management, security, and reliability. *Prerequisite:* COSC 4740.

5750. Distributed Computing Systems. 3. Provides an in-depth study of distributed computing systems, including both architecture and software issues. Topics include concepts of distributed computing, communication primitives, distributed operating systems, distributed file management, and distributed programming languages. Particular attention is paid to modeling and analysis of distributed systems and algorithms. Programming projects and research papers are assigned. *Prerequisite:* COSC 5740.

5755. Network Applications. 3. Introduces the structure, implementation, and theoretical underpinnings of computer networking and the applications that have been enabled by that technology. Dual listed with COSC 4755. Prerequisite: COSC 3020.

5785. Compiler Construction I. 3. Theory and implementation of interpreters and compilers. Compiler topics include lexical analysis, top-down and bottom-up parsing methods, symbol tables, and code generation for a block-structured language with recursion and parameters. Project uses compiler writing tools. Dual listed with COSC 4785. *Prerequisite:* COSC 3020.

5790. Compiler Construction II. 3. Advanced topics concerning the front end of a programming language compiler, the description and implementation of features found in the back end of a compiler, and the run time environment. Topics include data type checking, global data flow analysis, flow graph reduction, local and global code optimization, and code generation. Reports on recent research papers. *Prerequisite:* COSC 4785 or 5785.

5820. Database Systems. 3. Provides comprehensive coverage of the problems involved in database design, in-depth coverage of data models and database languages. Students acquire practical skills of conceptual/logical database design and general familiarity with the problems and issues of database management. *Prerequisite:* COSC 3020.

5825. Advance Data Systems. 3. Provides comprehensive coverage of the problems involved in database system design and an in-depth examination of contemporary structures and techniques used in modern database management systems and database applications. *Prerequisite:* COSC 4820.

5840. Software Engineering Management. 3. Management issues in the development of software systems. Topics include planning documentation for requirements, design, implementation and testing, cost projection and modeling, documentation standards, code control, tracking of defects, management psychology, group interaction and communication, and the management of reviews and walk through. *Prerequisites:* COSC 4740, 4780 or equivalent and consent of the department.

5850. Software Management Laboratory. 3. Laboratory course designed to illustrate the principles discussed in COSC 5840. Students are team leaders on a project which involves the integration, testing, and maintenance of a large software system. The project is the same as that used for COSC 4850. *Prerequisite:* COSC 5840.

5880. Software Verification and Validation. 3. Concepts and practices for assuring the quality of software systems. Covers test planning, operational testing, formal verification, proofs of correctness, and validation testing. *Prerequisite:* COSC 3020 or COSC 4050.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2. (Max 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-16 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 3). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisites:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Department of Electrical and Computer Engineering

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Web site: wwweng.uwyo.edu/electrical
Department Head: Mark J. Balas

Professors:

MARK J. BALAS, B.S. University of Akron 1965; M.A. University of Maryland 1970; M.S. University of Denver 1974; Ph.D. 1974; Professor of Electrical Engineering 2004.

STANISLAW F. LEGOWSKI, M.Sc. Technical University of Gdansk, Poland 1962; Ph.D. 1971; Professor of Electrical Engineering 1993, 1983.

JOHN E. McINROY, B.S. University of Wyoming 1986; M.S. Rensselaer Polytechnic Institute 1988; Ph.D. 1991; Professor of Electrical Engineering 2002, 1991.

JOHN W. PIERRE, B.S. Montana State University 1986; M.S. University of Minnesota 1989; Ph.D. 1991; Professor of Electrical Engineering 2002, 1991.

A. H. M. SADRUL ULA, B.Sc.E.E. Engineering College in Bangladesh 1968; M.Sc.E.E. University of Engineering and Technology in Bangladesh 1973; Ph.D. University of Leeds 1977; Professor of Electrical Engineering 1992, 1982.

DAVID L. WHITMAN, B.S. University of Wyoming 1975; Ph.D. 1978; Professor 1991, 1986, 1981.

Associate Professors:

STEVEN F. BARRETT, B.S. University of Nebraska 1979; M.E. University of Idaho 1986; Ph.D. University of Texas 1993; Associate Professor of Electrical Engineering 2005, 1999.

EVA S. FERRE-PIKAL, B.S. University of Puerto Rico 1988; M.S. University of Michigan 1989; Ph.D. University of Colorado 1996; Associate Professor of Electrical Engineering 2004, 1998.

JERRY C. HAMANN, B.S. University of Wyoming 1984; M.S. 1988; Ph.D. University of Wisconsin-Madison 1993; Associate Professor of Electrical Engineering 1999, 1993.

ROBERT F. KUBICHEK, B.S.C.S., B.S.E.E. University of Wyoming 1976; M.S. 1977; Ph.D. 1985; Associate Professor of Electrical Engineering 1997, 1991.

SURESH S. MUKNAHALLIPATNA, B.E. University of Bangalore, India 1988; M.E. 1991; Ph.D. University of Wyoming 1995; Associate Professor of Electrical Engineering 2003, 1997.

JON M. PIKAL, B.S. Purdue University 1988; M.S. University of Colorado 1993; Ph.D. Colorado State University 1999; Associate Professor of Electrical Engineering 2005, 1999.

CAMERON H.G. WRIGHT, B.S. Louisiana Tech University 1983; M.S. Purdue University 1988; Ph.D. University of Texas 1996; Associate Professor of Electrical Engineering 2008, 2003.

Assistant Professors:

JOHN F. O'BRIEN, B.S. California State Polytechnic University, Pomona 1991; M.S. University of Wyoming 1997; Ph.D. Rensselaer Polytechnic Institute 2001; Assistant Professor of Electrical Engineering 2003.

MARGARETA STEFANOVIC, Dipl. Ing., University of Nis, Yugoslavia 1996; M.S. University of Southern California 2002; Ph.D. 2005; Assistant Professor of Electrical Engineering 2005.

Academic Professonal:

JEFFREY R. ANDERSON, B.S.E.E. University of Utah 1989; M.S.E.E 1992; Ph.D. University of Wyoming 2004; Assistant Academic Professional Lecturer in Electrical and Computer Engineering 2006.

Professors Emeriti:

Christos T. Constantinides, Jerry J. Cupal, Clifford D. Ferris, Raymond G. Jacquot, John W. Steadman

The department offers programs of study leading to the degrees of master of science and doctor of philosophy in electrical engineering. The areas of major concentration at the graduate level are: control systems (including robotics and electrical energy), electronic systems and devices (including material devices and RF circuits), and signal processing (including image processing, computer vision, and biomedical instrumentation) and computer networks. The department also offers a combined B.S./M.S. program for exceptional students wishing to obtain both degrees in a shorter period of time (see below).

Program Specific Admission Requirements

Statement of purpose
Official transcripts from all post-secondary institutions attended
GRE verbal percentile minimum of 40 percent
GRE quantitative percentile minimum of 65 percent. ETS only reports GRE scores taken within five years of the date of request
TOEFL total of 550 or 79 iBT

Program Specific Graduate Assistantships

The English Proficiency Assessment (EPA) is mandatory for incoming non-native English speaking international GAs with responsibilities in instruction. The English Proficiency Assessment is recommended for all international graduate students regardless of teaching responsibilities. Students also will need to follow recommendations for English language advancement.

Program Specific Degree Requirements

Master's Programs

Plan A (thesis)

This is a 30 hour program, 26 hours coursework and 4 hours of thesis

16 (minimum) in ECE formal coursework
3 (minimum) in formal coursework outside the department and approved by the student's committee
7 additional credits in or out of the department with committee approval
4 or more credits of M.S. thesis research
Of the above credit hours in formal coursework, no more than 12 can be 4000 level

Plan B (non-thesis)

This is a 30 hour program:
16 (minimum) in ECE formal coursework
3 (minimum) in formal coursework outside the department and approved by the student's committee
11 additional credits in or out of the department with committee approval
Of the above credit hours in formal coursework, no more than 12 can be 4000 level.
The candidate must meet the minimum requirements for the master of science degree and complete a plan B project
Satisfying the "Plan B project" can be completed in one of the following ways:

- Complete a project for a 5000-level EE course, including a class presentation
- Complete an independent project under EE 5880 (up to three credit hours), including a presentation

Doctoral Program

In addition to the minimum requirements of the university, doctoral students must pass a written and oral comprehensive examination, part of which is a written proposal explaining their planned dissertation research. Programs of study, including coursework and any research tools, are arranged by consultation between the students and their graduate committee.

Quick Start BS/MS Program

The combined B.S./M.S. program in electrical and computer engineering enables especially well-qualified students to be admitted to the M.S. program during the junior year of their B.S. program, and to work thereafter towards both the B.S. and M.S. degrees. These students would earn the B.S. in either electrical engineering or computer engineering and the M.S. degree in electrical engineering following the current curricula. This program allows for early planning of the M.S. portion of the student's education, taking graduate courses as part of the B.S. degree, more flexibility in the order in which courses are taken, and more efficient use of what would otherwise be a final semester with a light credit hour load.

Up to 6 credit hours from UW, at the 5000-level or above, may be counted toward both the B.S. and M.S. degree programs.

For further information please visit our Web site at wwweng.uwyo.edu/electrical/grad/bsms.html.

Electrical Engineering (EE)

5210. Systems Theory. 3. Review of linear time-invariant systems theory. Laplace, Fourier, and Z-transforms. Introduction to complex variable theory and its application to integral transform inversion. State variable formulation of physical systems. Application of linear algebra and matrices to the analysis of finite-state constant differential systems. Controllability and observability. *Prerequisite:* EE 4620.

5300. Introduction to Microwave & RF Circuits. 3. Analysis and design of microwave and RF circuits with applications to communication and radar systems. Review of transmission line concepts and the Smith Chart, scattering parameters, microstrip lines, and matching networks. Analysis and design of microwave and RF amplifiers, oscillators, and mixers. Dual listed with EE 4300. *Prerequisite:* EE 3150 or concurrent enrollment in EE 3330.

5320. Advanced Microwave Circuits. 3. Analysis and design of passive microwave circuits including microwave filters, resonators, power dividers, and directional couplers. Microstrip lines, broadband matching networks and effects of discontinuities in microstrip circuits are also discussed. *Prerequisites:* EE 4300 or EE 5300.

5330. Advanced Electronic Systems Design. 3. Theory of errors. High accuracy: multiplexers; voltage references; sample and hold circuits. Amplifiers: programmable gain; high speed voltage feedback; current feedback. Noise in integrated circuits. Pulse code modulation ADC; sigma delta ADC; oversampling; undersampling. Analog and digital audio systems. CD players. Superheterodyne and digital receivers. Signal transmission and conditioning. Hardware design techniques. *Prerequisite:* EE 4330 and 4210.

5340. Advanced Semiconductor Material and Devices. 3. Advanced semiconductor materials and device concepts including noise in semiconductors, heterostructure and quantum fundamentals, high power materials and devices, high performance transistors including the MESFET, HEMT, and HBT. Also discusses GUNN and IMPATT diodes, Resonant Tunneling devices, and future computing devices based on the quantum properties of semiconductors. *Prerequisite:* EE 4340.

5350. Optoelectronic Semiconductor Materials and Devices. 3. Optoelectronic properties of semiconductor materials and devices. Includes a review of the basic electronic properties of semiconductors materials, epitaxial growth, optical properties including absorption and emission of light, effects of quantum confinement and strain, and Heterostructures. Operation and optimization of basic optoelectronic devices including: photodetectors, LEDs Lasers, and modulators. *Prerequisite:* EE 4340.

5360. Digital VLSI Design. 3. Digital building blocks, stick diagrams, CMOS cells and arrays, CMOS digital subsystems and systems. Chip design software such as layout, simulators and digital synthesis using HDL. Digital design verification and timing issues. *Prerequisite:* EE 4360.

5370. Analog VLSI Design. 3. CMOS amplifiers, comparators, operational transconductance amplifiers, op-amps, D/A and A/D, signal sources, chip design, software and SPICE will be used. *Prerequisite:* EE 4360.

5390. Computer Architecture. 3. Examines the various methodologies used in the design of high-performance computer systems. Topics include CISC and RISC architecture and instruction sets, pipelining, instruction-level parallelism, memory hierarchy (including cache) design and computer networks. *Prerequisite:* EE 4390.

5400. Introduction To Robotics. 3. Representation of pose using Euler angles, quaternions and homogeneous coordinate transformations. Forward and inverse kinematics of rigid body manipulators. Velocity and force transformation in a rigid robot using Jacobians. Trajectory generation using splines. Robotic vision for depth measurement. Analysis of actual robotic systems. *Prerequisite:* MATH 2250.

5410. Neural and Fuzzy Systems. 3. Theory of feed forward and recurrent neural networks. Supervised and unsupervised learning theories. Fuzzy logic and systems. Associative memories. Matching and self-organizing networks. Application of neural and fuzzy systems. *Prerequisite:* EE 3220.

5420. Speech Processing. 3. Introduction to the field of digital speech processing and analysis. Speech production models. Analysis using LPC, spectrum, cepstrum, hidden Markov models. Pitch and formant estimation. Speech coding and compression. Speech and speaker recognition. Speech synthesis and enhancement. *Prerequisite:* EE 3220, EE 4220.

5450. Topics in Robotics. 3. Topics vary between offerings, but include exponential coordinates for describing rigid motion, parallel machines, robotic vision, actuators and sensors, calibration, quaternions, motion planning, multifinger grasp dynamics, singularities, and singularity-free design, and limited-DOF machines. *Prerequisite:* MATH 2250, senior or higher level standing and permission of the instructor.

5470. Optimal Control. 3. Calculus of Variations: Principal of Optimality; Hamilton-Jacobi-Bellman Equation; Linear Quadratic regulator; Linear Quadratic Gaussian; Loop Transfer Recovery; Suboptimal Feedback; LQR with Output Feedback; Optimal Estimation Theory; Pontryagin's minimum principle. *Prerequisites:* EE 4620, MATH 2210, MATH 2310, MATH 2250.

5475. Adaptive Control Systems. 3. One of the fundamental problems in the successful operation of mechanically flexible aerospace structures is their poorly known dynamical behavior in the new environment of space. Experimentation, both ground and space based, are combined with large-scale simulation to understand and control these structures. Introduces the fundamental ideas of adaptive systems and develop a foundation from which to assess the voluminous literature. *Prerequisites:* EE 5210.

5490. Convex Optimization. 3. Covers fundamentals of numerical convex optimization. These methods have potential applications in many fields, so the goal of the course is to develop the skills and background needed to recognize, formulate, and solve convex optimization problems. Covers convex sets, convex functions, convex optimization problems and applications. *Prerequisites:* MATH 2250 and senior or higher level standing.

5590. Real Time Embedded Systems. 3. Emphasizes a systems approach to real time embedded systems. Students are expected to apply methodical system design practices to designing and implementing a microprocessor-based real time embedded system. Students employ a robot-based educational platform to learn the intracacies of real time embedded systems, distributed processing, and fuzzy logic. Students learn processor input/output interfacing techniques. Students use state-of-of-the-art design and troubleshooting tools. Dual listed with EE 4590. *Prerequisites:* EE 4390.

5600. Statistical Signal Processing. 2-4. (Max. 9). Topics vary between offerings but include signal detection, feature extraction and pattern recognition, information theory and coding, spectral analysis, identification, speech processing, image processing, and seismic processing. *Prerequisite:* EE 4220.

5610. Randon Processing Theory I. 3. Introduction to statistical models. Applications of sampling theorems. Correlation functions and spectra. Shot noise and thermal noise. Introduction to measurements and computational techniques. Nonlinear random processes. Term papers on special problems. *Prerequisite:* EE 4220.

5625. Spectral Analysis. 3. Spectral estimation including nonparametric methods such as Welch and Blackman-Tukey; modern parametric methods for AR, MA and ARMA spectra including Yule-Walker and Levinson-Durbin. Parametric line spectral subspace methods including MUSIC and ESPRIT. Filterbank and spatial methods such as beamforming. *Prerequisites:* EE 3220, 4220 or equivalent.

5630. Advanced Image Processing. 3. Introduces students to advanced aspects of image processing (IP), using specific applications to demonstrate these principles. Concepts such as medical imaging; color IP; wavelets and multiresolution IP; image compression; morphological IP; image segmentation, representation, description and understanding are covered. *Prerequisites:* EE 4530.

5640. Adaptive Filters and Signal Processing. 3. Adaptive filtering including eigenanalysis, low-rank modeling, Wiener filters, linear prediction, steepest descent methods, least mean-squares and recursive least squares methods, adaptive beamforming. Performance, convergence, and stability issues. Realization techniques. *Prerequisites:* EE 4220.

5650. Object and Pattern Recognition. 3. Introduces students to both fundamental and advanced aspects of object and pattern recognition, using specific applications to demonstrate these principles. Concepts such as Bayesian, maximum-likelihood, principal components, nonparametric, linear discriminant, multi-layer neural networks, etc., and the trade-offs and appropriateness of classification techniques are covered. *Prerequisite:* EE 4220.

5660. System Identification. 3. Fundamental and advanced topics in identification of system models from measured data. A variety of model structures are studied such as ARX, ARMAX, and State Space. Both non-parametric and parametric identification techniques are investigated with applications to real world systems and data. Experiment design and model validation are also examined. *Prerequisites:* EE 4220.

5700. Power Engineering. 2-6 (Max. 6). Design of transmission lines and distribution systems. Coordination studies. System stability studies, load distribution and dispatching. System interconnections. Correlation of machines and transmission systems. *Prerequisite:* EE 4510.

5740. Digital Control Systems. 3. Mathematical models of digital control system components; Sample-and-Hold Device, A/D and D/A conversion, Pulse transfer function, Modified Z-transform; Jury's and Routh-Hurwitz test, Bilinear Transformations, Nyquist Criterion, Root Locus; Frequency Domain Techniques (Bode Diagrams, Nichols Charts); Digital Control Design, Observers; DT state space representation; Sampling and Quanitization, Aliasing. Design Project. *Prerequisite:* EE 4620.

5770. Non Linear Systems. 3. Time variable parameter systems, approximation methods for small nonlinearites. Phase-plane methods. The second method of Liapunov. Describing function. Optimum switched systems. Adaptive control systems. *Prerequisite:* EE 4620.

5880. Probems In Electrical Engineering. 1-6 (Max. 9). A graduate special topics course in which advanced developments are studied. Section I is individual study. Other sections primarily seminar format in which participants present reports on the subject under study. Prior approval of the instructor is required.

5900. Practicum in College Teaching. 1-3. (Max 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies:. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 12). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrolled in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisites:* enrolled in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Bioengineering (BE)

5810. Bioinstrumentation. 3. Discussion of the cardiovascular, pulmonary, and nervous systems with regard to monitoring function and the transducers used to measure system parameters. Transducer systems, amplifiers, and recording systems used in research and clinical applications. Dual listed with BE 4810. *Prerequisite:* basic course or equivalent in electronics, ZOO 4240 or concurrent enrollment.

5820. Bio-Data Systems. 2. Extraction of signals from noise and data analysis. Emphasis on system modeling of physiological functions from experimental data. Dual listed with BE 4820. *Prerequisite:* basic course, or equivalent, in electronics, ZOO 4240 or concurrent enrollment.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

Environmental Engineering

3074 Engineering Building, 766-5255
E-mail: ceinfo.uwyo.edu
Web site: www.eng.uwyo.edu/civil

A master of science in environmental engineering is available in the College of Engineering through a joint effort of the Department of Civil and Architectural Engineering and the Department of Chemical and Petroleum Engineering in cooperation with the School of Environment and Natural Resources. This interdisciplinary degree offers students an engineering perspective for solutions to environmental problems. Emphasis is on minimization, monitoring, control, and processing of waste products as well as treatment and disposal associated with point and non-point pollution sources. Integration of engineering with science, regulatory, and policy aspects of environmental engineering is an important component of this unique program. Further information is available from the environmental engineering graduate studies program office and/or departments involved.

Program Specific Admission Requirements

Any additional requirements as per cooperating department: Civil and Architectural Engineering or Chemical and Petroleum Engineering.

Program Specific Degree Requirements

Master of Science in Environmental Engineering

Plan A (thesis)

Students must meet university minimum requirements.

Early in the program, the student must submit a program of study listing coursework for approval by the departmental graduate studies committee, the department head, and subsequently, the Office of the Registrar.

Plan A is required of all state supported graduate assistants.

Plan B (non-thesis)

Students must meet university minimum requirements

Early in the program, the student must submit a program of study listing coursework and the course number that the Plan B paper covers for approval by the graduate studies committee, the department head, and subsequently, the Office of the Registrar.

Environmental Engineering (ENVE)

5010. Environmental Engineering Principles. 4. Covers the engineering science topics for environmental engineers, such as water biology and chemistry, mass transfer processes, adsorption/absorption, ion exchange, porous media flow, etc. Some laboratory and field trip experience will be involved, including use of computer software related with water, air, and solid pollution. *Prerequisite:* CHEM 1030 or 1060, MATH 2310.

5440. Hazardous Waste Management Engineering. 3. A general treatment of the hazardous waste management problem and the regulatory climate surrounding the storage, transportation, treatment and disposal of hazardous waste is presented. The relationship between risk assessment and treatment/disposal facility design is covered. Design of landfills and incinerators is emphasized while waste minimization and resource recovery methods are reviewed using case studies. Cross listed with CE 5440. *Prerequisites:* CE 3400, consent of instructor.

5450. Advanced Physical Chemical Treatment. 3. A study of physical and chemical processes for treatment of water, and waste water. Cross listed with CE 5450. *Prerequisite:* CE 4400.

5510. Air Pollution Control Engineering. 3. Coverage includes science and engineering of air pollution sources, formation mechanisms, and removal of pollutants including discussion on air pollution effects. *Prerequisites:* CHEM 1060 or CHEM 1030, MATH 2310.

5880. Topics. 1-3 (Max. 6). Selected topics in environmental engineering. Offered on an individual or small group basis as appropriate. Intended to accommodate various specialized subjects not offered on a regular course. Students may enroll in more than one section of this course provided topics are different. *Prerequisite:* consent of instructor.

5885. Problems. 1-3 (Max. 6). Special course designed to make possible individual investigation of problems of environmental engineering selected to fit student's educational research needs. *Prerequisite:* consent of instructor.

5895. Environmental Engineering Seminar. 1-3 (Max. 3). Departmental seminar on current research with formal training for professional and scholarly presentation of research/technical papers. *Prerequisites:* consent of instructor, graduate standing.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

Department of Mechanical Engineering

2052 Engineering Building, 766-2122
FAX: (307) 766-2695
Web site: wwweng.uwyo.edu/mechanical
E-mail: me.info@uwyo.edu
Department Head: Demitris A. Kouris

Professors:

DENNIS N. COON, B.S. Alfred University-New York; M.S. 1984; Ph.D. Pennsylvania State University 1986; Professor of Mechanical Engineering 1999, 1988.

ANDREW C. HANSEN, B.S Montana State University 1980; M.S. University of Washington 1982; Ph.D. Montana State University 1985; Professor of Mechanical Engineering 1996, 1986.

DEMITRIS A. KOURIS, Diploma National Technical University of Athens 1982; M.S. Illinois Institute of Technology 1984; Ph.D. Northwestern University 1987; Professor Mechanical Engineering 2001; Head of Mechanical Engineering 2001.

DIMITRI J. MAVRIPLIS, B.S. McGill University 1982; M.Eng. 1982; Ph.D. Princeton University 1987; Professor of Mechanical Engineering 2003.

OVID A. PLUMB, B.S. Colorado State University 1967; M.S. 1972; Ph.D. State University of New York-Buffalo 1976; Professor of Mechanical Engineering 1999.

DAVID E. WALRATH, B.S. University of Wyoming 1974; M.S. 1975; Ph.D. University of Delaware 1986; Professor of Mechanical Engineering 1998, 1986.

Associate Professors:

PAUL A. DELLENBACK, B.S. Texas Tech University 1978; M.S. 1980; Ph.D. Arizona State University 1986; Associate Professor of Mechanical Engineering 1994, 1990.

MARK R. GARNICH, B.S. Michigan Technological University 1981; M.S. 1983; Ph.D. University of Wyoming 1996; Associate Professor of Mechanical Engineering 2001.

JONATHAN W. NAUGHTON, B.S. Cornell University 1986; Ph.D. Pennsylvania State University 1993; Associate Professor of Mechanical Engineering 2003, 1997.

DOUGLAS R. SMITH, Sc.B. Brown University 1987; M.A. Princeton University 1990; Ph.D. 1993; Associate Professor of Mechanical Engineering 2004, 1998.

Assistant Professor:

SUKKY JUN, B.S. Yonsei University Korea 1988; M.S. Michigan State University 1992; Ph.D. Northwestern University 1996; Assistant Professor of Mechanical Engineering 2006.

CARL P. FRICK, B.S. University of Colorado at Boulder 1999; M.S. 2003; Ph.D. 2005; Assistant Professor of Mechanical Engineering 2008.

Associate Lecturer:

ANN NANCY PECK, B.S. Lehigh University 1984; M.S. Rensselaer Polytechnic Institute 1987; Ph.D. 1992; Associate Lecturer in Mechanical Engineering 2000, 1997.

Senior Research Scientist:

SCOTT A. MORTON, B.S. University of Wyoming 1972; M.S. 1978; Research Scientist in Mechanical Engineering 1999.

Associate Research Scientist

CHANGWEN MI, B.S. Nanjing University, China 2001; M.S. UTSC, China 2003; Ph.D. University of Wyoming 2006; Research Scientist in Mechanical Engineering 2007.

Professors Emeriti:

Donald F. Adams
Bruce R. Dewey
William R. Lindberg
John E. Nydahl
Kynric M. Pell
Donald A. Smith
Robert A. Wheasler

Adjunct Faculty:

Mark J. Balas
Michael L. Kmetz
Dan Stanescu
Stephan Heinz

The Department of Mechanical Engineering offers graduate study leading to both the M.S. and Ph.D. degrees in mechanical engineering. Mechanical engineering faculty conduct research in the areas of heat transfer, turbulence, aerodynamics, computational fluid dynamics, energy conversion, composite materials, continuum mechanics, computational material science, materials reliability, and nanomechanics of surfaces and interfaces.

Program Specific Admission Requirements

Applicants should submit a Statement of Purpose indicating their area of interest (either fluid or solid mechanics), abilities, and objectives in completing a mechanical engineering degree.

Program Specific Degree Requirements

Master's Program

Elements common to both Plan A and Plan B M.S. degrees

A core course of study, including ME 5000 (Solid Mechanics I), ME 5440 (Fluid Mechanics), and two mathematics-oriented courses, is required.

No graduate credit is allowed for 4000-level mechanical engineering courses. In conjunction with their advisor, students develop the balance of their program.

Candidates for the Master of Science degree normally have a bachelor's degree in mechanical engineering from an accredited engineering school. A holder of a bachelor's degree in another branch of engineering or in a related area, may qualify as a master's degree candidate in mechanical engineering by completing, without credit, certain prerequisite courses as specified by the department. These prerequisites would depend upon the candidate's background and upon the area in which he/she plans to specialize.

Plan A (thesis)

A thesis project is chosen in consultation with the appropriate ME faculty, and constitutes 4 credit hours of the 30-hour Plan A program.

ME 5478 (Seminar) is to be taken during the final semester when thesis is presented and defended.

Plan B (non-thesis)

The Plan B M.S. degree can be completed by earning a minimum of 31 credits beyond the baccalaureate degree.

Classes will consist of the following:

- Mathematics or Statistics (4000-level or above); minimum of 6 hours
- ME courses (5000-level); minimum of 15 hours
- Graduate Project (ME 5961); minimum of 1 hour
- Technical Electives (4000-level or higher); minimum of 9 hours
- Total: minimum of 31 hours

*Technical electives must be chosen with the approval of the academic adviser. They can be in mathematics, statistics, science, or other engineering disciplines. Up to two courses may be from the fields of business, ENR, or public policy. A maximum of 12 credits at the 4000 level may be taken. Special topic credits may be earned using ME 5475; a maximum of 6 credits may be earned in this manner.

*Research credits earned through ME 5960 as part of an unfinished M.S. Plan A program may not be counted. Although the Plan B M.S. degree is not research-oriented, the program must contain an "element of discovery", documented by completing ME 5961 (Graduate Project). This could be a special project performed as independent study or as part of a graduate course. The department's graduate committee must approve the project.

In addition, on-campus students enrolled in this program will be expected to attend at least three Mechanical Engineering Department graduate seminars per semester.

Quick Start BS/MS Program

Through judicious choice of undergraduate electives, this program allows double-counting up to two 5000-level courses from the B.S. program toward M.S. degree requirements, thus reducing the time requirement for completing an M.S. degree. The joint B.S./M.S. program is only available to highly qualified students. Students can apply for admission to the B.S./M.S. program by achieving junior status and meeting the following requirements for admission:

- completion of the four core ME courses (ME 3010, ME 3020, ME 3040, and ME 3360),
- a minimum overall GPA of 3.25,
- a minimum GPA of 3.25 in ME courses, and
- a minimum of three letters of recommendation (at least two must be from ME faculty at UW).

Students must maintain a GPA of at least 3.25 in their undergraduate and at least 3.0 in their graduate coursework in order to remain in good standing in the program. Not meeting the GPA requirement places a student on probation for one semester. If the GPA requirement is not met after that semester, the student will no longer be enrolled in the Quick Start program.

Transfer students must have taken courses equivalent to the ME core courses. Transfer students must have also completed at least 15 credit hours of courses at UW in order to be eligible for admission.

PhysME - B.S. in Physics & M.S. in Mechanical Engineering

The PhysME program provides an opportunity for undergraduate physics students at UW to continue their studies in mechanical engineering. At the end of the fourth year, students would be able to receive a B.S. in Physics Plus and automatically (after fulfilling the university admission requirements) enroll in the mechanical engineering M.S. Program. This integrated program takes advantage of similar courses in the curricula of the two departments and by utilizing a number of carefully selected engineering courses as electives within the Physics Plus degree.

Doctoral Program

For students of outstanding academic ability and with demonstrated capacity for undertaking independent research on advanced engineering problems, the Ph.D. program in mechanical engineering is offered.

The PhD requires a minimum of 72 graduate hours, at least 42 of which must be earned in formal coursework.

No graduate credit is allowed for 4000-level mechanical engineering courses.

A preliminary exam is required, and in most cases this should be taken before completing the third semester of study. The preliminary exam shall consist of a written component administered by the student's committee and an open presentation of the proposed dissertation research.

The dissertation research will be publicly presented and conclusions defended in accordance with university policy.

Mechanical Engineering (ME)

5000. Solid Mechanics I. 3. The first in a sequence of two introductory courses in solids mechanics. It includes elements of continuum mechanics, in addition to the introduction of elasticity theory (limited to plane problems), as well as elements of viscoelasticity and plasticity. Identical to CE 5000. *Prerequisite:* CE 3200 or ME 3010 and MATH 2310.

5010. Solid Mechanics II. 3. The second in a sequence of two introductory courses in solids mechanics. Includes elements of three-dimensional elasticity and fracture mechanics. *Prerequisite:* ME 5000.

5140. Computational Methods I. 3. First semester of a three-semester computational methods series. Second and Third courses of this series offered in MATH Department. Review of iterative solutions of linear and nonlinear systems of equations, poloynomial interpolation/approximation, numerical integration and differentiation, and basic ideas of Monte Carlo methods. Comparison of numerical techniques for programming time and space requirements, as well as convergence and stability. Identical to: PETE 5140, CE 5140, CHE 5140 and COSC 5310 and MATH 5310. *Prerequisite:* MATH 3310, COSC 1010.

5422. Advanced Vibrations. 3. Advanced principles of dynamics: Hamilton's principle, Lagrange's equations, modal analysis of discrete systems. Analysis of continuous systems; natural modes, approximate methods, forced vibration. Introduction to random vibration. *Prerequisite:* ME 4010.

5431. Analysis of Composite Materials. 3. Analysis of laminated anistropic structures, including plates and shells; buckling, failure criteria, and vibrations. *Prerequisite:* ME 4210.

5432. Advanced Materials Science. 3. An analysis of the relationships between the structures of materials and their mechanical and physical properties, leading to the application of these relationships to the design of materials for advanced engineering systems. Topics include crystallography, lattice defects, transport phenomena, phase transformations, fracture, environmental effects, and control of microstructure by processing. *Prerequisites:* ES 3450 and 4360, or consent of instructor.

5438. Plasticity and Viscoelasticity. 3. Analysis of stress and deformation of idealized plastic and viscoelastic solids. Limit theorems in plasticity. Time-dependent behavior of viscoelastic materials. *Prerequisite:* ME 5000.

5440. Fluid Mechanics. 3. Lagrangian and Eulerian descriptions, conservation laws, stress and rate-of-stress tensors, Navier-Stokes equations, energy equations, vorticity and circulation inviscid and potential flows, laminar flows, turbulent flows, boundary-layer theory. Cross listed with CHE 5440. *Prerequisites:* none.

5442. Advanced Fluid Mechanics. 3. Introduction to inviscid and viscous hydrodynamic stability; closure in turbulent flows; vorticity and vortex dynamics, theoretical aerodynamics, numerical simulations of viscous flows, experimental methods in fluid flows. *Prerequisite:* ME 5440.

5444. Optical Diagnostics in the Thermal and Fluid Sciences. 3. An introduction to optical measurement schemes used in gas and liquid flows. Topics include a review of relevant optical principles and lasers, and in-depth coverage of laser velocimetry, droplet and particle sizing, and temperature measurement. *Prerequisite:* graduate standing.

5446. Turbulence. 3. Basic notions, properties and scales in turbulent flows. Transport equations; Reynold's stresses, mixing and phenomenological theories. Turbulence dynamics; mean and fluctuating kinetic energy balances, vorticity and temperature fluctuations. Statistical description of turbulence; correlations and spectra, transport, isotropy and homogeneity. Shear flows; plane jets, wakes and boundary layers (including planetary). Turbulent diffusion. Identical to CHE 5446. *Prerequisite:* ME 5440.

5448. Experimental Fluid Dynamics. 3. Provides an introduction to the design of fluid dynamics experiments. Specific instrumentation will be discussed and methods of analyzing and assessing data will be presented. *Prerequisites:* graduate standing.

5450. Conduction and Radiation. 3. Applications of principles of heat transfer and thermodynamics to solution of steady-state and transient problems. Classical heat conduction theory. Radiation heat transfer theory. *Prerequisite:* MATH 4440 or concurrent registration.

5452. Convection Heat Transfer. 3. Convection, including heat and momentum transfer. Boundary layer theory. Laminar and turbulent flows, steady and unsteady formulations including differential and integral descriptions. High velocity, compressible systems. Cross listed with CHE 5452. *Prerequisite:* ES 3360 or consent of instructor.

5461. Computational Fluid Dynamics I. 3. An introduction to the fundamental techniques and theory of computational fluid dynamics. Topics include discretization methods (finite difference, finite volume, and finite element methods), numerical stability, consistency and convergence, and solution techniques such as explicit, implicit and multigrid methods. The emphasis will be on modern techniques for compressible flows. *Prerequisite:* MATH 5310.

5462. Computational Fluid Dynamics II. 3. A study of advanced techniques in modern-day scientific computing as applied to Computational Fluid Dynamics. These include unstructured mesh generation using Delaunay triangulation, searching and sorting techniques, and efficient data structures. Other topics cover efficient hardware implementation including cache-effects and parallel computing and sensitivity analysis for design optimization. Prerequisite: ME 5461.

5472. Continuum Mechanics. 3. The basic laws of the physical behavior of continuous media. Stress and deformation at a point; fundamental equations of balance of mass, momentum, and energy; second law of thermodynamics; curvilinear coordinate analysis. Applications to linear elasticity and fluid mechanics. *Prerequisite:* MATH 3310.

5474. Energy Methods. 3. Introduction to variational calculus with applications in solid mechanics. The basic theorems of virtual work, minimum potential energy, and complementary energy are developed. Direct methods such as Castigliano's theorem as well as the approximate methods of Ritz and Galerkin are developed and used to obtain solutions for a variety of problems in solid mechanics. *Prerequisite:* ME 3010.

5475. Topics in Mechanical Engineering II. 1-6 (Max 6). Directed research in mechanical engineering. *Prerequisite:* senior or graduate standing in engineering.

5476. Topics in Mechanical Engineering III. 1-6 (Max. 6). Directed research in mechanical engineering. *Prerequisite:* graduate standing in engineering.

5478. Seminar in Mechanical Engineer. 2. Prerequisite: graduate standing in engineering.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5961. Graduate Projects. 1-4 (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. Prerequisites: enrollment in Plan B program and have departmental approval.

5980. Dissertation Research. 1-12 (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

College of Health Sciences

Beverly Sullivan, Interim Dean
235 Health Sciences Center
Phone: (307)766-6556 FAX: (307)766-6608
Web site: www.uwyo.edu/hs

The College of Health Sciences offers programs leading to Master of Science degrees in Speech/Language Pathology (Communication Disorders), Kinesiology and Health, Nursing, and Social Work.

Health Sciences (HLSC)

5100. Global Public Health. 4. Introduces students to the global context of public health, to principles underlying global health, and to dimensions of public health particular to international settings. Examines major themes and policies in global health and analyzes health problems and varying responses to them in different parts of the world. Dual listed with HLST 4100; cross listed with INST 5100. *Prerequisite:* upper division or graduate standing.

5990. Topics In Health Sciences. 1-6 (Max. 12). Provides upper division/graduate student with the opportunity for critical analysis and in-depth examination of various current topics in health sciences fields. *Prerequisite:* graduate status.

Division of Communication Disorders

265 Health Sciences, 766-6427
Clinic FAX: (307) 766-6829;
Division FAX: (3074)766-5584
Web site: www.uwyo.edu/comdis
Director: Teresa Ukrainetz

Professors:
MARY HARDIN-JONES, B.A. Texas Tech University 1978; M.S. 1979; Ph.D. University of Iowa 1984; Director, Division of Communication Disorders 2001; Professor of Speech-Language Pathology 2005, 2001.
DAVID L. JONES, B.S. Westminster College 1980; M.A. University of Iowa 1983; Ph.D. 1987; Professor of Speech-Language Pathology 2005, 2001.
TERESA A. UKRAINETZ, B.A. University of Calgary 1984; M.S. University of British Columbia 1987; Ph.D. University of Texas at Austin 1995; Professor of Speech-Language Pathology 2007, 1995.

Associate Professors:
MICHAEL A. PRIMUS, B.A. University of Minnesota 1969; M.S. Colorado State University 1975; Ph.D. University of Washington 1984; Associate Professor of Audiology 1984.

Assistant Professors:
MELISSA M. ALLEN, B.A. University of Oregon 1992; M.S. 1999; Ph.D. 2003; Assistant Professor of Speech-Language Pathology 2007.
JILL E. SENNER, B.S. Northwestern University 1991; M.S. Purdue University 1996; Ph.D. Northwestern University 2002; Assistant Professor of Speech-Language Pathology 2008.
ROGER W. STEEVE, B.A. San Diego State University 1990; M.A. 1993; Ph.D University of Washington 2004; Assistant Professor of Speech-Language Pathology 2005.

Academic Professionals:
LUCY C. CARTER, B.S. University of Wyoming 1993; AAS-Interpreter, Front Range Community College 1995; Assistant Lecturer 2005.
TODD L. CORBETT, B.A. University of Wyoming 1993; M.A. Lewis & Clark College 1994; Associate Lecturer 2006, 1999.
LYNDA D. COYLE, B.A. Holy Names College 1981; M.S. University of Wisconsin-Eau Claire 1982; Senior Lecturer 2007, 1999.
CHRISTIANE DECHERT, B.A. Georg August Universitat 1979; M.A. University of Arizona 1982; M.A. Washington State University 1997; Assistant Lecturer 2001.
TERESA J. GARCIA, B.S. University of Wyoming 1989; M.S. 1991; Associate Lecturer 2004, 1995.
CATHERINE L. ROSS, B.S.W. Missouri State University 1973; M.S. University of Wyoming 1999; Assistant Lecturer 2008.
AMY M. WEAVER, B.S. University of Wyoming 1997; M.S. 2001; Assistant Lecturer 2004.

Adjunct Faculty:
Robert Quesal Ph.D.
Cathy Binger, Ph.D.

Adjunct Clinical Instructors:
Amy Bracken, M.S. CCC-SLP
Lisa Burns, M.S. CCC-SLP
Kathe Dahill, M.S. CCC-SLP
Susie Fornstrom, M.S. CCC-SLP
Lani Kersenbrock, M.S. CCC-SLP
Tempe Murphy, M.S. CCC-SLP
Micky Routson, M.S. CCC-SLP
Jean Marie Seitz, M.S. CCC-SLP

Professors Emeriti:
Janis A. Jelinek
Douglas W. Laws

The Division of Communication Disorders offers graduate work leading to the master of science degree in speech-language pathology.

Program Specific Admission Requirements

A bachelor's degree in speech, language, and hearing science or communication disorders. Admission is also open to students with a bachelor's degree in another major; however, these students must complete a set of undergraduate coursework (called leveling) as specified by division faculty as a prerequisite to graduate studies,

3.0 grade point average (on a 4.0 scale),

Composite score of 900 on the verbal and quantitative sections of the GRE. ETS only reports GRE scores taken within five years of the date of request.

Three letters of recommendation;

A Candidacy Statement (max. 400 words);

A GRE Writing score.

International applicants are welcomed, but they must fulfill the requirements for eligibility for certification as a speech-language pathologist in the United States. Applicants may have to provide evidence of oral and written English competence additional to a minimum 600 TOEFL score.

Acceptance to the graduate program is on a competitive basis.

Acceptance into the on-campus and distance program is made for fall starts only.

The GPA and GPA requirements apply to full admission. Only full admission is considered for the distance program.

Provisional admission to the on-campus program is possible. Provisional admission occurs when one score is below but close to the stated minimum and there is evidence of strengths in other areas sufficient to make the student competitive with other applicants. Additional requirements are imposed on students admitted provisionally.

Program Specific Graduate Assistantships

Financial help for graduate students is available each year through the department with assistantships and other funding. Typically, graduate assistantships include one-half tuition support and a monthly stipend. These assistantships require the student to spend 10 hours per week providing supportive services to the division or to individual faculty members.

Awards are competitive and based on past academic performance, evidence of professional promise, and letters of recommendation.

Apply for an assistantship by completing a graduate assistantship application. This application must be supported by at least three letters of recommendation, and a complete, official set of transcripts. Applications for graduate assistantships are accepted by the department until February 1 of the year preceding study. Recipients of the awards are notified as soon as possible after March 1.

Graduate assistantships are only awarded to on-campus applicants with full admission.

Program Specific Degree Requirements

Master's Programs

The graduate program consists of academic coursework, on-campus clinical practica, and external clinical practica. Students may pursue either a thesis or non-thesis track during their graduate studies. Both tracks lead to eligibility for the Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP), granted by the Clinical Certification Board of the American Speech-Language-Hearing Association. Graduates are also eligible for the Wyoming license in speech-language pathology. A supervised Clinical Fellowship Year (CFY) is required beyond the graduate degree for certification. The master of science program in speech-language pathology is accredited by the Council of Academic Accreditation of the American Speech-Language-Hearing Association.

Plan A (thesis)

Speech-Language Pathology (53 hour program)
- 33 hours of graduate academic coursework
- 16 hours of graduate clinical practicum (clinical track) or eight hours of additional graduate coursework (research option)
- 4 hours of 5960 thesis research

Plan B (Non-thesis) (50 hour program)

Speech-Language Pathology
- 34 hours of graduate academic coursework
- 16 hours of graduate clinical practicum (clinical track)

Distance Learning Program

The University of Wyoming Division of Communication Disorders offers a distance master's degree program and leveling course work in speech-language pathology. The program is open to both resident and nonresident students. Refer to the division Web site for current information and the Outreach School for course registration.

Leveling Coursework

Leveling is completed on a course-by-course basis, not as part of a degree program. Students sign up for leveling courses as non-degree undergraduate (NDU) each semester that they take only undergraduate courses. Any semester in which a student takes a graduate class (numbered 5000 or above, with the pre-requisites), the student must change status to non-degree graduate (NDG). This allows the graduate courses to be applied to the master's program at a later date. Fees and tuition for all the coursework in that semester are charged at the graduate student rate. Refer to the division Web site for a list of courses.

Continuing Education

Students may take graduate coursework on a continuing education basis without having been admitted to the graduate program. If students are accepted at a later date into the graduate program, they may apply a maximum of 12 graduate credit hours earned as a non-degree student toward their graduate degrees. Coursework submitted must be approved by the division at the time the official program of study is submitted. Coursework may not be older than 6 years from time of master's graduation.

Speech-Language Pathology (SPPA)

5000. Seminar in Communication Disorders. 1-8 (Max. 8). The participation in and discussion of special problems and/or research related to speech-language, pathology and audiology. *Prerequisite:* B.S. degree and consent of instructor.

5020. Phonological Assessment and Intervention. 3. Emphasis on normal phonetic and phonologic development, diagnosis and clinical management of articulatory and phonological disorders. *Prerequisite:* SPPA 3210.

5030. Clinical Practicum. 1-4 (Max. 8). Supervised clinical experience with speech, language, and hearing disordered children and adults under supervision of University of Wyoming Speech and Hearing Clinic faculty. *Prerequisite:* matriculating graduate students only.

5070. Deaf Culture and the History of Deaf America. 4. Studies deaf culture and history in the United States. Culture topics include deaf community dynamics, humor, behavior, emotional and social interaction, besides issues involving deaf children as a linguistic minority. History is discussed from the 1700s to the present in the U.S. Dual listed with SPPA 4070. *Prerequisite:* SPPA 4100.

5090. American Sign Language III. 4. Translation of English idioms for ASL and learning of ASL idioms, along with drugs, religion and sexuality signs, vocabulary, and cultural usage. *Prerequisite:* SPPA 2120.

5100. Motor Speech Disorders. 4. Utilizing audio and audio visual aids, this course acquaints student with dysarthric speech symptoms characteristic of various neurological disorders/diseases. Methods of dysarthric speech evaluation and therapy are considered. *Prerequisite:* SPPA 4380.

5110. Craniofacial Disorders. 2. Studies communication disorders related to cleft lip and palate disorders and associated craniofacial sequences and syndromes. Assessment and treatment of these communication disorders is presented in the context of interdisciplinary management. Surgical and nonsurgical treatment procedures employed to manage speech problems associated with velopharyngeal insufficiency are included. *Prerequisite:* SPPA 3265, SPPA 3210.

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing, and psychology. Cross listed with FCSC, EDEC, NURS, PSYC, HLED 5115. *Prerequisite:* graduate status.

5120. Stuttering. 3. Theories of etiology, symptoms of the problem, diagnosis and treatment of childhood non-fluency and various approaches to therapy for the adult stutterer. *Prerequisite:* graduate level standing.

5130. Aphasia. 3. Includes neuroanatomical bases of language; characteristics, assessments and intervention with individuals who have aphasia or right hemisphere damage. *Prerequisites:* SPPA 4380.

5140. Evaluation Procedures in Communication Disorders. 3. Focuses on the processes and procedures related to the evaluation of communication disorders. Topics include interviewing, norm-referenced assessment, criterion-based measurement, dynamic assessment, progress monitoring, and psychometric analysis. Overviews models of disability, such as medical, functional, and sociopolitical models, and how they influence the evaluation process. *Prerequisite:* acceptance to the University of Wyoming SLP Master's Program.

5150. Aural Rehabilitation. 3. Examines basis for and characteristics of communication problems created by hearing loss and management procedures to facilitate communication and adjustment to hearing loss. Includes acoustic and visual proper- ties of speech, amplification devices and hearing loss in school children. Dual listed with SPPA 4150. *Prerequisite:* SPPA 4340.

5200. Internship. 1-12 (Max. 12). An advanced practicum in speech pathology; the student is given increased responsibility in clinic management and practicum. Offered summers only. *Prerequisite:* SPPA 5030.

5210. Augmentative and Alternative Communication. 3. Theories and practices in clinical management of individuals with severe speech impairments or nonspeaking persons. Application of graphics, signs and gestural means of communication; use of aids and devises; development of interactive communication behaviors; development and use of computer-assisted communication strategies; intervention strategies for developmental disabilities and acquired communication disorders. *Prerequisite:* SPPA 4160.

5220. Voice Disorders. 3. Study of the etiology, assessment, and remediation of voice disorders. Includes a discussion of preventing disorders, maintaining a healthy voice, and normal changes in voice. Presentation of rehabilitation options for laryngectomized speaker. *Prerequisite:* SPPA 3265.

5230. Dysphagia. 3. Provides information regarding the anatomy and physiology of the adult and pediatric swallowing mechanisms, the diagnosis of dysphagia and feeding disorders using clinical and instrumental approaches, the medical diagnoses for which dysphagia is a common symptom, and methods that are commonly used to treat dysphagia and feeding disorders. *Prerequisite:* SPPA 3265.

5250. Topics in Functional Speech Disorders. 1-8 (Max. 8). Provides a critical review of contemporary theories and developments related to functional speech disorders. This is a continuing seminar type course dealing with advanced topics in functional speech disorders. *Prerequisite:* graduate standing.

5260. Topics in Organic Speech Disorders. 1-8 (Max. 8). Provides a critical review of contemporary theories developments related to organic speech disorders. This is a continuous seminar type course dealing with advanced topics in organic speech disorders. *Prerequisite:* graduate standing.

5270. Educational Practicum. 1-12 (Max. 12). Under supervision, the student is given increased responsibility for performing speech and language assessments, hearing screenings and treatment of children and adults in a medical setting. Students relate to other medical and clinical personnel and counsel professionals and families about communication disorders. *Prerequisites:* completion of at least two semesters (including summer) of approved graduate coursework and clinical practicum; and approval of faculty.

5280. Preschool Language Intervention. 3. Principles and techniques of language assessment and intervention for preschoolers, infants, and low- functioning individuals. *Prerequisite:* SPPA 4160.

5290. Medical Practicum. 1-12 (Max. 12). Under supervision, the student is given increased responsibility for performing speech and language assessments, hearing screenings and treatment of children and adults in a medical setting. Students relate to other medical and clinical personnel and counsel professionals and families about communication disorders. *Prerequisites:* Completion of at least two semesters (including summer) of approved graduate coursework and clinical practicum; and approval of faculty.

5330. School-Age Language Intervention. 3. Principles and techniques of language assessment and intervention for school-age children and adolescents with particular attention to service delivery issues in schools. *Prerequisite:* SPPA 4160.

5380. Professional Practice. 1-2 (Max. 4). Discusses issues related to the professional practice of speech-language pathology or audiology, including ethics, professional standards, public law, and universal precautions. Prerequisite: graduate standing in Communication Disorders and consent of instructor.

5500. Topics in Language. 1-8 (Max. 9). Provides a critical review of recent theories and developments in the area of language disorders. This is a continuing seminar course dealing with various advanced topics in language disorders. *Prerequisite:* graduate standing.

5750. Research Methods in Speech Pathology and Audiology. 3. Emphasizes the application of scientific methodologies to areas of Speech-Language Pathology and Audiology. Topics to be covered include: introduction to writing research papers; reviewing and critiquing the literature; experimental designs; techniques in data analyses. *Prerequisite:* STAT 2070 or equivalent; B.S. degree in speech pathology audiology; and acceptance into the graduate program.

5890. Problems in Speech Pathology and Audiology. 1-4 (Max. 4). *Prerequisite:* graduate standing or consent of instructor.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Students are expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5961. Graduate Projects. 1-4. (Max. 4). Limited to those students enrolled in a Plan B graduate program. Students should be involved in non-course scholarly activities in support of their Plan B project. *Prerequisites:* must be enrolled in Plan B program and have departmental approval.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Division of Kinesiology and Health

Corbett Building, 766-5285
FAX: (307) 766-4098
Web site: www.uwyo.edu/kandh
Director: Mark Byra

Professors:

MARK BYRA, B.Ed. University of Victoria 1979; M.S. Dalhousie University 1983: Ph.D. University of Pittsburgh 1989; Professor of Kinesiology and Health 2001, 1990.

D. PAUL THOMAS, B.Ed. Nottingham University 1969; M.A. Michigan State University 1970; Ph.D. Temple University 1977; Professor of Kinesiology and Health 1992, 1989.

Associate Professors:

RODERICK T. BARTEE, B.S. Ed. University of Nebraska 1994; M.A. University of Alabama 1996; Ph.D. 2000; Associate Professor of Kinesiology and Health 2006, 2000.

TAMI BENHAM DEAL, B.S. Indiana University 1981; M.S. 1988; P.E.D. 1989; Associate Professor of Kinesiology and Health1995, 1989.

JAYNE M. JENKINS, B.S. Mankato State University 1971; M.S. University of Wyoming 1995; Ph.D. University of North Carolina 1999; Associate Professor of Kinesiology and Health 2005, 1999.

Assistant Professors:

BRANDON ALDERMAN, B.S. University of Wyoming 1997; M.S. 2000; Ph.D. Arizona State University 2004; Assistant Professor of Kinesiology and Health 2005.

MATTHEW W. BUNDLE, B.A. Harvard University 1996; Ph.D. University of Montana 2005; Assistant Professor of Kinesiology and Health 2006.

TENA BOSTROM HOYLE, B.S. University of Alabama 1969; M.A. 1972; Ed.D. University of South Carolina 2005; Assistant Professor of Kinesiology and Health 2006.

DEREK SMITH, B.S. Colorado State University 1997; M.S. Wake Forest University 1999; Ph.D. University of Colorado 2003; Assistant Professor of Kinesiology and Health 2003.

TRISTAN WALLHEAD, B.S. Loughborough University 1994; M.S. Leeds Metropolitan University 2000; Ph.D. Ohio State University 2004; Assistant Professor of Kinesiology and Health 2004.

QIN ZHU, B.S. Shanghai University of Sports 1999; M.Ed. 2002; Ph.D. Indiana University 2008; Assistant Professor of Kinesiology and Health 2008.

Instructors:

JOHN A. HAEFNER, B.S. University of Iowa 1968; M.A. 1971; Instructor in Kinesiology and Health 1977, 1971.

Academic Professionals:
MARCI SMITH, B.S. Colorado State University 1995; M.S. Wake Forest University 1998; Academic Professional in Kinesiology and Health 2003.
GARY WERHONIG, B.S. University of Wyoming 1997; M.S. Colorado State University 2000; Academic Professional in Kinesiology and Health 2001.

Clinical Assistant Professor:
WILLIAM T. LYONS, B.S. University of Wyoming 1973; M.S. University of Arizona 1974; Athletic Training Program Director and Instructor in Kinesiology and Health 2001.

Adjunct Faculty:
Lawrence Deal, Patricia Moore, Ken Robertson, M.D., Shane Tweeter

Adjunct Athletic Training Instructors:
Ryan Aukerman, M.D., Jay Carson, M.D., Robert Curnow, M.D., Nancy Goldsmith-Perry, A.T.C., James Hollon, O.D., Jeremy Jones, D.C., Kent Kleppinger, M.D., Scott Knerr, A.T.C., Angela Kopriva, A.T.C., Alison Mosel, A.T.C., Brian O'Flanigan, Missy Schultz, A.T.C., Joi Thomas, Robb Williams, Head Athletic Trainer, A.T.C.

GA Athletic Trainers:
Brett Anderson, UW Athletics
Cole Vertz, UW Athletics
Sonnie Palm, UW Wellness Program

Professors Emeriti:
Paul Dunham
Ward Gates
Charles W. Huff
Donna Marburger
John Woods

Program Specific Admission Requirements

Admission into the M.S. degree program is open to students who have obtained an undergraduate with a major program of study in exercise and sport science, health, kinesiology, physical education, or other area in the human movement sciences.

Students who do not have a bachelor's degree in kinesiology, physical education, or health are required to complete four undergraduate courses in kinesiology and/or health (e.g., HLED 3000 Theories of Health Promotion; KIN 3034 Lifespan Motor Development; KIN 2040 Human Anatomy; KIN 3115 Human Systems Physiology; KIN 3037 Sport Psychology; etc.) above and beyond the master's program of studies.

Program Specific Graduate Assistantships

Graduate assistantships are available on a competitive basis. Teaching opportunities exist within the laboratory portions of the human anatomy and exercise physiology courses, the teaching laboratory portions of the pedagogy practical courses, HLED 1006. Personal Health and the lecture and physical activity sections of PEAC 1001. Physical Activity and Your Health. A graduate assistantship also involves some research opportunities with assigned graduate faculty advisers.

A stipend for a full time graduate assistant is $11072.00 per academic year. Tuition and fees are covered according to the percentage of assistantship allocated to the student.

Program Specific Degree Requirements

Master's Programs
Plan A (thesis)
Minimum of 30 credit hours
Minimum of 18 credit hours of HLED and/or KIN coursework
HLED/KIN 5085
Must choose at least one from this list: STAT 5050, 5060, 5070, or 5080; or EDRE 5600 or 5640
4 credit hours of HLED/KIN 5960 (Thesis Research)
Minimum of 9 credit hours of HLED/KIN coursework in area of specialization
Oral presentations of thesis proposal and defense

Plan B (non-thesis)
Minimum of 36 credit hours
Minimum of 18 credit hours of HLED and/or KIN coursework
HLED/KIN 5085
Must choose at least one from this list: STAT 5050, 5060, 5070, or 5080; or EDRE 5600 or 5640
3 credit hours of HLED/KIN 5080
Minimum of 3 credit hours of coursework selected from outside the Division of Kinesiology and Health
Plan B paper (written and oral)

M.S. in Kinesiology and Health Distance Education

The Division of Kinesiology and Health offers the M.S. degree in kinesiology and health (non-thesis) as a distance education program through the University of Wyoming Outreach School. The program is structured such that students can pursue the M.S. degree on a part time basis off-campus. For more information visit our Web site at www.uwyo.edu/kandh.

M.S. in Kinesiology and Health/Early Childhood Development

For more information please see Early Childhood Development section of this bulletin for degree requirements.

Health Education (HLED)

5004. Needs Assessment and Program Planning. 3. Focuses on needs assessment and program planning in the health education process. Extensive time will be spent learning, analyzing, and applying a variety of needs assessment methods. The impact of extensive community needs assessment on planning effective community programs and interventions will be examined. Additional emphasis will be placed o the methods necessary for planning effective health promotion programs. Dual listed with HLED 4004. *Prerequisite:* HLED 3000 or graduate status and a graduate course in research methods.

5010. Program Evaluation and Grant Writing. 3. Provides students with an in-depth examination of health promotion programs, evaluation techniques and methodology. Students will also gain an understanding of how to identify funding opportunities (grants) and how to prepare grant proposals. Dual listed with HLED 4010. *Prerequisite:* HLED 4004 or HLED 5004 and graduate standing.

5013. Models of Teaching in Physical Education. 3. Explores the range of teaching styles and the appropriateness of their uses. Cross listed with PEPR 5013. *Prerequisite:* graduate status.

5016. Analysis and Supervision of Teaching Physical Education. 3. Students are introduced to various evaluative and supervisory techniques which are designed to improve teaching effectiveness and student learning. Emphasis is be placed on utilizing various strategies of evaluation in instructional settings. *Prerequisite:* graduate standing

5017. Research on Teaching Physical and Health Education. 3. Survey of techniques, paradigms, and findings of research on teaching. Cross listed with KIN 5017. *Prerequisite:* graduate standing.

5025. Teaching Sensitive Isues in Human Sexuality. 3. Prepares educators and helping professionals whose work involves promoting healthy sexuality in children, young people and adults. Also provides detailed investigation into important aspects of teaching sensitive issues related to human sexuality. Students practice, critique, develop, and evaluate sexuality education processes and resources. Dual listed with HLED 4025. *Prerequisite:* junior class status, GPA of 2.5 and SOC 2200.

5035. Theories in Health Promotion. 3. Explores the variety of theories related to health education/promotion, comparing and contrasting them when necessary, synthesizing them when appropriate. An additional purpose will be to apply these theories to either a research problem/question or a practice setting. *Prerequisite:* graduate standing.

5040. Stress Management. 3. The stress process and its relationship to the concept of total health. The physical and psychological effects of stressors and individual appraisals are explained using theoretical models and practical examples. Students learn how to personally identify and manage stress in a healthy manner. Emphasis is placed on learning effective skills to reduce harmful effects of stress. Dual listed with HLED 4040. *Prerequisite:* graduate standing.

5050. Community and Public Health Promotion. 3. Identifying, understanding, and working with unique needs and assets of communities is emphasized, including ethnic, religious, and social structures. Planning and implementation of community health programs is stressed. Open but not limited to students interested in the following areas: healthcare, health promotion, public health, the schools. Dual listed with HLED 4050. *Prerequisite:* a minimum of 6 hours of coursework within the College of Health Sciences or min. of 9 hours of coursework within selected major.

5080. Investigations in Kinesiology and Health. 1-3 (Max. 3). Designed to develop master of science level graduate students into critical consumers of research. An additional purpose is to develop research skills to the level necessary to complete a master of science Plan B paper. Dual listed with KIN 5080. *Prerequisite:* graduate standing.

5085. Research Methods in Health Education. 3. Focuses on methods and techniques for evaluating and conducting research. Potential and completed research problems are analyzed and evaluated. Research processes are reviewed with emphasis on application. Standards for writing literature reviews and research proposals are also emphasized. Cross listed with KIN 5085. *Prerequisite:* admission to the UW Division of Kinesiology and Health's graduate program.

5097. Individual Problems. 1-3 (Max. 6). Provides flexible credit for students who wish to undertake intensive study of a special problem identified in a regular class. Cross listed with KIN 5097. *Prerequisite:* graduate standing.

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing, and psychology. Cross listed with FCSC, EDEC, NURS, PSYC, SPPA 5115. *Prerequisite:* graduate standing.

5130. Management of Coordinated School Health Programs. 3. Reviews the coordinated program (CSHP) model and identifies research that supports the eight components of the model. Prepares students to advocate for CSHP and to develop the school infrastructure necessary to carry out such a program. Also prepares individuals to work with school from job settings outside the school. Dual listed with HLED 4130. *Prerequisites:* HLED 1006 and 3110, junior standing and 2.50 GPA.

5586. Seminar in Health Education. 1-6 (Max. 8). Graduate students in kinesiology and health work intensively on current issues and problems, and may pursue specific areas of emphasis. Although a total of 8 hours is permitted under this number, only 6 hours are allowed by the Division of Kinesiology and Health toward a student's graduate program. Cross listed with KIN 5586. *Prerequisite:* graduate standing.

5587. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and/or experiential activities. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisite:* consent of instructor and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

Kinesiology (KIN)

5001. Short Course. 1-6 (Max. 6). Used for special topics in physical education on the basis of need. Each department in the college may make offerings under this number, the maximum allowable credit for each department is 6 semester hours. Offered satisfactory/unsatisfactory only. *Prerequisite:* graduate standing.

5012. Curriculum Design in Physical Education. 3. Addresses current problems of curriculum design and development in physical education, including foundational concerns, curriculum anatomy (aims, goals, objectives, content, evaluation), and problems associated with design (scope, sequence, relevance, continuity, articulation, balance, and integration). *Prerequisite:* graduate standing, completion of a teacher certification program in physical education and teaching experience or permission of school.

5013. Models of Teaching. 3. Explores the range of teaching styles and the appropriateness of their uses. Cross listed with HLED 5013. *Prerequisite:* graduate standing.

5014. Teaching Tactics in Sport-Based Physical Education. 3. Introduces students to the instructional strategy of the Tactical Games Approach (Mitchell, Oslin, & Griffin, 2006) of teaching sport-based activities in physical education. Emphasis is on planning, implementing, assessing and evaluating the tactical approach within the K-12 physical education context. *Prerequisite:* graduate standing.

5016. Analysis and Supervision of Teaching in Physical and Health Education. 3. Introduces various evaluative and supervisory techniques which are designed to improve teaching effectiveness and student learning. Emphasis will be placed on utilizing various strategies of evaluation in instructional settings. *Prerequisite:* graduate standing.

5017. Research on Teaching Physical and Health Education. 3. Survey of techniques, paradigms, and findings of research on teaching. Cross listed with HLED 5017. *Prerequisite:* graduate standing.

5025. Exercise Physiology II. 2-4 (Max. 4). Provides interested students with an additional opportunity to study selected aspects of exercise physiology. Research and investigation are emphasized. *Prerequisite:* graduate standing.

5029. Methods of Training and Conditioning. 3. Upper-level applied exercise training and conditioning course aimed at giving students the knowledge and experience needed to develop and lead exercise training programs. It will be of interest to teachers, coaches, and fitness leaders. Dual listed with KIN 4029. *Prerequisite:* junior standing, KIN 3021 and a minimum 2.50 GPA.

5034. Lifespan Growth and Psychomotor Development. 3. Takes a scholarly approach to the subject of psychomotor development, with particular emphasis on the theoretical and scientific examination of motor behavior as it changes over time. Emphasis is placed on observing movement and analyzing changes in it. *Prerequisites:* graduate standing, KIN 3034 or equivalent.

5035. Sociology of Sport. 3. Study of the social aspects of sport and play. Includes concepts, research studies, and theories related to such topics as politics, economies, crowd behavior, religion, sexual identity and gender, and ethical and moral values related to sport. Prerequisites: graduate standing and a general sociology course.

5036. Motor Learning II. 3. Advanced course in motor learning designed to prepare students to make a critical evaluation of research completed in motor performance and learning. Includes the use of laboratory equipment, conducting limited research project, and evaluating outside readings. *Prerequisites:* KIN 2030 and graduate standing.

5046. Applied Biomechanics. 3. Designed to provide in-depth study of sport, clinical, and tissue applied biomechanics. Students select one area of inquiry and conduct a comprehensive literature review of the topic. *Prerequisite:* KIN 3042, graduate standing.

5047. Research Biomechanics. 3. Designed to develop skills and techniques needed to conduct biomechanics research and the knowledge to better understand published research studies in biomechanics. *Prerequisite:* KIN 5045.

5056. Health Appraisal, Exercise Testing, and Prescription. 4. Teaches foundational electrocardiography to perform graded exercise stress tests (GXT), performance GXTs to health and diseased populations based on a health appraisal assessment. Knowledge used to develop comprehensive exercise prescriptions, make metabolic calculations. Emphasis on how physical activity, nutrition/weight management, and behavioral factors interact with exercise programming. Dual listed with KIN 4056. *Prerequisites:* completion of KIN 3010 and 3021; 2.5 GPA; CPR certification.

5062. Applied Concepts in Human Aging. 3. Designed to integrate and apply concepts acquired in core KIN and HLED courses (e.g. human physiology, health promotion, etc.) to the growing population of older/aging adults. Age-related pathologies are presented and discussed as is the scientific method. Dual listed with KIN 4062. *Prerequisites:* KIN 3021; minimum 2.50 GPA; junior standing.

5080. Investigations in Kinesiology and Health. 1-3 (Max. 3). Designed to develop Master of Science level graduate students into critical consumers of research. An additional purpose is to develop research skills to the level necessary to complete a master of science Plan B paper. Cross listed with HLED 5080. *Prerequisite:* graduate standing.

5085. Research Methods. 3. Focuses on methods and techniques for evaluating and conducting research. Potential and completed research problems are analyzed and evaluated. Research processes are reviewed with emphasis on application. Standards for writing literature reviews and research proposals are also emphasized. *Prerequisite:* admission to the UW Division of Kinesiology and Health's graduate program.

5097. Individual Problems. 1-3 (Max. 6). Provides flexible credit for students who wish to undertake intensive study of a special problem identified in a regular class. Cross listed with HLED 5097. *Prerequisite:* graduate standing.

5536. Sport Psychology. 3. Examines theoretical, research, and professional issues in contemporary sports psychology. Basic research design, including quasi-experimental design are covered, particularly to discuss the outcome studies or proposed applications such as imagery and hypnosis. Development of applied sport psychology and proposed interventions with sport behavior are viewed in relation to the development of these approaches, related training issues and outcome research. Identical to PSYC 5536. *Prerequisites:* graduate standing, sport or general psychology course, and consent of instructor.

5537. Exercise Psychology. 3. Focuses on key conceptual issues and research in exercise psychology and the application of research findings in a variety of physical activity settings. Specific content areas include psychological benefits of physical activity, exercise adherence, public health and exercise issues, theory, and determinants of physical activity, interventions for adoption and maintenance, and professional ethics. *Prerequisites:* graduate standing, KIN 3037.

5586. Seminar. 1-6 (Max. 8). Graduate students in kinesiology and health work intensively on current issues and problems, and may pursue specific areas of emphasis. Although a total of 8 hours is permitted under this number, only 6 hours are allowed by the Division of Kinesiology and Health toward a student's graduate program. Cross listed with HLED 5586. *Prerequisite:* graduate standing.

5587. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and wherever possible the student collects and uses original information in practical school situations. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisite:* consent of instructor and division director, graduate status.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5980. Dissertation Research. 1-12 (Max. 48). Graduate level course designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate degree program.

5990. Internship. 1-12 (Max. 24). *Prerequisite:* graduate standing.

Health Education (HLED)

USP Codes are listed in brackets by the 1991 USP code followed by the 2003 USP code (e.g. [M24QB]).

5004. Needs Assessment and Program Planning. 3. Focuses on needs assessment and program planning in the health education process. Extensive time will be spent learning, analyzing, and applying a variety of needs assessment methods. The impact of extensive community needs assessment on planning effective community programs and interventions will be examined. Additional emphasis will be placed o the methods necessary for planning effective health promotion programs. Dual listed with HLED 4004. *Prerequisite:* HLED 3000 or graduate status and a graduate course in research methods.

5010. Program Evaluation and Grant Writing. 3. Provides students with an in-depth examination of health promotion programs, evaluation techniques and methodology. Students will also gain an understanding of how to identify funding opportunities (grants) and how to prepare grant proposals. Dual listed with HLED 4010. *Prerequisite:* HLED 4004 or HLED 5004 and graduate standing.

5013. Models of Teaching in Physical Education. 3. Course will explore the range of teaching styles and the appropriateness of their uses. Cross listed with PEPR 5013. *Prerequisite:* graduate status.

5016. Analysis and Supervision of Teaching Physical Education. 3. Students are introduced to various evaluative and supervisory techniques which are designed to improve teaching effectiveness and student learning. Emphasis is be placed on utilizing various strategies of evaluation in instructional settings. *Prerequisite:* graduate standing.

5017. Research on Teaching Health and Physical Education. 3. Survey of techniques, paradigms, and findings of research on teaching. Cross listed with KIN 5017. *Prerequisite:* graduate standing.

5025. Teaching Sensitive Issues in Sexuality. 3. Prepares educators and helping professionals whose work involves promoting healthy sexuality in children, young people and adults. Also provides detailed investigation into important aspects of teaching sensitive issues related to human sexuality. Students practice, critique, develop, and evaluate sexuality education processes and resources. Dual listed with HLED 4025. *Prerequisite:* junior class status, GPA of 2.5 and SOC 2200.

5035. Theories in Health. 3. Explores the variety of theories related to health education/promotion, comparing and contrasting them when necessary, synthesizing them when appropriate. An additional purpose will be to apply these theories to either a research problem/question or a practice setting. *Prerequisite:* graduate standing.

5040. Stress Management. 3. The stress process and its relationship to the concept of total health. The physical and psychological effects of stressors and individual appraisals are explained using theoretical models and practical examples. Students learn how to personally identify and manage stress in a healthy manner. Emphasis is placed on learning effective skills to reduce harmful effects of stress. Dual listed with HLED 4040. *Prerequisite:* graduate standing.

5050. Community and Public Health Promotion. 3. Identifying, understanding, and working with unique needs and assets of communities is emphasized, including ethnic, religious, and social structures. Planning and implementation of community health programs is stressed. Open but not limited to students interested in the following areas: healthcare, health promotion, public health, the schools. Dual listed with HLED 4050. *Prerequisite:* a minimum of 6 hours of coursework within the College of Health Sciences or min. of 9 hours of coursework within selected major.

5080. Investigations in Kinesiology and Health. 1-3 (Max. 3). Designed to develop master of science level graduate students into critical consumers of research. An additional purpose is to develop research skills to the level necessary to complete a master of science Plan B paper. Dual listed with KIN 5080. *Prerequisite:* graduate standing.

5085. Research Methods. 3. Focuses on methods and techniques for evaluating and conducting research. Potential and completed research problems are analyzed and evaluated. Research processes are reviewed with emphasis on application. Standards for writing literature reviews and research proposals are also emphasized. Cross listed with KIN 5085. *Prerequisite:* admission to the UW Division of Kinesiology and Health's graduate program.

5097. Individual Problems. 1-3 (Max. 6). Provides flexible credit for students who wish to undertake intensive study of a special problem identified in a regular class. Cross listed with KIN 5097. *Prerequisite:* graduate standing.

5115. Interdisciplinary Early Childhod Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing, and psychology. Cross listed with FCSC, EDEC, NURS, PSYC, SPPA 5115. *Prerequisite:* graduate standing.

5130. Managed Health Program. 3. Reviews the coordinated program (CSHP) model and identifies research that supports the eight components of the model. Prepares students to advocate for CSHP and to develop the school infrastructure necessary to carry out such a program. Also prepares individuals to work with school from job settings outside the school. Dual listed with HLED 4130. *Prerequisites:* HLED 1006 and 3110, junior standing and 2.50 GPA.

5586. Seminar in Health Education. 1-6 (Max. 8). Graduate students in kinesiology and health work intensively on current issues and problems, and may pursue specific areas of emphasis. Although a total of 8 hours is permitted under this number, only 6 hours are allowed by the Division of Kinesiology and Health toward a student's graduate program. Cross listed with KIN 5586. *Prerequisite:* graduate standing.

5587. Special Problems. 1-6 (Max. 9). Provides a broad perspective through selected reading material and/or experiential activities. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of the project. *Prerequisite:* consent of instructor and graduate standing.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

Division of Medical Education and Public Health

Family Medicine Residency Programs
Casper: Stephan Trent, Director
(307) 233-6020
Cheyenne: James Broomfield, Director
(307) 777-7911

WWAMI Medical Education Program
Laramie: Matthew McEchron, Director
(307) 766-2496
Web site: www.uwyo.edu/wwami

Professors:

WALTER G. (JERRY) SAUNDERS, M.D. University of Colorado Health Sciences Center 1966; B.S. Univeristy of Wyoming 1996; Clinical Professor 2007.

Associate Professors:

JAMES F. BROOMFIELD, B.S. University of Arkansas 1986; M.D. 1990; Associate Professor of Family Medicine, Cheyenne 2005, 1999.

RONALD L. MALM, B.S. University of Wyoming 1988; D.O. The University of Health Sciences, College of Osteopathic Medicine 1992; Associate Professor of Family Medicine, Cheyenne 2005, 1999.

MATTHEW McECHRON, B.S. University of Iowa 1990; M.S. University of Miami 1993; Ph.D. 1995; Associate Professor, WWAMI Medical Education Program 2008.

DOUGLAS S. PARKS, B.S. Baker University 1978; M.D. University of Kansas 1984; Associate Professor of Family Medicine, Cheyenne 1999, 1993.

BETH ROBITAILLE, B.A. University of Notre Dame 1991; M.D. Creighton University School of Medicine 1995; Clinical Associate Professor of Family Medicine, Casper 2007, 2002.

STEPHAN N. TRENT, B.A. University of Tennessee 1973; D.O. University of Health Sciences 1980; Clinical Associate Professor of Family Medicine 2007, 2002.

Assistant Professors:

DEAN W. BARTHOLOMEW, B.A. Hastings College 1997; M.D. Creighton University School of Medicine 2001; Clinical Assistant Professor 2008.

LISA K. BRANDES, B.S. Kansas State University 1987; M.D. University of Kansas School of Medicine 1993; Clinical Assistant Professor 2006.

WHITNEY A. BUCKLEY, PharmD University of Wyoming 2004; Clinical Assistant Professor 2008.

FREDERICK DREILING, B.A. Oberlin College 1972; Ph.D. University of North Carolina 2002; Clinical Assistant Professor, WWAMI Medical Education Program 2008.

HELEN IAMS, B.A. Mary Baldwin College 1987; M.S. University of Southern California 1990; M.D. Loyola University Chicago 2000; Sports Medicine Fellowship 2004; Clinical Assistant Professor of Family Medicine, Cheyenne 2003.

RAYMOND B. JOHNSON, B.S. Chadron State College 1968; B.S. St. Johns Hospital-South Dakota 1969; B.S. Emory University 1973; Assistant Professor of Family Medicine, Casper 1979.

MICHAEL MILLER, B.A. Wheaton College 1992; D.O. Kirksville College of Osteopathic Medicine 2000; Clinical Assistant Professor of Family Medicine, Casper 2004.

ROBERT M. MONGER, B.A. Augustana College 1988; M.D. University of Utah School of Medicine 1992; Clinical Assistant Professor 2008.

THOMAS E. RADOSEVICH, B.S. University of Wyoming 1990; M.D. Creighton University School of Medicine 1999; Clinical Assistant Professor of Family Medicine 2008.

G. DOUGLAS SCHMITZ, B.S. and M.D. University of Nebraska Medical School 1979; Clinical Assistant Professor 2008.

AMY TRELEASE-BELL, B.S. University of Wyoming 1992; M.D. Creighton University School of Medicine 1996; Clinical Assistant Professor of Family Medicine, Cheyenne 2004.

BRIAN M. VEAUTHIER, B.S. University of Notre Dame 1996; M.D. Georgetown University School of Medicine 2001; Clinical Assistant Professor of Family Medicine 2006.

Associate Lecturer:

COLLEEN HUBBELL, B.A. New School for Social Research 1978; M.S. University of Wyoming 1994; Associate Lecturer, WWAMI Medical Education 2000.

The Division of Medical Education and Public Health provides graduate medical (residency) education for physicians in the specialty of family medicine. The university supports two fully accredited family medicine residency programs in Casper and Cheyenne with a capacity for 42 residents (14 in each of the three years). The Casper program began in 1976 and is affiliated with the Community Health Center of Central Wyoming and the Wyoming Medical Center. The Cheyenne program opened in 1980 and is affiliated with Cheyenne Regional Medical Center. In addition, the Cheyenne program has a close working relationship with the Veterans Administration Hospital. The residency programs are housed in two family medicine centers acclaimed to be among the most modern and comprehensively equipped facilities of their kind in the nation. Particular emphasis is placed on preparing physicians for rural practice and addressing those facets of medical practice that are unique to Wyoming.

In 1997, the University of Wyoming joined the University of Washington's WWAMI Program to provide undergraduate medical education for the students of Wyoming. Medical students accepted into this program (WWAMI) take their first year of classes on campus at the University of Wyoming. Students interested in this program should contact the WWAMI in the College of Health Sciences at (307) 766-2496.

Fay W. Whitney School of Nursing

351A Health Sciences Center, 766-6568
FAX: (307) 766-4294
E-mail: gradnurse@uwyo.edu
Web site: www.uwyo.edu/Nursing
Dean: Mary E. Burman

Professors:

MARY E. BURMAN, B.S.N. University of Minnesota 1983; M.S. University of Michigan 1986; Ph.D. 1990; Professor of Nursing 2003; Dean of Nursing 2008.

PAMELA N. CLARKE, B.S.N. Wayne State University 1969; M.P.H. University of Michigan, Ann Arbor 1971; Ph.D. Wayne State University 1983; Professor of Nursing 2003.

PAMALA D. LARSEN, B.S.N. Fort Hays State University 1969; M.S. University of Colorado Health Science Center 1984; Ph.D. University of Northern Colorado 1989; Professor of Nursing 2006; Associate Dean of Nursing 2008.

Associate Professors:

ANN MARIE HART, B.S.N. Medical College of Virginia 1991; M.S. University of Wyoming 1996; Ph.D. University of Colorado at Boulder 2003; Associate Professor of Nursing 2009.

Assistant Professors:

MARY ANNE PURTZER, B.S.N. University of Nebraska 1975; M.A. University of Wyoming 2002; M.S. 2005; Ph.D. 2007; Assistant Professor of Nursing 2008.

Senior Lecturer:

Holly Miller

Associate Lecturers:

Margaret Cashen, Anita C. Deselms, Mary Sue Hager, Sherrie Rubio-Wallace, Linda Williams

Assistant Lecturers:

Karen Benjamin, Penelope Caldwell, Sandy Cole, Constance Diaz-Swearingen, Linda Johnson, Laura Meloche, Dana Murphy-Parker, Kristy Nielson, Lois Pine, Debora Retz, Janet Somlyay

Adjunct Faculty:

Margo Burrows, Sandra Conklin, Leigh Earle, Ann Enlow, Michael Enright, Tracy Farris, Pam Gale, Mary Gills, Julian Good, Jane Hartsock, Sue Hume, Ronda Kinsey, Sue Lowe, Teri Lund, James Martinchick, Susan Nelson, Marcia Newell, Jeanine Niemoller, Karen Ouzts, Shawn Petrini, Thelma Robinson, Phyllis Schulz, Scott Seys, Patty Sherard, Marsha Siegel, Janice Stephens, Veronica Taylor, Brenda Vance, Betty Varga, Clarann Weinart, Robert Weinland, Wendy Wright

Emeriti:

Marcia L. Dale, Beverly Taheri-Kennedy, Beverly McDermott, Fay W. Whitney, Elizabeth H. Wiest, Norma Wilkerson

Degree and Certificate Programs

M.S. in Nursing, options: Family Nurse Practitioner (FNP), Psychiatric Mental Health Nurse Practitioner (PMNHNP), Nurse Educator (NE). Certificate Program, options: Family Nurse Practitioner (FMNP), Psychiatric Mental Health Nurse Practitioner (PMHNP), Nurse Educator (NSED).

The Fay W. Whitney School of Nursing offers a graduate program leading to a master of science (M.S.) degree. The focus of the program is advanced practice nursing (APN) in rural health with a clinical concentration leading to eligibility to take the certifying examination for Family Nurse Practitioner (FNP) and Psychiatric Mental Health Nurse Practitioner (PMH). A Nurse Educator (NE) option leads to a M.S. with eligibility to take the national certifying examination as a Nurse Educator. Programs of study are also available for RNs with non-nursing baccalaureates. Admission to the university does not guarantee admission to a specific option in the School of Nursing.

Certificate programs are available for RNs who have a master's degree in nursing who wish to become either Nurse Practitioners (FMNP or PMHN) or Nurse Educators (NSED). The certificate programs (FMNP, PMHN, or NSED) also lead to eligibility to take the certifying examination as such.

The School of Nursing accommodates the working, commuting nurse. On-campus nurse practitioner graduate courses are scheduled primarily in Thursday/Friday/Saturday blocks. These courses may be computer assisted. A typical three-credit course requires three trips to the Laramie campus. Starting fall 2010, new admits will be required to come to campus for a fall orientation.

Physical Requirements

All nursing students must be able to perform the essential functions of a student nurse. Reasonable accommodations will be afforded to student nurses with disabilities as required under the Americans with Disabilities Act of 1990. Faculty and staff from the School of Nursing will work with staff from the University Disability Support Services office to determine what constitutes reasonable accommodations.

Background Checks Requirements

Students enrolled in clinical training programs within the College of Health Sciences are placed in educational and clinical settings where highly vulnerable clients such as minor children, individuals with disabilities, and/or the elderly, are routinely served. These clinical/practice training sites (including schools, hospitals, pharmacies, and other university sites) routinely require criminal background checks for all students who engage in clinical activities. Therefore, background checks shall be required on all applicants to programs in the College of Health Sciences prior to admission into their prospective program.

Students applying for admission into our M.S. Program and Certificate Program (post-master's) will be notified by the School of Nursing at the time of any admission offer the process for completing the required background check. Previous background checks (e.g. RN Licensure) are not acceptable to fulfill this expectation. The results of the background check may determine final admittance to our program.

You may also be required to update your criminal background check. Each clinical training site will be informed that you have passed a background check (if you have) prior to your placement at that site; some sites may require a more current background check. Clinical agencies may bar a student access to their facility for clinical experiences based on the results of the background check. If faculty and staff are not able to place the student in an alternative setting the student will not be able to complete the program. In addition, students seeking readmission into the program are required to complete a new background check. Students are responsible for the costs associated with the admission background check and any other background checks that may be required.

Drug Screening Requirements

Drug screening may be required by some clinical training sites. Students will be notified by the School of Nursing should this be an expectation of them. Students may incur charges for this screening and will be notified of such at that time.

Program Specific Admission Requirements

Nurse Practitioner Option (FNP, FMNP, PMH, & PMHN)

Links to forms/information are available at www.uwyo.edu/nursing. A complete application will include all of the following:

UW application with applicable fee ($50.00-non-refundable). NOTE: If enrollment (admission) does not occur within three years of the semester you planned to enroll, a new application and processing fee must be submitted.

The School of Nursing M.S. program application.

Statement of goals (see "Goals Data" on School of Nursing application).

$30 School of Nursing M.S. program admission application/evaluation fee, payable online, must accompany this application (separate fee from admission fee).

A current resumé.

Official transcripts from each individual college/university previously attended and currently attending - separate transcripts required even if posted on another school's records (send to the Admissions office). Prefer a cumulative GPA of at least 3.00 calculated on all credits earned up to receipt of baccalaureate degree. (Your bachelor's degree must be from an accredited - Council on Higher Education or equivalent - institution; your nursing degree must be from a CCNE or NLN accredited program.)

Three letters of recommendation from persons knowledgeable about preparation and/or qualifications for the graduate degree.

Graduate Record Examination (GRE) results on these test components: analytical writing, verbal, and quantitative. (Not required for post-master's certificate options.)

The university prefers a cumulative score of 900 on the verbal and quantitative sections of the GRE. The GRE test needs to have been taken within five years of admission. If a previous master's degree has been earned, the GRE is not required.

A current, active, unencumbered RN license for any state in which completing clinical practice OR have completed an RN program (*baccalaureate or associate/diploma*) and be eligible to take the NCLEX and obtain RN licensure prior to clinical courses. If not from Wyoming, a Wyoming license is also required due to being on campus at times to work with faculty in their clinical placements.

The Nurse Practitioner options require an on-campus admission interview (applicants will be notified regarding interview dates).

Nurse Educator Option (NE & NSED)

A complete application will include all of the following:

University application with applicable fee ($50.00-non-refundable). NOTE: If enrollment (admission) does not occur within three years of the semester you planned to enroll, a new application and processing fee must be submitted.

The School of Nursing M.S. program application.

Statement of goals (see "Goals Data" on School of Nursing application).

$30 School of Nursing M.S. program admission application/evaluation fee must accompany this application (separate fee from university admission fee). Make check payable to the "Fay W. Whitney School of Nursing" (non-refundable).

A current résumé.

Official transcripts from each individual college/university previously attended and currently attending - separate transcripts required even if posted on another school's records (send to the Admissions office). Prefer a cumulative GPA of at least 3.0 calculated on all credits earned up to receipt of baccalaureate degree. (Your bachelor's degree must be from an accredited - Council on Higher Education or equivalent - institution; your nursing degree must be from a CCNE or NLN accredited program.)

Three letters of recommendation from persons knowledgeable about preparation and/or qualifications for the graduate degree.

Graduate Record Examination (GRE) results on these test components: analytical writing, verbal, and quantitative. (Not required for post-master's certificate option.)

The university prefers a cumulative score of 900 on the verbal and quantitative sections of the GRE. The GRE test needs to have been taken within five years of admission. If a previous master's degree has been earned, the GRE is not required.

A current, active, unencumbered RN license for state in which you would be completing your education practicum.

ADN/Diploma RNs With Non-Nursing Baccalaureate Degree

An associate degree or diploma in nursing and a baccalaureate degree in an area other than nursing with normally a cumulative grade point average of 3.0 (4.0 scale) for regular admission. (Your bachelor's degree must be from an accredited - Council on Higher Education or equivalent - institution; your nursing degree must be from a CCNE or NLN accredited program.

In addition, these students must have evidence of a course in the following UW courses (available online) or an equivalent course (submit syllabi for review of transfer equivalency) and have passed the courses with a grade of "C" or better.

NURS 3010 - Introduction to Higher Education in Nursing - 3 credits
NURS 3020 - Cultural Diversity in Family Health Care - 3 credits
NURS 4440 - Community Health or NURS 5060 - Epidemiology in Rural Health Care - 3 credits (*this course can be taken concurrently once accepted into the program*)

Disclaimer: the bridge courses are under revision and subject to change. Please contact gradnurse@uwyo.edu for questions/updates.

Application files that are complete with the exception of these courses may be considered for admission, if documentation of course enrollment is available. Final admission, if offered, would be contingent upon verification of successful completion of the BSN prerequisite courses.

Application Deadlines

Application packets must be complete with the School of Nursing by the deadlines (see below) to be considered by the admissions committees. (*Postmarks by the deadline are not considered as meeting the deadline.)* The applicant is responsible to make certain that our office is in receipt of all application materials/fees.

Nurse Educator
Disclaimer: the NP admission consideration date will be changing to summer.
February 1 application deadline for the following **fall** admission consideration
Family Nurse Practitioner
February 1 application deadline for the following **fall** admission consideration
Psychiatric Mental Health Nurse Practioner
February 1 application deadline for the following **fall** admission consideration

Applications completed after specified deadlines will be held and reviewed for the next admission consideration. To ensure admittance equality, completed application packets are reviewed as a group following the above deadlines.

Mail all application materials to:
University of Wyoming
Fay W. Whitney School of Nursing
Attn: M.S. Application Records
Dept. 3065
1000 E. University Avenue
Laramie, WY 82071

Program Specific Graduate Assistantships

Assistantships are available in the School of Nursing involving duties such as clinical teaching, online teaching, and/or research functions. Assistantships include tuition and fee reductions for all or part of the tuition costs, and a monthly stipend. Incidental students fees are usually the student's responsibility. Student Health Insurance is part of the fee structure paid for by the department. Students should contact the department at the time of application to inquire about the availability of an assistantship. All assistantship applications should be received by April 1. Notification will be made by May 1.

Program Specific Degree Requirements

Disclaimer: there are some extensive revisions being made to the degree requirements of each program. Please note that they could include but are not limited to: changes to thesis/non-thesis requirements, overall credit hours for each course, plans of study, area of study in the Psyc NP Program, addition of clinical hours, and course sequencing. Please refer to our website www.uwyo.edu/nursing for updates or email gradnurse@uwyo.edu.

Master's Programs
Plan A (thesis)
Core courses which provide a foundation of advanced knowledge for rural nursing: 12 hrs.
Clinical or functional coursework: 12-34 hrs.
Electives either from nursing or outside nursing: 2-3 hrs.
Thesis: 4 hrs.
Total: 30-53 hrs.
The FNP option requires 53 credits; the PMHNP option requires 48 credits; the EDUC option requires 30 credits.
Students must complete the CAPP program in lieu of a program of study.

Plan B (non-thesis)
Core courses which provide a foundation of advanced knowledge for rural nursing: 12 hrs.
Clinical or functional coursework: 12-34 hrs.
Electives either from nursing or outside nursing: 2-3 hrs.
Non-thesis project : 4 hrs.
Total: 30-53 hrs.
The FNP option requires 53 credits; the PMHNP option requires 48 credits; the EDUC option requires 30 credits.
Students must complete the CAPP program in lieu of a program of study.

Course Sequences

Family Nurse Practitioner Option (FNP)
Total Credits: 53 Credits
Core Courses (16 Credits)
NURS 5010
Health & Health Care in Rural Cultures... 3
NURS 5025
App of Theory in Adv Nursing Practice 3
NURS 5026
App of Research in Adv Nursing Practice. 3
NURS 5500
Issues in Rural Advanced Practice.....3.0

Plus Choice of One of the Following
NURS 5960
Thesis Research 4
NURS 5650
Non-Thesis Project..... 1-4

Advanced Practice Nursing Core (37 credits minimum)
NURS 5006
Adv Health Assessment & Clinical Decision Making 4
NURS 5060
Epidemiology in Rural Health Care..... 3
NURS 5111
Adv Primary Care: The Young Family 3
NURS 5112
Adv Primary Care: The Mature Family 3
NURS 5120
Advanced Therapeutics I 5
NURS 5130
Advanced Therapeutics II..... 5
NURS 5140
Pharmacotherapy for Primary Care Practitioners..... 4
- must NOT take NURS 5140 prior to admission
NURS 5165
Advanced Pathophysiology..... 4
(if NURS 5165 completed prior to admission, must be within 2 years of admission or will have to retake)
NURS 5300
Clinical Practicum in Rural Health Nursing 6

Psychiatric Mental Health Nurse Practitioner Option – (PMH)
Total Credits: 48 Credits
Core Courses (16 Credits)
NURS 5010
Health & Health Care in Rural Cultures... 3
NURS 5025
Application of Theory in Advanced Nursing Practice 3
NURS 5026
Application of Research in Advanced Nursing Practice 3
NURS 5500
Issues in Rural Advanced Practice..... 3

Plus Choice of One of the Following
NURS 5960
Thesis Research or..... 4
NURS 5650
Non-Thesis Project..... 4

Advanced Practice Nursing Core (12 Credits)
NURS 5006
Advanced Health Assessment & Clinical Decision Making 4
NURS 5140
Pharmacotherapy for Primary Care Practitioners..... 4
NURS 5165
Advanced Pathophysiology..... 4

Psychiatric Advanced Practice Nursing Core (20 Credits)
NURS 5201
Diagnostics Systems of Psychiatric Practice 3
NURS 5211
Clinical Management of Psychiatric Disorders 4
NURS 5220
Clinical Management: Modality 1 3
NURS 5225
Psychotherapy for Psychiatric/Mental Health Nurse Practitioners..... 3
NURS 5230
Clinical Management: Modality 2..... 4
NURS 5300
Clinical Practicum in Rural Health Nursing 3

Nurse Educator Option (NE)
Total: 30 Credits
Core Courses (16 Credits)
NURS 5010
Health & Health Care in Rural Cultures... 3
NURS 5025
Application of Theory in Advanced Nursing Practice 3
NURS 5026
Application of Research in Advanced Nursing Practice 3
NURS 5500
Issues in Rural Advanced Practice..... 3

Plus Choice of One of the Following:
NURS 5960
Thesis Research or 4
NURS 5650
Non-Thesis Project..... 4

Educator Core Courses (12 credits minimum)
NURS 5090
Curriculum and Evaluation in Nursing Education 3
NURS 5390
Nursing Education Practicum..... 3
ADED 5050
Learning Theories for Education 3

Plus Choice of One of the Following:
ADED 5240
Teaching Adults or 3
ADED 5260
Education Issues in Race, Class and Gender or 3
ITEC 5010
Instructional Technology or..... 3
ITEC 5160
Introduction to Instructional Design 3

Electives (2-3 credits minimum)

Select one 2- or 3-credit (minimum) course which would supplement your need or interest (or meet your state's requirements). Courses in Adult Education & Technology or Nursing are recommended.

Certificate Programs

Family Nurse Practitioner (FMNP)
Core courses which provide a foundation of advanced knowledge for rural nursing: 6 hrs.
Clinical or functional coursework: 34 hrs.
Electives either from nursing or outside nursing: 3 hrs (recommended, but not required)
Total: 40-43 hrs.

Psychiatric Mental Health Nurse Practitioner (PMHNP)
Core courses which provide a foundation of advanced knowledge for rural nursing: 6 hrs.
Clinical or functional coursework: 24 hrs.
Total: 30 hrs.

Nurse Educator (NSED)
Clinical or functional coursework: 12 hrs.
Total: 12 hrs.

Course Sequences

Family Nurse Practitioner Option (FMNP)
Total Credits: 40 Credits
Core Courses (6 Credits)
NURS 5010
Health & Health Care in Rural Cultures... 3
NURS 5500
Issues in Rural Advanced Practice..... 3

Advanced Practice Nursing Core (34 credits minimum)
NURS 5006
Advanced Health Assessment & Clinical Decision Making 4
NURS 5111
Advanced Primary Care: The Young Family 3
NURS 5112
Advanced Primary Care: The Mature Family 3
NURS 5120
Advanced Therapeutics I..... 5
NURS 5130
Advanced Therapeutics II..... 5
NURS 5140
Pharmacotherapy for Primary Care Practitioners..... 4
- must NOT take NURS 5140 prior to admission
NURS 5165
Advanced Pathophysiology..... 4
- if NURS 5165 completed prior to admission, must be within 2 years of admission or will have to retake
NURS 5300
Clinical Practicum in Rural Health Nursing 6

Electives - Recommended but not required (3 credits minimum)
NURS 5060
Epidemiology in Rural Health Care..... 3

Psychiatric Mental Health Nurse Practitioner Option – (PMHN)
Total Credits: 30 Credits
Core Courses (6 credits)
NURS 5010
Health & Health Care in Rural Cultures... 3
NURS 5500 Issues in Rural Advanced Practice 3

PMHNP Nursing Core (24 credits minimum)
NURS 5201
Diagnostics Systems of Psychiatric Practice 3
NURS 5211
Clinical Management of Psychiatric Disorders 4
NURS 5215
Transition to PMHNP Role..... 3
NURS 5220
Clinical Management: Modality I 3
NURS 5225
Psychotherapy for Psychiatric/Mental Health Nurse Practitioners..... 3
NURS 5230
Clinical Management: Modality II..... 4
NURS 5300
Clinical Practicum in Rural Health Nursing 4

Nurse Educator Option (NSED)
Total Credits: 12 Credits
Educator Core Courses (12 credits minimum)
NURS 5090
Curriculum and Evaluation in Nursing Education 3
NURS 5390
Nursing Education Practicum..... 3
ADED 5050
Learning Theories for Education 3

Plus Choice of One of the Following:
ADED 5240
Teaching Adults or 3
ADED 5260
Education Issues in Race, Class and Gender or 3
ITEC 5010
Instructional Technology or 3
ITEC 5160
Introduction to Instructional Design 3

Nursing (NURS)

5005. Pediatric Assessment. 3. Online course builds upon basic nursing assessment skills. Includes advanced pediatric assessment techniques as well as family interviewing techniques that lead to clinical decision-making. *Prerequisites:* admission to Early Childhood Interdisciplinary Nursing Program; RN Licensure.

5006. Advanced Health Assessment and Clinical Decision-Making. 4. Builds upon basic nursing assessment skills. Includes advanced assessment techniques, scientific and diagnostic reasoning, interviewing techniques that lead to clinical decision making. Advanced practice nurses use these skills in advanced practice roles. *Prerequisite:* admitted to UW's FNP Program; others by space available.

5010. Health and Health Care in Rural Cultures. 3. Examines the patterns and health care of people of rural cultures for the purpose of adapting knowledge and health care models to the rural life-style and needs. Special attention is focused on development of culturally congruent self-care and professional primary care methods and on appropriate nursing roles. *Prerequisite:* admitted to UW's graduate nursing program; or consent of instructor (required form on nursing web page).

5025. Application of Theory in Advanced Nursing Practice. 3. Emphasizes critical analysis of theory and the use of theory as a base for nursing practice. Theory analysis and evaluation are used to develop theory-based practice and the interrelationships among theory, research and practice in the development of nursing knowledge are examined. *Prerequisite:* admitted to UW's graduate nursing program or consent of instructor (required form on nursing web page).

5026. Application of Research in Advanced Nursing Practice. 3. Prepares the advanced practice nurse for critical analysis of knowledge and implementation of research in health care and educational settings. Emphasizing qualitative and quantitative research traditions, it examines and critiques a variety of research methods and designs with regard to their applicability to clinical problems. *Prerequisite:* admitted to UW's graduate nursing program; NURS 5025; statistics course; or consent of instructor, (required form on nursing web page).

5060. Epidemiology In Rural Health Care. 3. Presents the basic principles of epidemiology. Includes an overview of the purposes and methods of epidemiology including selected biostatics. Consideration is given to sources of epidemiological data and epidemiological strategies. Special consideration is given to the epidemiology of rural health. *Prerequisite:* baccalaureate degree.

5090. Curriculum and Evaluation in Nursing Education. 3. Designed for nurses preparing for the teaching role in institutions of higher learning or health care. Focus is on analysis of curriculum process and culminates in the design of a model for teaching nursing in a selected area of interest. *Prerequisite:* admission to UW's graduate nursing program; NURS 5010, 5025, 5026, and ADED 5050; one of the following courses: ADED 5240 or 5260 or ITEC 5160 or concurrent enrollment (required form on nursing web page).

5105. Child Care Health Consultation. 3. Topics include consultation skills, children's mental health, child care health and safety, child abuse and neglect, nutrition, injury prevention, oral health, caring for ill children in child care settings, working with children with special needs, issues of diversity, model child care health policies, and injury prevention. Cross listed with FCSC 5105. *Prerequisite:* graduate standing.

5111. Advanced Primary Care: The Young Family. 3. Expands upon the student's basic assessment skills while stressing management strategies for the health promotion/maintenance needs of young families in rural areas. *Prerequisite:* NURS 5006.

5112. Advanced Primary Care: The Mature Family. 3. Expands upon the student's basic assessment skills while stressing management strategies for the health promotion/maintenance needs of maturing families and individuals in rural areas. *Prerequisite:* NURS 5006 and concurrent enrollment in NURS 5111.

5115. Interdisciplinary Early Childhood Seminar. 3. Advanced professional course for students interested in current trends and issues in early childhood development. Interdisciplinary in nature, drawing from research in communication disorders, kinesiology and health, elementary and early childhood education and special education, child and family studies, nursing and psychology. Cross listed with EDEC, FCSC, PSYC, HLED, SPPA 5115. *Prerequisite:* graduate standing.

5120. Advanced Nursing Therapeutics I. 5. Examines the underlying pathophysiological and psychosocial basis for occurrence, detection and management of selected acute and chronic illness in all age groups. Primary focus will be on those illnesses of highest incidence in rural primary care. Management will focus on prevention, intervention and evaluation. *Prerequisite:* NURS 5111 AND NURS 5112.

5130. Advanced Nursing Therapeutics II. 5. Continuation of NURS 5120 examines the underlying pathophysiological and psychosocial basis for occurrence, detection and management of selected acute and chronic illnesses in all age groups. Primary focus will be on those illnesses of highest incidence in rural primary care. Management will focus on prevention, intervention, and evaluation. *Prerequisite:* NURS 5120.

5140. Pharmacotherapy for Primary Care Practitioners. 4. Prepares primary care practitioners in drug therapy management for a variety of client populations with an emphasis on rural practice. Cross listed with PHCY 5140. *Prerequisite:* baccalaureate degree in health care field.

5155. Women, War & Health. 3. Focuses on the physical and psychological health of women and children as influenced by armed conflict. Examines the psychosocial, public health, and socioeconomic effects of living in contemporary war zones or conditions of threatened war. Key international documents that address effects upon women and children are discussed in order to evaluate feminist initiatives to prevent and mediate the consequences of war. Dual listed with NURS 4155; cross listed with WMST/INST 5155. *Prerequisites:* upper-division standing, lower division social or psychological science course and consent of instructor.

5160. Parent/Child Policy Development and Health Promotion. 3. Focuses on the advanced practice nursing role of the prevention specialist in parent child health promotion with implications for rural community health policy development. *Prerequisite:* baccalaureate degree.

5165. Advanced Pathophysiology for Primary Care Practitioners. 4. A system-based approach is used to explore selected pathophysiological states encountered across the lifespan in primary care. The developmental physiology, etiology, pathogenesis, clinical manifestations, and physiological responses to illness and treatment regimens are examined, providing a basis for the foundation of clinical decisions. *Prerequisites:* PHCY 4450 or equivalent.

5175. Gender, Women & Health. 3. Focuses on issues of gender, women and health, including the effects of gender bias in medical research and health care practices and policies. Health care issues of specific concern to women, both nationally and internationally are examined. Dual listed with NURS 4175; cross listed with WMST/INST 5175. *Prerequisites:* Upper-division standing, lower division social or psychological science course.

5201. Diagnostic Systems of Psychiatric Practice. 3. Focuses on taxonomic systems used to classify psychiatric disorders and treatment, with emphasis on the common etiologic threads that are used to cluster psychiatric disease states. The relationship of taxonomies to health promotion and disease prevention, settings of care, intensity of services and related care issues are emphasized. *Prerequisite:* NURS 5006 or NURS 5215

5211. Clinical Management of Psychiatric Disorders. 4. Focuses on the professional role and standards of the Psychiatric Mental Health Nurse Practitioner. Emphasizes care practices for the diagnosing, acute treatment, and long term management of common psychiatric disorders including legal, ethical and health policy issues. *Prerequisite:* concurrent enrollment in NURS 5201.

5215. Transition to Psychiatric Mental Health Nurse Practitioner. 3. Designed for currently certified nurse practitioners. Builds on their core APN knowledge and experience, emphasizing concepts of psychiatric assessment, psychopharmacology, and neuron-pathophysiology. *Prerequisites:* graduate standing, Master of Science in Nursing, Certified Nurse Practitioner.

5220. Management of Common Psychopathological Disorders: Modality I. 3. Practicum focuses on clinical experience in diverse settings to allow students to enhance abilities in the diagnosis, common treatment, and medication management of psychiatric illness. *Prerequisite:* NURS 5211 or concurrent.

5225. Psychotherapy for Psychiatric Mental Health Nurse Practitioner. 3. Focuses on selected specific psychotherapy models relevant tot he advance practice nurse to achieve quality outcomes for individuals, families and groups with psychiatric disorders. Aspects of psychotherapy care are established within a framework of diagnostic reasoning, critical thinking, and clinical judgment to develop and apply comprehensive evidenced based treatment. *Prerequisite:* NURS 5201, 5220, 5211 or concurrent enrollment with NURS 5211, 5230.

5230. Management of Common Psychopathological Disorders: Modality II. 4. Clinical experiences will deal with more complex patients with more integrated health needs. Emphasis is placed on application of non-somatic therapeutics. *Prerequisite:* NURS 5220.

5300. Clinical Practicum In Rural Health Nursing. 3-15 (Max. 15). Final clinical experience provides students with the opportunity to apply theoretical content, research findings, and actively involved in rural health settings appropriate to their area of concentration. *Prerequisite:* all courses in the clinical area of concentration.

5390. Nursing Education Practicum. 3. Provides opportunities for analysis, application and evaluation of theories, methods, roles and responsibilities of the nurse educator in selected settings. *Prerequisite:* NURS 5090.

5500. Issues in Rural Advanced Practice. 3. A capstone course that brings together the role(s) of the advanced practice nurse and the environment(s) in which they practice. Economic, ethical and legal issues related to health policy development are the focus for synthesis in relation to the professional role of the advanced practice nurse for rural nursing practice/leadership. *Prerequisite:* completion of or concurrent enrollment in all required nursing courses except the final clinical practicum.

5590. Preparation for Non-Thesis Clinical Scholarship Option. 1. Facilitates students in completing the preliminary work of topic identification that is necessary to move through the Non-Thesis clinical Scholarship Option (NURS5600) It provides the opportunity to identify and select a professional nursing problem of interest and to develop a prospectus for a clinical scholarship paper. *Prerequisites:* NURS 5010, NURS 5025, NURS 5026, and at least two of the specialty courses within the MS program completed. Students are encouraged to take this course the semester immediately preceding enrollment in NURS 5600.

5600. Non-Thesis Portfolio Seminar. 1-4 (Max. 4). Designed to facilitate documentation of the outcomes of the masters program. In an interactive forum, students apply previously learned research, theory and practice skills to the rural advanced practice nursing role. Each student will develop a portfolio to document attainment of program outcomes. *Prerequisite:* NURS 5010, 5025, and 5026; specialty courses within the MS program completed or concurrent enrollment.

5650. Non-Thesis Clinial Project. 1-4 (Max. 98). A non-thesis project involving independent student work focusing on developing, implementing and evaluating a clinical nursing project. The course contend is adapted to meet the specific focus of the student. A report must be written under the direction of a member of the graduate faculty in the School of Nursing. A non-thesis committee is composed of the chair, as director, one faculty member from the School of Nursing, and a member of the graduate faculty from another discipline. Prerequisites: completion of NURS 5010, 5025 5026 and the majority of support courses or concurrent.

5750. Independent Advanced Study. 1-4 (Max. 8). Provides students the opportunity to analyze a problem in nursing; apply theory to clients in a clinical setting; or pursue an area of interest under the guidance of a faculty member. Requirements and evaluation are mutually established between the student and faculty member. Offered as satisfactory/unsatisfactory only.

5790. Advanced Issues in Health. 1-3 (Max. 12). Designed to provide graduate students the opportunity of pursuing advanced issues in health. *Prerequisite:* graduate status.

5900. Practicum in College Teaching. 1-3 (Max. 3). Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate status.

5920. Continuing Registration: On Campus. 1-2. (Max 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrolled in a graduate degree program.

School of Pharmacy

292 Pharmacy Building, 766-6120
FAX: (307) 766-2953
Web site: www.uwyo.edu/**Pharmacy**
Dean: John H. Vandel
Associate Dean of Operations and Academics: Linda G. Martin
Associate Dean of Student Affairs: M. Glaucia Teixeira
Associate Dean of Pharmacy Practice: Robert D. Scalley
Associate Dean of Pharmaceutical Science: Bruce W. Culver

Professors:

BRUCE W. CULVER, B.S. University of Wyoming 1969; Ph.D. University of Kansas Medical Center 1975; Professor of Pharmacy 2004, 1986, 1977.

JUN REN, B.S. Beijing University 1985; M.D. Peking Union Medical College 1989; Ph.D. University of Alberta 1994; Professor of Pharmacology 2005, 2002.

ROBERT D. SCALLEY, B.S. University of Utah 1967; Pharm.D. University of Southern California 1971; Professor of Pharmacy Practice 1987, 1972.

BEVERLY A. SULLIVAN, B.S. University of California-Irvine 1972; B.S. University of North Carolina-Chapel Hill 1982; Pharm.D. 1984; Professor of Pharmacy Practice 2003.

WEERANUJ YAMREUDEEWONG, B.S. Mahidol University Faculty of Pharmacy-Thai-land 1978; B.S. Massachusetts College of Pharmacy 1987; Pharm.D. 1987; Professor of Clinical Pharmacy 2004, 1997, 1992.

Associate Professors:

MITA DAS, B.S. University of Calcutta 1980; M.S. 1982;l Ph.D. 1990; Associate Professor of Medicinal Chemistry 2008.

E. KURT DOLENCE, B.S. University of Wyoming 1983; Ph.D. University of Kentucky 1987; Associate Professor of Medicinal Chemistry 2005, 1999.

KEM KRUEGER, Pharm.D. University of Missouri-Kansas City; Ph.D. University of Arizona 1998; Associate Professor of Social and Administrative Pharmacy 2006.

TRACY D. MAHVAN, B.S. University of Colorado 1995; Pharm.D. 1998; Associate Professor of Pharmacy Practice 2006, 2000.

LINDA G. MARTIN, B.S. University of Wyoming 1975; M.B.A. 1979; Pharm.D. Creighton University 1998; Associate Professor of Social and Administrative Pharmacy 2006, 2000.

SREEJAYAN NAIR, B.S. College of Pharmaceutical Sciences, Manipol, India 1989; M.S. 1991; Ph.D. 1996; Associate Professor of Pharmacology 2009, 2002.

M. GLAUCIA TEIXEIRA, B.S. Federal University of Ceara 1975; M.S. 1982; Ph.D. Universit Paul Sabatier 1992; Associate Professor of Pharmaceutics 2001, 1995.

W. MIKE ZAWADA, B.A. Hendrix College 1987; Ph.D. University of Arkansas for Medical Sciences 1993; Associate Professor of Toxicology 2008.

Assistant Professors:

SUZANNE CLARK, B.S. University of Iowa 1977; B.S. University of Wyoming 1981; Ph.D. Duke University 1996; Assistant Professor of Pharmacology 2007.

CAROL HERMANSON KOBULNICKY, B.S. University of Wisconsin 1992; M.S. 1998; Ph.D. 2002; Assistant Professor of Social/Administrative Pharmacy 2002.

JI LI, B.S. Lanzhou University of China 1989; M.S. 1992; Ph.D. 1998; Assistant Professor of Pharmacology 2008.

Clinical Assistant Professors

WHITNEY BUCKLEY, Pharm.D. University of Wyoming 2004; Clinical Assistant Professor of Pharmacy Practice 2008.

MARY EMASHOWSKI, B.S. Oregon State University 2003; Pharm.D. 2006; Clinical Assistant Professor 2007.

MICHELLE L. HILAIRE, Pharm.D. Duquesne University 2002; Clinical Assistant Professor of Pharmacy Practice 2004.

JAMIE R. HORNECKER, B.S. Texas Tech University 1999; Pharm.D. University of Wyoming 2003; Clinical Assistant Professor of Pharmacy Practice 2006.

KERRI VANDEL KILGORE, B.S. University of Wyoming 1981; Pharm.D. University of Minnesota 1985; Clinical Assistant Professor of Pharmacy Practice 2002.

JANELLE L. KRUEGER, B.S. University of Wyoming 1992; M.S. University of Kansas 1997; Clinical Assistant Professor of Pharmacy Practice 2005.

A. CHRISTIE NELSON, Pharm.D. University of New Mexico 2002; Clinical Assistant Professor of Pharmacy Practice 2003.

JENNIFER L. PETRIE, Pharm.D. University of New Mexico 2003; Clinical Assistant Professor of Pharmacy Practice 2004.

AMY STUMP, Pharm.D. University of Nebraska Medical Center 2003; Clinical Assistant Professor 2006.

CHRISTY M. WEILAND, B.A. Sonoma State University 2003; Pharm.D. University of Washington 2007; Clinical Assistant Professor of Pharmacy Practice 2008.

TONJA M. WOODS, Pharm.D. University of Wyoming 2002; Clinical Assistant Professor of Pharmacy Practice 2003.

Drug Information Director:

Dr. Melissa Hunter

Professors Emeriti:

H. John Baldwin, Ph.D.
Emery Brunett, Ph.D.
Kenneth F. Nelson, Ph.D.
Robert B. Nelson, Ph.D.

At present, no program for graduate degrees in pharmacy is being offered; however, some courses that may be counted at the graduate level are offered. For courses that can be taken at the graduate level please contact the School of Pharmacy.

The School of Pharmacy instituted a doctor of pharmacy (Pharm.D.) program as the sole entry-level professional degree in pharmacy, effective fall 1996. Contact the School of Pharmacy for program information.

Division of Social Work

Health Sciences Building, 766-6112
FAX: (307) 766-6839
Web site: www.uwyo.edu/socialwork
Director: Mona C.S. Schatz

Professor:

MONA C.S. SCHATZ, B.A. Metropolitan State College 1976; M.S.W. University of Denver 1979; D.S.W. University of Pennsylvania 1985; Professor of Social Work 2006.

Associate Professors:

GAIL LEEDY, B.A. Ohio Wesleyan 1976; M.S. Tulane 1979; Ph.D. 1980; M.S.W. Ohio State University 1993; Associate Professor of Social Work 2001.

Assistant Professors:

DIANE A. KEMPSON, B.A. Columbia College 1968; M.S.W. Florida State University 1970; Ph.D. University of South Carolina 1998; Assistant Professor of Social Work 2003.

KATHLEEN McKINNEY, B.A Eckerd College 1987; M.A. Michigan State University 1992; Ph.D. 1997; Assistant Professor of Social Work 2008.

KELLI LARSEN, B.A. University of Maryland 2000; M.S.W.2001; Ph.D 2008.; Assistant Professor of Social Work 2008.

VICTORIA MURDOCK, B.A. Indiana University; M.S.W. University of South Carolina 1995; Ph.D. 2003; Assistant Professor of Social Work 2003.

JOHN TRACY, B. S. Truman State University 1970; M.A. 1976; M.S.W. University of Iowa 1986; Ph.D. Colorado State University 2005; Assistant Professor of Social Work 2008.

Assistant Lecturers:

ANDREA DEVITA, B.S. University of Maryland 1988; M.S.W. 1990; Assistant Lecturer and MSW Admissions Coordinator of Social Work 2008.

CAROLYN HANEY, B.A. Chadron State College 1993; M.S.W. University of Wyoming 2000.

LEA GRUBBS, B.S.W. West Chester State University 1975; M.S.W. Temple University 1979; Assistant Lecturer of Social Work 2003.

TISA SUCHER, B.S.W. University of Wyoming 1993; M.S.W. 2001; Assistant Lecturer of Social Work 2008.

ELIZABETH DOLE-IZZO, B.S. Colorado State University 1996; M.S.W. 2002; Academic Professional, Assistant Lecturer of Social Work 2006.

Professors Emeriti:

Boyer, Chesteen, Miller, Williams

Master of Social Work

The master of social work (MSW) is designed to prepare graduate students for advanced level social work practice and leadership positions in rural human service organizations. The MSW program is accredited by the Council on Social Work Education. The master of social work program is fashioned around an advanced generalist and rural social work focus that relies on the problem-solving method, and is based on the values, knowledge, and skills of the profession. Part-time and full-time options are available.

Certificate Programs

Rural Clinical Mental Health Social Work
Health and Medical Social Work
School Social Work

Program Specific Admission Requirements

The Division of Social Work's admission committee bases its decisions primarily on the evaluation of previous undergraduate and graduate work, recommendations, experience in human services (paid, volunteer, research, and internship), the applicant's personal statement, an academic essay, and optional supporting materials.

Standard MSW Program

Applicants to the MSW program are expected to meet the following minimum criteria for admission:

A baccalaureate degree from an accredited college or university; (e.g. Council on Higher Education or equivalent)

An undergraduate cumulative grade point average (GPA) of normally 3.0

A baccalaureate degree that reflects a broad liberal arts preparation. The Division of Social Work defines a broad liberal arts preparation as having completed at least six credits in each of the following four curricular areas:

social and behavioral sciences;
natural sciences;
humanities and visual and performing arts (art, philosophy, religion, literature, music, theater); and
quantitative reasoning.

In addition, applicants must have completed a human biology course (or its equivalent) and a statistics course in which they earned a grade of C or better.

Applicants also will be evaluated on their:

Intellectual and personal qualities essential to the successful practice of social work, such as sensitivity and responsiveness in relationships, concern for the needs of others, adaptability, good judgment, creativity, and integrity;

Commitment to social justice and equality;

Written and verbal communication skills;

References; and the compatibility of career goals with the MSW program's advanced generalist perspective.

Advanced Standing Program

Applicants who have a baccalaureate degree in social work from an accredited social work program are eligible to apply for the advanced standing program. Advanced standing students enter the MSW program in the summer of each academic year, complete two summer bridge courses, and enter the advanced generalist concentration in the fall.

To qualify for advanced standing, applicants must have:

A baccalaureate degree in social work from an accredited (Council on Higher Education or equivalent) college or university and social work program which is accredited by the Council on Social Work Education;

An undergraduate social work GPA of 3.25 or better;

A university GPA of normally 3.0; and preferably obtained a grade of B or better in each undergraduate social work course.

Early Childhood Development area of specialized study (2nd major)

This program is under review.

The Rural Behavioral/Mental Health Social Work Certificate on-line educational program provides specialized educational preparation for social workers who graduate with an advanced generalist concentration and want to build specialized knowledge and skills to work in mental health settings in rural and frontier environments. Providing this on-line educational avenue extends greater access to post-graduate social workers throughout Wyoming and can also serve current graduate students in the Division of Social Work.

The Health and Medical Social Work Certificate on-line educational program addresses the important professional development process for social workers who graduate with an advanced generalist concentration and want to build specialized knowledge and skills to work in public and private health and medical care settings. Providing this on-line educational avenue extends this learning opportunity throughout Wyoming to the many graduate social workers who need post-graduate educational opportunities.

The School Social Work Graduate Preparatory Certificate provides specialized educational preparation for social workers who have graduated with an MSW degree in other concentrations or specializations and want to come back to the university to gain the pre-requisite coursework for to be able to be certified as a school social worker from the Professional Teaching Standards Board of Wyoming (and possibly certified through other School Boards in the U.S.).

The Application Process for Certificate Programs is as follows:

Persons applying for this certificate program must have a completed MSW from an accredited social work program. Applicants must:

Apply through the university Admissions office at www.uwyo.edu/admissions. Complete the UW on-line graduate application, and pay the required application fee. Applicants should indicate that they will be applying for a certificate (CERT) program. Official college transcripts must be submitted to the Admissions office directly.

Each applicant must send their 1) Resume and 2) a Letter of Application to the Director of the Division of Social Work, Dr. Mona C. S. Schatz. In this application letter, the student should indicate the reasons for their interest in applying for the program and what they hope to gain from this area of study.

Applicants must have a 3.0 or better in MSW courses. When accepted into the certificate program, the student will be assigned a faculty advisor who will provide assistance in planning the student's course of study. The faculty member will approve all elective classes. Students in graduate certificate programs are required to submit a program of study, a graduation/title form and completion of requirements form when the student is ready to complete the certificate program. The certificate will be noted on the student's transcript and certificate awarded by the Office of the Registrar. The faculty advisor or Division Director will sign the program of study, graduation/title form, and completion form in lieu of the committee.

For course requirements in these certificate areas and any updated information on these certificates, please visit the Division's website at www.uwyo.edu/socialwork.

Program Specific Degree Requirements

The MSW program is divided into two phases: foundation and concentration. The foundation year of the MSW program prepares students for the advanced generalist concentration in the second year. Students may complete either program full-time or structured part-time. Students must also complete a final paper and oral exam.

Master of Social Work Plan A

Students complete all SOWK required courses except SOWK 5740 and SOWK 5750. Plan A students register for SOWK 5960 Thesis Research (variable credit, maximum 12). Students registering for the Plan A option are required to carry out original research. Thesis proposal defense, thesis implementation, and final defense are required. Plan A students may write a monograph fully detailing their research or a publishable peer-refereed journal article, determined in consultation with the student's Research Chair.

Advanced Plan A = 37 hours
Standard Plan A = 59 hours of coursework

Master of Social Work Plan B

Students complete all SOWK required courses including SOWK 5740 and SOWK 5750. Plan B students register for SOWK 5740 (1 credit), to build a student project proposal that will be implemented in the SOWK 5750 (2 credit) course. A final written paper and oral defense are required.

Advanced Plan B = 36 hours of coursework
Standard Plan B - 58 hours of coursework

Social Work (SOWK)

5000. Topics: Social Work. 1-3 (Max. 15). Various advanced topics in social work will be presented. May be repeated for a maximum of 15 hours when offered for different topics. *Prerequisite:* bachelor's degree; 18 hours in socio/behavioral sciences preferred.

5020. Disabilities: Supports and Services. 3. Explores needs of people with disabilities and related policies and service delivery systems from social work's person in environment perspective. Issues explored in light social work values and ethics and social and economic justice. Issues of diversity within disabilities services considered throughout. Dual listed with SOWK 4020; cross listed with WIND 5020. *Prerequisite:* (for social work students) SOWK 3530, 3540.

5030. Social Work and Mental Health. 3. Explores mental health services, policies, neologies, history, and interventions. Information examined in light of social work values and ethics, concerns for populations-at-risk, and social and economic justice. Issues of diversity in mental health areas considered throughout. Dual listed with SOWK 4030. *Prerequisite:* graduate standing.

5060. Social Work with Diverse Populations. 3. Examines social works' roles and issues related to human diversity. Social work values and ethics and social and economic justice are explored throughout. Dual listed with SOWK 4060. *Prerequisite:* graduate standing.

5100. Principles and Philosophy of Social Work. 2. Explores the history, traditions, ethics, purpose, philosophy, and knowledge base of the social work profession. Introduces the generalist social work perspective in rural settings using the problem-solving approach. *Prerequisite:* admission into the MSW program.

5110. Social Policy Analysis. 3. Explores the theory, history, structure and impact of social welfare policy on individuals, families, groups, organizations and communities. Particular attention paid to the analysis and development of policy, programs, and services related to social issues on a national, state, and local level. *Prerequisite:* admission into the MSW program and have either completed SOWK 5100 or take SOWK 5110 and 5100 concurrently.

5200. Individuals and Families in their Environment. 3. A theoretical examination of human behavior in the social environment, focusing on individuals and families in the context of human life cycle development. Emphasizes issues of human diversity and social and economic justice in the context of the environment. *Prerequisite:* admission into the MSW program and either completed SOWK 5100 or take SOWK 5200 and 5100 concurrently.

5210. Groups, Organizations, and Communities. 3. A theoretical examination of human behavior in the social environment, focusing on groups, communities, organizations and institutions. Emphasizes issues of human diversity and social economic justice. *Prerequisite:* admission into the MSW program; SOWK 5100 must be completed or taken concurrently with SOWK 5210.

5300. Generalist Practice I. 3. Applies social work skills, values, and knowledge to a range of human service settings in a rural state. Emphasis is on generic methods within a systems and problem-solving framework. Covers assessment and intervention with individuals and families. Addresses ethics and diversity throughout the course. *Prerequisite:* admission into the MSW program.

5310. Generalist Practice II. 3. Applies social work skills, values, and knowledge to the assessment and intervention with groups, organizations, and communities. Emphasizes generic methods within a systems and problem-solving framework. Addresses ethics and diversity throughout the course. *Prerequisite:* admission into the MSW program; must have completed SOWK 5300.

5400. Social Work Generalist Research Methods. 3. Covers design, implementation and interpretation of research in social work practice settings. Presents methods of program evaluation and practive research at all system levels using both quantitative and qualitative research methodologies. *Prerequisite:* admission into the MSW program.

5450. Supervised Practicum I. 3. Provides practical social work experience in a community human service organization. Emphasizes application of social work ethics, values, theory, skills, and practice evaluation to social work with individuals, families and groups. *Prerequisite:* admission into the MSW program; must have completed or be taken concurrently with SOWK 5300; must have consent of the field practicum coordinator.

5460. Supervised Practicum II. 5. Provides practical social work experience in a community human service organization. Emphasizes application of social work ethics, values, theory, skills, and practice evaluation to social work with groups, organizations, and communities.

5495. Social Work Research and Analysis. 2. Designed for MSW advanced standing students to address research methods and analysis in the context of the generalist problem-solving approach. *Prerequisite:* admission to the MSW advanced standing program; concurrent enrollment in SOWK 5499.

5498. Generalist Practice in Communities and Organizations. 2. Addresses socio-behavioral practice theories and principles relevant to work with large client systems including groups, organizations, and communities. *Prerequisites:* admission into graduate social work program as an advanced standing student.

5499. Social Work Generalist Practice. 2. Designed for MSW advanced standing students to address foundation practice, knowledge and skills in the context of the generalist problem-solving approach. Issues of ethics and diversity addressed throughout the course. *Prerequisite:* admission to the MSW advanced standing program; concurrent enrollment in SOWK 5495.

5500. Social Work Policy and Administration. 3. Covers theories of planning, design, and administration of human service systems within local, state, and national communities. *Prerequisite:* successful completion of foundation courses of the MSW or SOWK 5495 and 5499.

5550. Child Welfare Services. 3. Examines issues of child and family welfare in the context of national, state, and local policy and practice. Social and economic justice are examined as they relate to interventions with children and families. Dual listed with SOWK 4550. *Prerequisites:* admission to advanced standing or SOWK 5100 and 5200.

5600. Advanced Theories and Practice with Adults. 3. Introduces students to 1) the primary mental disorders in children and adults and examines causal theory and prognosis, and 2) theories about family dysfunction. Issues and diversity are addressed throughout the course. *Prerequisite:* successful completion of foundation year of foundation courses of the MSW program or SOWK 5495 and 5499.

5700. Advanced Theories and Practice with Children and Families. 3. Advanced application of generalist problem-solving theories and skills in working with individuals and families in the context of their environment. Issues of ethics, rural practice, diversity, and evaluation of practice addressed throughout the course. *Prerequisite:* successful completion of foundation courses in the MSW program or SOWK 5495 and 5499; successful completion or concurrent enrollment with SOWK 5600.

5715. Advanced Theories and Practice with Groups. 2. Emphasizes advanced understanding and application of models of group interventions for promotion of well-being, prevention of impairment, and restoration of functioning. Models are appropriate to the social work profession, based on ethical considerations, cultural competency, and the strengths perspective. *Prerequisite:* successful completion of foundation courses of MSW Program or completion of SOWK 5495 and 5499.

5720. Advanced Theories and Practice with Communities. 1. Emphasizes advanced understanding and application of models of community organization for promotion of well-being, prevention of impairment, and restoration of functioning. Models are appropriate to the social work profession, based on ethical considerations, cultural competency, and the strengths perspective. *Prerequisites:* successful completion of foundation courses of MSW Program or completion of SOWK 5495 and 5499.

5740. Social Work Research Applications: Proposal Preparation. 1. Application of research methods in the development of a proposal for a thesis or non-thesis, Plan B paper. Options include a proposal for developing a program and completing a grant proposal, a proposal for an original research project or a proposal for an integrative research-based literature review. *Prerequisites:* must have completed Foundation level course work; or be admitted to the Advance Standing Program and have completed SOWK 5495.

5750. Social Work Research Applications. 1-12 (Max. 12). Builds on the SOWK 5740 course. Students complete a non-thesis Plan B paper of quality. Must complete a minimum of two credit hours. *Prerequisite:* SOWK 5740.

5795. Rural Health Care Seminar. 3. Examines social work and rural health and medical care for individuals, families and larger systems through policy, practice, and research. Includes a focus on the health and health care of older adults. *Prerequisites:* consent of instructor, graduate standing, participation in WYO HealthCARE Inter-disciplinary rural training grant.

5800. Advanced Seminar in Social Work. 1-3 (Max. 15). Consideration of special topics of current interest in social work. May be repeated for a maximum of 15 hours when the topic of the seminar is different. *Prerequisite:* graduate standing and consent of instructor.

5810. Advanced Practice: Working with Children and Families in the School. 2. Enhances knowledge, skills, and values of the generalist social worker serving children of diverse backgrounds and their families in the school and its environment, preparing the social worker for a leadership role in a rural school setting. *Prerequisite:* graduate standing.

5820. Advanced Seminar: Working with Children and Families in the School. 1. Builds on the skills developed in SOWK5810, for advancing the skills necessary for school social work. Students integrate observations of school social work settings with theory and practice, and personal evaluation, within this advanced seminar. *Prerequisite:* successful completion of SOWK 5810.

5850. Supervised Practicum III. 6-12 (Max. 12). Provides advanced generalist social work practice experience in a community human service organization. Emphasizes application of social work ethics, values, theory, skills, and practice evaluation to social work with individuals, groups, families, organizations, and communities. *Prerequisites:* SOWK 5500, 5600, 5700 and 5710.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5950. Interpers Cnsl. 3.

5959. Enrichment Studies. 1-3 (Max. 99). Designed to provide an enrichment experience in a variety of topics. Note: credit in this course may not be included in a graduate program of study for degree purposes.

5960. Thesis Research. 1-12 (Max. 24). Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisite:* enrollment in a graduate degree program.

5975. Independent Study. 1-3 (Max. 3). In-depth exploration of a social work topic in consultation with a social work faculty member. *Prerequisite:* consent of instructor.

Wyoming INstitute for Disabilities (WIND)

147 Health Sciences Buliding, 766-2761
FAX: (307) 766-2763
Web site: www.uwyo.edu/wind
Executive Director: Keith Miller, Ph.D.

Professor:

KEITH A. MILLER, B.S. Bowling Green University 1966; M.A. 1967; Ph.D. 1970; Professor Emeritus, Social Work 2007, 1988, 1972.

Assistant Professor:

MICHELLE JARMAN, B.A. University of California at Berkeley 1989; M.A. Northern Michigan University 2000; Ph.D. University of Illinois at Chicago 2006; Assistant Professor of Disability Studies 2007.

Academic Professional/Senior Lecturer:

KENNETH B. HEINLEIN, B.S. University of Wyoming 1975; M.A. Colorado State University 1979; Ph.D. 1994; Academic Professional/Senior Lecturer 2001, 1995.

Academic Professional/Assistant Lecturer:

SANDY ROOT-ELLEDGE, B.S. University of Wyoming 2001; M.A. 2003; Assistant Lecturer 2004.

W. DAVID SCHAAD, B.S. Utah State University 1984; M.H.R. University of Oklahoma 1988; Assistant Lecturer 2004.

LAURIE MARQUARDT WESTLAKE, B.S. University of Wyoming 1978; B.A. 1986; M.Ed. 1998; Ph.D. 2005; Assistant Lecturer 2006.

Advisory Committee:

Beverly Sullivan, Chair; Interim Dean, College of Health Sciences
Thomas Buchanan, President, University of Wyoming
William A. Gern, Vice President, Research
Martin Agran, College of Education
Susan Bentley, Family Specialist, UPLIFT
Karen Bowyer, Administrative Assistant, WIND
Peg Brown-Clark, Director, Special Education Unit, Wyoming Department of Education
Shannon Buller, Executive Director, Governor's Planning Council on Developmental Disabilities
Mary Comin, Accounts Manager, WIND
Kendall Corbett, Coordinator, Consumer Activities, WIND
Dorothy Cronin, Executive Director, Brain Injury Association of Wyoming
Deborah Fleming, Clinical Professor of Geriatrics, College of Health Sciences
George Garcia, Self-Advocate
Jeff Gardner, Vice President, ARK Industries and Rehabilitation Center
Fred Lamb, Self Advocate
Richard Leslie, Self Advocate
Jim McIntosh, Administrator, Division of Vocational Rehabilitation, State of Wyoming
Cliff Mikesell, Administrator, Developmental Disabilities Division, State of Wyoming
Brenda Oswald, CEO/President, Alliance for Self Determination, Inc.
Lori Regnier, Advocate, Protection and Advocacy Systems, Inc.

The Wyoming INstitute for Disabilities (WIND) is part of a national network of University Centers of Excellence in Disabilities Education, Research, and Service (UCEDD). These centers provide a broad array of interdisciplinary academic, clinical, and research experiences regarding people with disabilities - particularly developmental disabilities. A wide variety of disciplines contribute to the study of disabilities.

WIND courses examine the historical, cultural, and contemporary experiences of people with disabilities from an interdisciplinary developmental perspective. Students will gain knowledge of the purpose that education, technology, and community supports play in the lives of people with disabilities. This program is intended to complement the degrees of those who also have an interest in disability issues.

Wyoming INstitute for Disabilities (WIND)

5020. Disability: Supports and Services. 3. Explores disability issues and related policies and service delivery systems. Issues explored in light of social values, ethics and social and economic justice. Issues of diversity within disabilities services and supports considered throughout. Dual listed with WIND 4020; cross listed with SOWK 5020. *Prerequisite:* consent of instructor.

5100. Topics. 1-3 (Max. 12). Provides graduate students with the opportunity for critical analysis and in-depth examination of various topics in the field of Disability Studies. *Prerequisite:* upper division/graduate standing.

5990. Graduate School Internship. 1-12 (Max. 24). Provides graduate students with the opportunity for internship experiences within the disability field.

Division of Medical Education

WWAMI Medical Education Program
Phone: (307) 766-2496
E-mail: wyo-wwami@uwyo.edu
Web Address: www.uwyo.edu/WWMAI

Family Medicine Residency Program at Casper
Phone: (307) 233-6021
Web Address: www.uwyo.edu/uwfprp

Family Medicine Residency Program at Cheyenne
Phone: (307) 777-7911
E-mail: UWCheyFP@uwyo.edu
Web Address: www.uwyo.edu/chyfamprac

The Division of Medical Education and Public Health provides graduate medical (residency) education for physicians in the specialty of family medicine. The university supports two fully accredited family medicine residency programs in Casper and Cheyenne with a capacity for 42 residents (14 in each of the three years). The Casper program began in 1976 and is affiliated with the Community Health Center of Central Wyoming and the Wyoming Medical Center. The Cheyenne program opened in 1980 and is affiliated with Cheyenne Regional Medical Center. In addition, the Cheyenne program has a close working relationship with the Veterans Administration Hospital. The residency programs are housed in two family medicine centers acclaimed to be among the most modern and comprehensively equipped facilities of their kind in the nation. Particular emphasis is placed on preparing physicians for rural practice and addressing those facets of medical practice that are unique to Wyoming.

In 1997, the University of Wyoming joined the University of Washington's WWAMI Program to provide undergraduate medical education for the students of Wyoming. Medical students accepted into this program (WWAMI) take their first year of classes on campus at the University of Wyoming. Students interested in this program should contact the WWAMI in the College of Health Sciences at (307) 766-2496.

Early Childhood Development

Degrees Offered

M.A. or M.S. in (Program Major)/Early Childhood Development

Participating departments include Communication Disorders (Speech-Language Pathology), Counselor Education, Curriculum and Instruction (Early Childhood Education and Early Childhood Special Education), Family and Consumer Sciences, Kinesiology and Health, Psychology, and Social Work.

Offerings

This program permits the students to obtain a degree in their home department, with an area of emphasis (essentially a second major) in early childhood development. It is designed to be flexible in meeting the candidate's professional objectives while providing a multidisciplinary perspective. The students' degree reflects the master's degree in the home department, while the transcript shows the early childhood development program completion.

Primary responsibility for student guidance and graduate program formulation resides with the sponsoring department and major professor. Admission to the program requires both acceptance of the candidate by the sponsoring department and by the Early Childhood Development Academic Standards Committee.

Program Specific Admission Requirements

Potential candidates are encouraged to apply for admission to this program by contacting the participating department and by specifying at the initiation that they desire admission to the early childhood development option. Their credentials are first evaluated by the sponsoring department, and if the entrance requirements are met, the student's application is forwarded to the Academic Standards Committee for approval. The committee meets once per semester to review applications and discuss proposed programs of study. Students must meet current university admissions standards for GPA and GRE scores, and must have an undergraduate degree in one of the specified degree areas, which already provide their students key background coursework: Education, Communication Disorders, Kinesiology and Health, Family and Consumer Sciences/ Child Development, Social Work, or Psychology.

The department is notified of the student's admittance into the program. Upon acceptance to the program, the sponsoring department must assign a member of the Academic Standards Committee to the candidate's graduating committee. The Early Childhood Academic Standards Committee, through its representatives on the candidate's graduate committee (at least one from outside the student's department and the major professor from within), shall aid in formulating deficiency requirements, course program design, academic performance criteria, and research objectives throughout the candidate's tenure in the program. The Early Childhood Academic Standards Committee may be contacted through its chair (to be elected by the committee, currently Dr. Karen Williams).

Program Specific Degree Requirements

The strength of this program lies in its multidisciplinary nature, representing faculty expertise and coursework from four colleges and seven departments. The academic program of study undertaken by the candidate must be designed to enhance the student's background and expertise through formal graduate level coursework in the areas of: 1) child development (FSCS), 2) early childhood education (EDEC), 3) counselor education (CNSL), 4) health sciences (SPPA, KIN, and SOWK), and 5) psychology (PSYC).

Interdisciplinary Component

To insure the aforementioned multidisciplinary focus of the degree, the course program must contain at least four courses in addition to the requirements within the home department: an interdisciplinary seminar (FCSC 5115, cross-listed with each department), plus at least three courses from departments outside of the student's home department for a total of 12 credit hours. Courses can be chosen from within the same college as the sponsoring department as long as the three courses are taken outside of that department. Both Plan A and Plan B options continue to be acceptable.

Counselor Education/Early Childhood Development

Department of Counselor Education
332 Education Building
Phone: (307) 766-2366
E-mail: cnsled@uwyo.edu
Web Address: www.uwyo.edu/cnsled

Total: 61-65 hours

Education Option: Curriculum and Instruction/Early Childhood Development

Elementary and Early Childhood Education
313 McWhinnie Hall
Phone: (307) 766-6366
Web Address: www.uwyo.edu/elemed

Total: 30 hours

Family and Consumer Sciences/ Early Childhood Development

Department of Family and Consumer Sciences
251 Agriculture Building
Phone: (307) 766-4145
E-mail: fsc-consi@uwyo.edu
Web Address: www.uwyo.edu/family

Total: 34 hours

Kinesiology and Health/Early Childhood Development

Division of Kinesiology and Health
Corbett Building
Phone: (307) 766-5285
E-mail: kandh@uwyo.edu
Web Address: www.uwyo.edu/kandh

Total: 34 hours

Psychology/Early Childhood Development

Leading to a doctor of philosophy in developmental psychology

Department of Psychology
135 Biological Sciences Building
Phone: (307) 766-6303
E-mail: psyc.uw@uwyo.edu
Web Address: www.uwyo.edu/psychology

NOTE: Psychology graduate students are accepted only for doctoral degree programs. It is assumed that psychology students seeking the early childhood development interdisciplinary major would be already accepted into the developmental psychology doctoral program.

Total: 30 hours minimum

Social Work/Early Childhood Development

Division of Social Work
328 Health Sciences Center
Phone: (307) 766-5422
E-mail: socialwork@uwyo.edu
Web Address: www.uwyo.edu/SocialWork

Total: 34-58 hours

Speech-Language Pathology/Early Childhood Development
Division of Communication Disorders
264 Health Sciences Center
Phone: (307) 766-6427
E-mail: woodall@uwyo.edu
Web Address: www.uwyo.edu/comdis

The two areas, speech-language pathology and early childhood development, dovetail conceptually and professionally. All developmental centers in the United States have speech pathologists who work with children birth to age 6. However, the prescriptive and extensive requirements of the SLP program will extend the length of the master's program. If a student is willing to undertake both arms of the interdisciplinary program, the requirements would be as follows:

Total: 62 hours

Early Childhood Development Academic Standards Committee

Karen Bartsch
Developmental Psychology (307) 766-2942
College of Arts and Sciences
Department of Psychology
132 Biological Sciences Building

Tami Benham-Deal
Kinesiology and Health (307) 766-4284
College of Health Sciences
Division of Kinesiology and Health
106C Corbett P.E. Building

Michelle Buchanan
Early Childhood Special Education/
Early Childhood (307) 766-3211
College of Education
Department of Elementary and
Early Childhood Education
307 McWhinnie Hall

Tricia G. Johnson
(Early Childhood)
College of Education
Department of Elementary and Early
Childhood Education (307) 766-4002
317 McWhinnie Hall

Michael Morgan
Counselor Education (307) 766-2366
College of Education
Department of Counselor Education
336 Education Building

Mona C. S. Schatz
Social Work (307) 766-6112
College of Health Sciences
Division of Social Work
264 Health Sciences Center

Teresa Ukrainetz
Speech-Language Pathology
(307) 766-5576
College of Health Sciences
Division of Communication Disorders
264 Health Sciences Center

Karen Cachevki Williams
Child Development (307) 766-4145
College of Agriculture
Department of Family and
Consumer Sciences
251 Agriculture Building

Program in Ecology

420 Wyoming Hall
Phone: (307) 766-4828
E-mail: ecology@uwyo.edu
Web Address: uwacadweb.uwyo.edu/pie
PROGRAM DIRECTOR: Stephen T. Jackson, Ph.D.

Degree Offered

Ph.D. in Ecology

The Program in Ecology prepares doctoral students to lead the discipline of ecology during the coming decades. The program is grounded in the natural history of organisms in their environment, but incorporates tools and perspectives from across the biological, physical, mathematical, computational, and earth sciences . Students develop conceptual, historical, and philosophical perspectives spanning the entire range of subdisciplines in ecology, while receiving advanced training in the subdiscipline of their individual interest. The program fosters long-term career development by exploring the linkages of ecology with other disciplines, and by scanning the ecological horizon for emerging questions, concepts, and approaches that will shape the field in years to come.

Faculty members from several departments and colleges participate in the Program in Ecology. Their interests span the full range of topics covered in the field of ecology, and students in the program reflect this diversity.

Program Specific Admission Requirements

Only students seeking a doctoral degree will be admitted into the program. Minimum criteria for admission to the Program in Ecology are:

- minimum score of 900 on the Graduate Record Examination (GRE) general test
- minimum undergraduate GPA of 3.0
- agreement by a member of the PiE faculty to sponsor the student, or to co-sponsor the student together with a PiE affiliate
- admission to a home department at the University of Wyoming

All applications to the program will be reviewed by Graduate Affairs Committee, which has authority on admissions. Students applying to the program who lack a master's degree must show exceptional promise and commitment (e.g., through undergraduate or post-graduate research experiences, peer-reviewed publications, and/or success in competing for research fellowships). Such students are encouraged to consult with their prospective adviser on whether to apply directly to PiE or to master's programs in individual home departments of PiE faculty.

Students already admitted to doctoral programs in individual departments at the University of Wyoming may apply to transfer to the program. Transfer is not pro forma. Transfer applications are subject to the same criteria as for entering students, and admission to the program for transfer students must be approved by the Graduate Affairs Committee.

Program Specific Degree Requirements

Advisory Committee

Before the end of the second semester of study, the student should nominate a five-member advisory committee to the Office of the Registrar. At least three members of the committee, including the committee chair (usually the student's adviser), will be members of the PiE faculty. One other member, who will serve as Graduate Faculty representative, must be from outside the home department of the major adviser, although (s)he can be a faculty member in a department that participates in the program. The committee will advise the student on his/her program of graduate study, execute and evaluate the student's preliminary examination, evaluate the student's dissertation proposal and dissertation, and conduct the student's dissertation defense.

Program of Study

All students are required to take ECOL 5100 or equivalent. This course should be taken during the first year of residency. All students are required to take ECOL 5550 no sooner than the fourth and no later than the eighth semester of study. All students should take ECOL 5350 or its equivalent at least once a year, excepting years when they are enrolled in 5100 or 5550. Exceptions or substitutions of these requirements are subject to approval by the graduate affairs committee.

The program of study must include at least 6 credit hours aimed at developing a tool skill, which except for rare cases shall be in the quantitative/analytical domain (e.g., statistics, modeling, GIS, remote sensing, bioinformatics). Courses relating to research tools should be taken early in the student's residency to ensure that they can be used in thesis research and advanced studies. Specific coursework and tool-skill development for the student's program of study will be developed in consultation with and subject to approval by the student's advisory committee.

Admission to Candidacy

Admission to candidacy for the Ph.D. requires two steps: 1) providing evidence that the student is prepared to identify a research question, design an approach for investigating that question, and a plan for executing the approach, all in the format of an NSF-style research proposal, and 2) illustrating adequate proficiency in the subject matter of ecology through a process involving both written and oral exams.

Proposal

Students must submit a NSF-style proposal to their committee outlining their project, typically by the end of the fourth semester. Each committee member will provide feedback to the student on the proposed research and indicate approval of the proposal or request revision. The proposal must be approved by all committee members prior to starting the preliminary exams.

While this proposal should be a plan for actual dissertation research, unforeseen circumstances may require altering the student's dissertation work after the proposal has been approved by the committee. In the case of a major alteration, the student should reformulate a research plan and submit it to the committee in writing for committee approval.

Preliminary Exam

Passing the preliminary exam is the official admission to candidacy.

Written portion of the preliminary exam. The student will take the written exam portion of the preliminary exam no fewer than two weeks following approval of the research proposal. The goal of this exam is to test breadth of knowledge in ecology. The design of this exam will be coordinated by the graduate committee under the leadership of the adviser. Each written exam will cover the following topics:

- Ecological topics ranging from organismal/evolutionary to ecosystem-level perspectives, integrating concepts and perspectives from across the discipline, over a wide range of spatial and temporal scales.
- The philosophical and historical development of ecology.
- The conceptual background of the student's area of specialization.

The exam will consist of four to six questions developed collectively by the committee and organized by the student's major professor. The exam will be open book; however, the answers will be solely the work of the student. Answers should be fully cited and collectively should be no longer than 30 pages double-spaced exclusive of references cited. Students will have one full week (seven days) to complete the exam. Committee members will indicate pass/fail within one week following completion of written exams. Four of five passing votes are required.

Oral Portion of the Preliminary Exam. No sooner than two weeks after successfully passing the written exam, the student may proceed to an oral exam administered by his/her graduate committee. Oral exams center around three goals from which questions will be derived:

- To verify that the student is prepared, conceptually and methodologically, to carry out successful dissertation research.
- To evaluate the student's ability to conceptualize specific questions in a broad, integrative context.
- To evaluate the student's ability to think spontaneously and creatively and to articulate responses about unexpected or novel questions.

The advisory committee will discuss and organize specific questions based on these goals in a short session at the beginning of the exam period before admitting the student to the examination room and starting the exam. Following the exam each committee member will provide non-binding paper votes of pass/fail for each of the three goals of the oral exam. Following discussion of the student's performance, committee members will each assign a grade of pass/fail for the overall exam. Four of five committee members must vote for passing the overall oral exam.

Students whose performance is unsatisfactory will be given one opportunity for retaking the oral examination. This retake will occur no later than the academic-year semester following the first examination.

Public Seminars

Students are required to give two oral presentations on their research. The purposes of these presentations are to provide the student with practice in oral presentations and to keep the PiE community informed of the student's progress. The first will describe the student's dissertation research proposal. This presentation will be given before the student submits his/her thesis proposal. The second presentation will summarize the student's completed dissertation research, and will normally be given the same semester as the student's dissertation defense. Under extraordinary circumstances (subject to approval by the Graduate Affairs Committee), this presentation may be given at an earlier time. These presentations must be open to the public, and may comprise part of a departmental or Program in Ecology seminar or brown-bag series.

Ecology (ECOL)

5100. Ecology Discipline. 3. Covers the range of ecological questions, processes, scales, and research approaches, in context of the history and philosophy of science in general and of ecology in particular. Aimed at first-year students in the doctoral program in Ecology, although students in other graduate programs are welcome. Prerequisite: graduate standing.

5350. Seminar in Ecology. 1-3. (Max. 12). Exploration of topical issues in ecology, based on discussions of relevant literature. *Prerequisites:* graduate standing and consent of instructor.

5380. Bayesian Data Analysis. 3. Bayesian statistical methods for analyzing data, with emphasis on ecological and biological data. Includes Bayes rule, basic Bayesian formulation (priors, posteriors, likelihoods), single-and multiple-parameter models, hierarchical models, generalized linear models, multivariate models, mixture models, models for missing data, merging statistical and process models, and introduction to computation methods. Cross listed with BOT/STAT 5380. *Prerequisites:* at least 2 semesters of calculus and one semester of statistics.

5550. Ecology as a Scientific Profession. 2. A capstone that prepares doctoral students for success and leadership in their careers as professional ecologists. Intended for students enrolled in the doctoral Program in Ecology in their second or third year. *Prerequisite:* graduate standing.

5620. Advanced Topics in Ecology. 1-4. (Max. 12). Provides advanced treatment of specific topics in ecology that are not covered in regular courses. *Prerequisites:* graduate standing and consent of instructor.

5745. Terrest Ecosystems. 3. Advanced course examines fundamental ecosystem functions and their relationship to ecosystem structure using a systems approach. We study cycles of carbon, water and nutrients through ecosystem components with an emphasis on interactions among plants, soil, and the atmosphere. Current readings focus on responses of terrestrial ecosystems to global climate change and human disturbance. Cross listed with BOT 5745. *Prerequisite:* one course in ecology.

5775. Forest Ecology. 4. Integrative study of the structure, function, and ecological diversity of forested ecosystems, and the physical factors that influence this diversity, including emergent properties of energy flow and nutrient cycling. Special emphasis is given to understanding forest disturbances and succession, and implications for impacts of management and sustainability are discussed throughout. Cross listed with RNEW 5775 and BOT 5775. *Prerequisite:* LIFE 3400.

5780. Research in Ecology. 1-6. (Max. 12). Designed for doctoral students pursuing exploratory research before they have determined a dissertation project, and for students to pursue independent research that will not comprise part of their dissertation. Research must be conducted under supervision of an Ecology Faculty member or Affiliate. *Prerequisite:* admission to doctoral Program in Ecology.

5920. Continuing Registration: On Campus, 1-2. (Max.16). *Prerequisite:* graduate standing.

5940. Continuing Registration: Off Campus, 1-12. (Max. 16). *Prerequisite:* graduate standing.

5980. Dissertation Research. 1-12. (Max. 48). Designed for students who are involved in research for their dissertation project. Also used for students whose coursework is complete and are writing their dissertation. *Prerequisite:* enrollment in a graduate level degree program.

Helga Otto Haub School of Environment and Natural Resources

212 Wyoming Hall
Phone: (307) 766-5080
E-mail: senr@uwyo.edu
Web Address: www.uwyo.edu/ENR/enrschool.asp

Degrees Offered

The Helga Otto Haub School of Environment and Natural Resources offers two major options for graduate students, including the graduate minor in environment and natural resources and the interdisciplinary master's degree major in environment and natural resources (ENR), both of which are available to all graduate students, regardless of discipline. Students pursuing the ENR dual major must also complete the major requirements for a master's degree in another UW department. A third option is available only to students admitted into the University of Wyoming College of Law. University of Wyoming law students may apply to the Haub School for admission to the joint JD/MA in Environment and Natural Resources program. The Haub School of Environment and Natural Resources (Haub School) is designed to move beyond the strictly disciplinary identification of environmental and natural resource problems to the interdisciplinary design and management of their long-term solutions. The school seeks to attract outstanding graduate students from a variety of disciplines, who are eager to pursue careers that engage other professionals, policymakers, and the public in finding innovative ways to resolve complex environmental and natural resource issues.

Program Specific Admission Requirements

The interdisciplinary ENR major program is available to any master's degree student enrolled in the university, subject to the approval of the student's home department and primary adviser. Primary responsibility for student guidance and program formulation resides with the home academic department. The ENR dual major is generally intended for master's students.

To pursue a minor in ENR, students must first be admitted to another master's or doctoral degree program offered at the University of Wyoming. The ENR minor is generally intended for doctoral students. Admission to the joint JD/MA in environment and natural resources degree requires and application to the Haub School. The JD/MA application includes transcripts, LSAT scores, three letters of recommendation, a personal statement, and an interview. Applications may be submitted to the Haub School during any semester. Please contact the Haub School directly for specific application guidelines.

Program Specific Major Requirements

Master of (Science or Art in Program)/Environment and Natural Resources

15 credit hours of a student's coursework must be applied toward the ENR interdisciplinary major. Six of these hours must come from the ENR Capstone (ENR 5000 and 5900) courses. An additional 9 credit hours must be completed in approved courses in three of the four distribution categories listed below. To add breadth to their academic training, students are required to complete courses in the three distribution categories most unlike their primary discipline. Also, to ensure an interdisciplinary character to the program, at least 6 of the 9 required credit hours must come from outside the individual student's home academic department. These distribution menus are subject to change, so contact the Haub School for current curriculum requirements.

A. ENR Policy, Economics, & Law

AGEC 4700. Economics of Range Resources
AGEC 4710. Natural Resource Law and Policy
AGEC 4720/5890. Water Resource Economics
AGEC 4750/5890. Natural Resource Planning Economics
AGEC 5630. Advanced Natural Resource Economics
ECON 4400. Environmental Economics
ECON 4410. Natural Resource Economics
ECON 4420. Seminar in ENR Economics for Scientists
ECON 5400. Advanced Resource and Environmental Economics
GEOG 4040. Conservation of Natural Resources
GEOG 4080. Management of Major River Basins
GEOG 5200. Land Use Planning
GEOG 5750. Public Land Management
LAW 6660. Environmental Law
LAW 6860. Water Rights
POLS 4052. Federal Land Politics
POLS 5051. Environmental Politics and Administration
SOC 4110. Sociology of International Development
SOC 5600. Global Population Issues

B. ENR Science and Engineering

ATSC 4010. Atmospheric Processes
ATSC 5880. Atmospheric Science Problems
BOT 4745/5745. Terrestrial Ecosystem Ecology
BOT 5700. Vegetation Ecology
BOT 5780. Biogeochemistry
CHE 4000. Environment, Technology, and Society
ENVE 5010. Environmental Engineering Principles
ENVE 5895. Environmental Engineering Seminar
GEOG 4450/5450. Fluvial Geomorphology
GEOG 4460. Biogeography
GEOG 4470/5470. Fire Ecology
GEOG 5060. Landscape Ecology
GEOL 4490. Geochemistry
GEOL 4880. Earth Surface Processes

GEOL 5444. Geohydrology
GEOL 5777. Geochemistry of Natural Waters
PATB 5140. Principles of Toxicology
REWM 4280. Wildland Hydrology
REWM 4700. Wildland Watershed Management
REWM 4710. Watershed Water Quality Management
REWM 4850. Rangeland Vegetation Management
REWM 5000. Rangeland Resource Management
ZOO 4425/5425. Genetic Markers
ZOO 5300. Principles of Wildlife Ecology and Mgmt.
ZOO 5310. Fisheries Management
ZOO 5430. Ecology of the Greater Yellowstone Ecosys.
ZOO 5550. Wetland Ecology

C. Human Dimensions
AMST 4640. Art and Ecology
AMST 5300. American Culture and the Public Sector
AMST 5400. American Built Environment
ANTH 5310. Environmental Anthropology
ENGL 4480. Regional Literature of the US: The West
GEOG 4500. American Landscapes
GEOG 4530. Images of Wyoming and the West
GEOG 5540. Topics in Cultural Ecology
HIST 5475. American Environmental History
PHIL/RNEW 4340. Topics in Environmental Ethics
REWM 4900. Rangeland Management Planning
SOC/WMST 4580. Women and Third World Development

D. Quantitative/Qualitative Methods
EDRE 5550. Action Research
EDRE 5600. Education Research I: Survey Research
EDRE 5640. Intro. to Qualitative Research in Education
GEOG 4200/4210. Geographic Information Sciences I/II
GEOG 4280/5280. Quantitative Methods in Geography
GEOG 4300/5300. GPS for Natural Resource Management
GEOG 4880. Spatial Modeling
GEOL 5111/BOT 4111. Remote Sensing
REWM 5200. Spatial Analysis for Watersheds & Ecosystems
STAT 5050. Statistical Methods for the Biological Sciences
STAT 5070. Statistical Methods for the Social Sciences
STAT 5080. Statistical Methods for the Agricultural and Natural Resource Sciences
STAT 5450. Biological Sampling and Estimation of Animal Abundance

Minor in Environment and Natural Resources

In addition to the degree requirements of the student's home department, students must also complete 12 credit hours toward the ENR minor. Six of these hours are completed in the ENR Capstone (ENR 5000 and 5900) courses. An additional 6 hours are completed in two of three distribution categories, including policy, science and engineering, and human dimensions. Students are required to complete their distribution requirements in the categories most unlike their primary discipline. Courses that meet the policy, science and engineering, or human dimensions requirements are any that the student's graduate adviser, Haub School director, and the student agree on. Student completing a graduate minor in ENR must submit an "Addendum for Minor to the Program of Study" form to the Office of the Registrar prior to graduation. The Addendum must be signed by the Haub School director or assistant director.

Juris Doctor/Masters of Art in Environment and Natural Resources

ENR Capstone Series (6 credit hours)
ENR 5000. Approaches to ENR Problem-Solving
ENR 5900. ENR Assessment Practice
ENR Distribution Courses (9 credit hours)
ENR Science and Engineering (one class from category B)
ENR Human Dimensions (one class from category C)
ENR Quantitative/Qualitative Methods (one class from category D)
Internship (3 credit hours)

College of Law Courses (12 credit hours)
LAW 6510. Administrative Law
LAW 6660. Environmental Law
LAW 6735. Native American Natural Resources Law
LAW 6780. Mining Law
LAW 6790. Oil and Gas
LAW 6800. Public Lands
LAW 6860. Water Rights
LAW 6870. Hazardous Waste and Water Pollution
LAW 6890. Land Use Law
Plan B paper

For more information on these and other programs, contact:

The Director
Haub School of Environment and Natural Resources
Department 3971
1000 E. University Ave.
Laramie, WY 82071
Phone: (307) 766-5080
Fax: (307) 766-5099
E-mail: senr@uwyo.edu

Environment and Natural Resources (ENR)

5000. Approaches to Environment and Natural Resources Problem-Solving. 3. Explores important environmental policy, collaborative and adaptive decision-making and the integration of diverse disciplines in the study and resolution of complex ENR challenges. This is the first course in the ENR Capstone series (along with ENR 4900) and the students should take both capstone courses in the same academic year. Dual listed with ENR 4000. *Prerequisite:* USP WA course.

5500. Risk Analysis. 3. Introduces basic concepts of risk analysis, including risk perception, identification, assessment, communication, management, and policy. Provides quantitative treatment of risk assessment procedures, fundamental mathematical models, and the concepts of variability and uncertainty; and practical experience in risk analyses conducted by teams of students. Emphasizes environment and natural resource examples. *Prerequisites:* MATH 1000 or 1400, introductory statistics and familiarity with Excel spreadsheets.

5600. Campus Sustainability. 3. Uses campus as a setting to explore long-term environmental, economic, and social sustainability theory and practice. Students design and implement a semester-long project to improve sustainability of the UW campus. This is an interdisciplinary course and is appropriate for students of all disciplines. Dual listed with ENR 4600. *Prerequisites:* USP WB course.

5890. Topics in Environment and Natural Resources. 1-6 (Max. 12). Special topics in environment and natural resources are offered under this number. The specific subject matter varies each year because the course is normally taught by faculty who wish to present a specialized topic of interest to ENR and other students. Check class schedule for specific topics offered each year. Dual listed with ENR 4890. *Prerequisite:* ENR 3000 or permission of the instructor.

5900. Solving Multidisciplinary Problems in ENR. 3. Participation in a multidisciplinary research team to solve a real or simulated problem in environment and natural resources. Dual listed with ENR 4900. *Prerequisites:* graduate standing and ENR 5000.

Food Science and Human Nutrition

Phone: (307) 766-2224 or (307) 766-4145
Web Address: www.uwyo.edu/anisci or www.uwyo.edu/family

Degree Offered

M.S. in Food Science and Human Nutrition

The interdisciplinary food science and human nutrition master's degree program affords students the opportunity to pursue graduate work in the area of human nutrition and/or food science. After admission to the program, students will choose a major department and work with a faculty member from that department. Students choosing the interdisciplinary program in food science and human nutrition will gain expertise in theory as well as research in the areas of food microbiology, meat science and food chemistry, human nutrition and metabolism, food product development, and community nutrition. All students will be exposed to laboratory as well as classroom learning experiences.

Program Specific Admission Requirements

Recommended prerequisites for students entering the program:
- One year of organic chemistry (may include laboratory)
- An organic chemistry lab
- Human or animal anatomy and physiology
- Introductory statistics
- Basic nutrition course

Students may be required by their graduate committee to take courses in these areas if not completed as part of their undergraduate programs.

Program Specific Degree Requirements

Master of Science in Food Science and Human Nutrition
Plan A (thesis)

One year of organic chemistry (may include a laboratory)

An organic chemistry lab

Human or animal anatomy and physiology

Introductory statistics

Basic nutrition course

Students may be required by their graduate committee to take courses in these areas if not completed as part of their undergraduate programs.

Students may be required to take more than the minimum of 30 hours, either because they have to satisfy prerequisites for some courses, or because a student's committee determines that more than 30 hours will be needed for the student to reach his/her professional objective.

A thesis is required.

All students are required to take courses in biochemistry, laboratory methodology, and statistics.

In addition, at least one credit of graduate-level seminar is required.

Students may request their area of thesis research in food science or in human nutrition.

Students may use the experimental animals and facilities within the animal science department.

A meat processing laboratory, sensory evaluation rooms, experimental kitchens, and a variety of modern facilities for research involving small animals and human subjects are available in the buildings. Major laboratory instruments including high performance liquid chromatographs, electrophoresis equipment, densitometers, gas chromatographs, ultracentrifuges, scintillation counters, differential scanning calorimeters, and histological equipment as well as computer terminals are available in each building.

See the Food Science (FDSC) and Family and Consumer Sciences (FCSC) section of this Bulletin for course listings.

Molecular and Cellular Life Sciences

203 Animal Science/Molecular Biology Complex
Phone: (307) 766-3300
E-mail: mcls@uwyo.edu
Web Address: www.uwyo.edu/mcls

Program Director: David Fay, Ph.D.
Admissions Director: Peter Thorsness, Ph.D.

Degree Offered

Ph.D. in Molecular and Cellular Life Sciences

This interdisciplinary program with more than 40 faculty participants spans a wide range of research topics, such as:
- Biotechnology, bioengineering, biomaterials, and pharmacology
- Cell biology and signaling
- Genetics and development
- Genomics, proteomics, and computational biology
- Microbiology and infectious disease
- Structural biology and biophysics

Coursework focuses on core courses in biochemistry and molecular biology, with electives that include such diverse courses as:
- Topics in Genomics
- Biophysics
- Microbial Physiology and Metabolism
- Cell and Developmental Genetics
- Mass Spectrometry and Analytical Chemistry
- Biomedical Engineering
- Mammalian Endocrinology
- Cell Culture and Virology
- Introduction to Bioinformatics
- Protein Structure and Function
- Microbial Genetics
- Computational Biology
- Plant Physiology

Program Specific Admission Requirements

Admission to MCLS is a two-step process. The first level of evaluation is carried out by the MCLS admissions committee. This step does not require any fee but does require that all requested materials be submitted as described below. Applicants who are chosen for admission to the MCLS program will then complete the final application step through the University of Wyoming Admissions office. This latter step does require a $50 processing fee by the university along with the completion of several additional forms. Students are then officially notified by the university of their acceptance into the MCLS program.

We encourage students to submit their completed applications at the very latest by February 1 of each calendar year. However, because our review of applications will begin in the late fall, early submissions are encouraged and may stand a greater likelihood of success. Also note that we will continue to review new applications received after February 1 in the event that additional slots are available.

Program Specifc Degree Requirements

MCLS doctoral students must fulfill the minimum requirements outlined by the university. In addition, students must obtain a high level of proficiency in the core foundations of the molecular and cellular life sciences through required courses in biochemistry/molecular biology, scientific literature analysis proficiency, and the MCLS cornerstone course. Because of the broad range of research interests pursued by MCLS faculty and students, considerable flexibility will be exercised regarding the specific nature of the graduate-level elective courses that students may take.

Students must successfully complete four eight-week rotations in MCLS laboratories of their choice during the first year.

Students must pass a comprehensive assessment exam at the end of the first year. Towards the end of the second year, students will undertake a qualifying examination in order to be formally admitted to graduate degree candidacy. This exam will have both written and oral components and will cover areas of science that are relevant to the students' research.

The research and coursework progress of MCLS students will also be monitored and evaluated every year by the MCLS curriculum committee. In addition, a research-specific dissertation committee will advise and evaluate the research progress of MCLS students beginning in the second year.

Students must attend weekly outside seminars on topics in the molecular life sciences for the durations of their studies.

Students must annually present their work at the Graduate Student Symposium.

For more information, please see the program's Web site at: www.uwyo.edu/MCLS/.

Neuroscience

Phone: (307) 766-6446
E-mail: flynn@uwyo.edu
Web Address: www.uwyo.edu/neuroscience
Program Director: Francis W. Flynn, Ph.D.

Degrees Offered

M.S. & Ph.D. in Neuroscience

The Graduate Neuroscience Program offers training leading to the M.S. and Ph.D. degrees in neuroscience. The Neuroscience Program emphasizes systems and integrative approaches, and our goal is to provide the students with the necessary background to be broadly trained research neuroscientists and carry out independent research in neuroscience. The Neuroscience Program emphasizes continuing interaction with faculty from several departments and we have a low student to faculty ratio. You will emerge from this program with a problem-oriented, rather than discipline-bound, approach to research.

The Neuroscience Program is designed to enable graduate students to acquire competence in the various disciplines necessary for research and teaching careers in the neurosciences. The current interests of the neuroscience faculty include auditory neurophysiology, behavioral pharmacology, neuroendocrinology, neuroethology, comparative endocrinology, regulatory physiology, somatosensory anatomy and physiology, pain research and cortical development and plasticity.

Program Specific Admission Requirements

University minimum requirements;

Bachelor's degree in biological sciences from an accredited institution;

Admission to the doctoral Neuroscience Program is based on GRE scores, transcripts, letters of recommendation, and your personal statement describing your areas of interest and experience. Admission is open to all students in the biological sciences who meet the minimum requirements.

You will be best prepared for our program if you have successfully completed courses in chemistry, general zoology/biology, physiology, physiological psychology or animal behavior, and biochemistry. Students may be admitted with deficiencies in some of the areas. If so, the student's advisory committee will determine what additional work is necessary during the first year to correct any deficiency.

Program Specific Degree Requirements

Master's Program

After acceptance into the program, each student would select, or be assigned a major adviser and two other faculty advisers, all from the Neuroscience Program faculty. They will serve as the student's graduate committee, devising a set of course requirements (26 credit hour minimum) to best suit the student's educational goals and overseeing the design, execution, and approval of the student's thesis research.

In addition to the usual university requirements for the M.S. degree, an original research thesis (4 hrs. thesis research; 5960) on a neuroscience problem and final oral examination will be required. Specific course requirements will include 1) Introduction to Neuroscience (NEUR 5280), 2) participation in at least two semesters in the Graduate Neuroscience Seminar (NEUR 5115; the topic and instructor changes each semester), 3) thesis research.

Students are required to take a minimum of two of the following courses: Neurophysiology (NEUR 5685), Structure and Function of the Nervous System (NEUR 5100), Neural Mechanisms of Behavior (ZOO 4290), and Cell Physiology (NEUR 5670). Students are required to earn a minimum grade of B for the required courses. Additional electives include: Pharmacology I and II (PHCY 6230), Molecular & Cellular Basis of Disease (HM 6520), and Statistics.

Students are required to obtain a B or better in required courses.

The thesis is the final, written product of the research project. The thesis must be submitted to the student's committee at least **two weeks** before the intended date of final examination. To finalize the master's program and project, one electronic copy of the thesis is submitted to the Office of the Registrar along with the completion of requirements and certificate of approval forms by the graduation deadline.

Doctoral Program

All doctoral neuroscience students are required to complete a 30 hour program of core courses that includes the following required courses: Introduction to Neuroscience, Structure and Function of the Nervous System and Neurophysiology. Students are required to take one course in Statistics (e.g. STAT 5050, STAT 5210) and the course that meets this requirement will be arranged with the student's committee. The statistics requirement must be met by the end of the second year. The Neuroscience Program is a research-oriented program and students are expected to take a minimum of 2 to 3 credit hours of research per semester. Students are also expected to enroll in an on-going Seminar in Neuroscience each semester. The Neuroscience Seminar, which meets weekly and is attended by students and faculty members, provides an opportunity for intellectual and social exchange. The topic and the faculty member directing the seminar changes each semester. The remainder of the 30 hour requirement for the doctor of philosophy degree is selected from designated courses in physiology, pharmacology, molecular biology, and psychology.

A grade of B or better is required for all neuroscience courses.

A student is expected to have a graduate adviser at all times. The faculty adviser will be a participating member of the neuroscience faculty and is on the Graduate Faculty. The adviser is responsible for directing the student's research and academic coursework. During the second year, the student will have an advisory committee. The advisory committee will consist of at least three neuroscience faculty members and an outside member. Normally, the student's adviser will chair the committee and help identify members of the committee who best match the student's area of interest. The role of the advisory committee is to oversee all aspects of the student's education after the first year.

In the student's third year, the advisory committee will set and evaluate the student's qualifying examination. After completion of the preliminary examination, the committee will evaluate the student's dissertation proposal and, eventually, the completed dissertation.

The dissertation is the single most important component of the graduate program. It reports the results of the student's research. As oral defense of the dissertation, the student will deliver a formal 50 minute seminar on original research from the dissertation. The seminar will be followed by an examination by the student's advisory committee.

Neuroscience (NEUR)

5100. Structure and Function of the Nervous System. 4. Aimed at understanding the structure and interconnections of neurons in the brain and how structure gives rise to the complex functions mediated by the brain. This is an essential feature of neuroscience. Covers gross anatomy of the brain, followed by detailed consideration of the divisions of the brain and their functional significance. Cross listed with ZOO 5100. *Prerequisite:* admission to the graduate neuroscience program or graduate standing.
5160. Degeneration and Regeneration. 2. Important neurodegenerative diseases of man and animals are discussed in terms of: impact on society, clinical findings, pathology, disease mechanisms and potential preventive and treatment strategies. There are lectures, class discussions and a written project. Cross listed with PATB 5160. *Prerequisite:* graduate standing.

5280. Introduction to Neuroscience. 3. Examines the basic properties of neurons and from there identifies determinants of brain development and how neuronal circuits are formed. How neuronal circuits underlie processing sensory information, coordinated movement, complex functions (e.g. sleep, learning) and homeostasis are discussed. Cross listed with ZOO 5280. *Prerequisite:* ZOO 3115 or equivalent.

5685. Neurphysiology. 3. Designed to investigate the structure and function of nervous systems, drawing information from both bertebrate and invertebrate oranisms. Topics such as sensory systems, motor coordination and central integrative mechanisms will be covered in addition to the basic neurophysiology of nerve cells. Cross listed with ZOO 5685. *Prerequisite:* one course in physiology, chemistry, physics.

5715. Seminar in Neuroscience. 1-2 (Max. 20). A continuing seminar. All students in the graduate neuroscience program are expected to register for this seminar each semester. The interdisciplinary approach to the nervous system is used employing work from physiology, neuroanatomy and neurochemistry, psychology, pharmacology and biochemistry. Cross listed with ZOO 5715. *Prerequisites:* admission to the graduate neuroscience program or graduate standing.

5800. Research in Neuroscience. 1-16 (Max. 16). The research must be conducted under the supervision of one of the neuroscience program faculty. Laboratory opportunities for research include neuroendocrinology, behavioral neuroscience, sensory neurophysiology, neuroanatomy, neuropharmacology, neurotoxicology, neural cell biology, and neurochemistry. Prerequisite: admission to the graduate neuroscience program or graduate standing.

5920. Continuing Registration: On Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5940. Continuing Registration: Off Campus. 1-2 (Max. 16). *Prerequisite:* advanced degree candidacy.

5960. Thesis Research. 1-12 (Max. 24). *Prerequisite:* advanced degree candidacy.

5980. Dissertation Research. 1-12 (Max. 48). *Prerequisite:* advanced degree candidacy.

Reproductive Biology

Phone: (307) 766-5374
E-mail: gm@uwyo.edu
Web Address: www.uwyo.edu/reprobio
Program Director: Gary Moss, Ph.D.

Degrees Offered

M.S. and Ph.D. in Reproductive Biology

The University of Wyoming offers an innovative program of graduate studies in vertebrate reproductive biology. This interdisciplinary graduate program was established in 1986 and combines the expertise of faculty members who have established records of accomplishment. Areas of emphasis include: ovarian biology, fetal/placental physiology, neuroendocrinology, nutrition/reproduction interactions, reproductive immunology, and the fetal origins of growth efficiency, reproductive function, and adult disease. In this regard, the Center for the Study of Fetal Programming, which was initiated in 2002, has established a link between faculty at New York University School of Medicine and the UW faculty in this program, emphasizing both biomedical and agricultural-related research.

The opportunity to study in these exciting areas is made available primarily through the collaborative efforts of the faculty in the departments of Animal Science, Molecular Biology, Veterinary Science, and Zoology and Physiology, as well as the School of Pharmacy. Programs are offered leading to the M.S. and Ph.D. degrees in reproductive biology. Qualified students are eligible to compete for a graduate assistantship assigned to the program. Post-doctoral positions provide advanced training in research and teaching.

Both the research and teaching aspects of the program reflect a truly interdisciplinary approach. Research activities range from directly applied to fundamental. Animals used for investigation can include livestock and laboratory species. Modern laboratories are designed for hormonal, chemical, and molecular analysis of biological samples, light, electron and confocal microscopy, incubation of cells, tissues and small animal experimentation. Well-equipped large animal handling and surgical facilities are located a short distance from campus at Red Buttes Research Center and the Animal Science Livestock Center.

Program Specific Admission Requirements

GRE composite score of 900 and 1,000 for M.S. and Ph.D. students, respectively.
GPA of 3.00 (with A=4.00).
TOEFL score of 540 for students whose native language is not English.

Program Specific Degree Requirements

Requirements are based on the university minimum requirements.

Water Resources

College of Agriculture
Department of Renewable Resources
2005 Agriculture Building
Phone: (307) 766-6658
E-mail: katta@uwyo.edu
Web Address: www.uwyo.edu/RenewableResources/water_resources_option.htm
Program Director: K.J. Reddy

Degrees Offered

M.A. or M.S. in (Program Name)/Water Resources

The Graduate School cooperates with various academic departments across the university to provide master of arts or master of science degree programs that contain multidisciplinary training in water resources. The master's degree offered through these affiliations is awarded as a major with each of the sponsoring department's graduate programs. The water resources interdisciplinary major will be acknowledged on the graduate transcript and thereby certify to potential employers that the candidate has completed an in-depth multidisciplinary course program in the broad area of water resources.

The educational underpinnings of this program include the following:

The purpose of the program is to provide multidisciplinary education and to impart a multidisciplinary perspective to candidates.
Training is to be consistent with the rigor of professional water resources demands.
The interdisciplinary major program is flexible so as to meet the candidates' individual professional objectives.

Primary responsibility for student guidance and graduate program formulation resides with the sponsoring department and sponsoring major professor. Once accepted, each candidate's graduate committee will contain at least one member drawn from the Water Resources Curriculum Committee.

Please refer to latest updated information on the Web site listed above:

K. J. Reddy, chair, Renewable Resources
Don McLeod, Agriculture and Applied Economiccs
Carol Frost, Geology and Geophysics
William Gribb, Geology
Wayne Hubert, Zoology and Physiology
Drew Johnson, Civil and architectual Engineering
David Legg, Renewable Resources

Upon acceptance to the program, the sponsoring department must assign a member of the Water Resources Curriculum Committee to the candidate's graduate committee. The Water Resources Curriculum Committee's representatives on the candidate's graduate committee shall aid in formulating deficiency requirements, course program design, academic performance criteria, and research objectives throughout the candidate's tenure in the program.

Program Specific Admission Requirements

University application and fee;
Application fee is valid for three years;
Official documentation indicating bachelor's degree earned (not necessary if UW is the most recent institution attended);
Potential candidates are encouraged to apply for admission to this program by contacting the participating department and by specifying at the initiation that they desire admission to the water resources interdisciplinary major. Their credentials will be evaluated by the sponsoring department and the department recommends admission of the individual into the program to the Graduate School.

Program Specific Degree Requirements

The academic program of study undertaken by the candidate must be designed to enhance the student's background and expertise through formal graduate level coursework in the areas of: (1) technical hydrology, (2) natural resources economics and/or law, and (3) water quality. To insure a minimum multidisciplinary character, the course program must contain nine hours of coursework with at least 3 hours from each of the aforementioned areas and at least 6 of those credit hours must be from outside the student's sponsoring department, along with a 1 credit hour seminar on water resources organized through the Department of Renewable Resources. Only Plan A master's degree programs, which require the writing of a thesis in the water resources area, are acceptable for the water resources degree option.

A. Hydrology *(3 hours)*
CE 4800. Hydrology 3
CE 4820. Groundwater and Drainage Engineering 3
CE 5810. Ground Water Hydrology 3
GEOG 5050. Fluvial Geomorphology 3
GEOL 5444. Geohydrology 3
GEOL 5550. Numerical Methods Groundwater Geology 3
GEOL 5570. Advanced Geohydrology 3
REWM 5285. Wildland Hydrology 3
REWM 5280. Stream Habitat Mgt 3
SOIL/MATH 5110. Modelling Flow Transport in Soil and Groundwater Systems 4

B. Law/Natural Resource Economics *(3 hours)*
AGEC 4710. Natural Resources Law & Policy... 3
AGEC 4720. Water Resource Economics 3
AGEC 5630. Advanced Natural Resource Economics 3
ECON 4400. Environmental Economics 3
ECON 4410. Natural Resource Economics 3
ECON 5400. Advanced Resource & Environ. Economics 3
LAW 6660. Environmental Law 3
LAW 6860. Water Rights 3

C. Water Quality *(3 hours)*
BOT 5740. Ecosystems Analysis 4
CE 5430. Biological Principles in Environmental Engineering 3
GEOL 4490. Geochemistry 3
GEOL 5450. Water Quality Modeling 3
GEOL 5777. Geochemistry of Natural Waters .. 3
REWM 4710/5710. Watershed Water Quality Management 3
SOIL 4130/5130. Chemistry of the Soil Environment 4
ZOO 4440. Limnology 3

D. One-Hour Seminar in Water Issues
REWM 5250. Seminar in Water Resources 1

Each student in the water resources interdisciplinary major program will be required to complete this course once during their graduate program. As part of the requirements for the seminar: (a) students will be required to present a seminar on a current water resource issue in Wyoming and to develop an executive summary of their issue to distribute to class participants. Each student is also required to participate in a discussion group following each seminar which stresses the interdisciplinary nature of the issue; (b) during the course of a student's graduate program, he/she will be required to present one seminar for the seminar series (preferably on some aspect of their thesis research). This presentation does not have to occur during the semester that the student is officially signed up for seminar credit.

Agricultural Economics/Water Resources

Department of Agricultural and Applied Economics
206 Agriculture Building
Phone: (307) 766-2386
E-mail: ag-econ@uwyo.edu
Web Site: www.uwyo.edu/agecon/

The objective of this program is to provide students with specialized study in water resources and to signify this specialization by the designation of the water resources interdisciplinary major on the transcript.

Coursework and Thesis

Students must complete the 24 credit hour agricultural and applied economics including M.S. core requirements plus 4 thesis hours and 9 credit hours in water resources approved courses.

Achieve a cumulative 3.0 GPA in the AGEC M.S. core requirements.

The candidate's graduate committee, nominated by the major professor, the student and the department head and appointed by the Graduate School, determine the final program of study and thesis research topic, which must be in the water resources area.

Presentation of research results at a formal public seminar.

Completion of an oral examination covering the student's thesis research administered by the graduate committee.

Oral Exam Requirement

In addition to coursework and a Plan A Thesis, students must pass a final oral examination. The student's committee may also require a written examination.

Interdisciplinary Component

nine hours
(see Water Resources degree requirements)

Rangeland Ecology and Watershed Management (REWM)

REWM 5250. Seminar in Water Resources (1). Objective is to develop interaction among students from the various water resource disciplines to enhance their perspective on how water problems are addressed within an interdisciplinary environment. *Prerequisite:* graduate standing.

Botany/Water Resources

Department of Botany
114 Aven Nelson Building
Phone: (307) 766-2380
Web Address: www.uwyo.edu/botany

In addition to the general requirements for admission to the existing master's program in botany, the master of science in botany/water resources interdisciplinary major requirements will include the following variations:

Coursework and Thesis

16 semester hours are required in botany, plus 9 semester hours in water resources courses. Other courses in mathematics, physics, chemistry, and statistics also may be required as the special program and undergraduate preparation require.

Due to the various, potential subspecialities that students might follow in connection with a botany/water resources interdisciplinary major, no particular botany courses are prescribed. An appropriate array of courses for the desired specialty will be determined by agreement between the advisory committee, graduate student adviser, student, and with the approval of the Water Resources Curriculum Committee.

For the water resources interdisciplinary major, a Plan A Thesis is required. The student must present his or her research in a seminar before the department, and must pass an oral exam on the thesis research.

Interdisciplinary Component

9 hours
(see Water Resources degree requirements)

Civil Engineering/Water Resources

Department of Civil and Architectural Engineering
3074 Engineering Building
Phone: (307) 766-5255
E-mail: ceinfo@uwyo.edu
Web Address: wwweng.uwyo.edu/civil/

The purpose of this program is to broaden the students' master of science program in the water resource area in civil engineering.

Plan A Thesis Requirement

Only students with a M.S. Plan A thesis option are eligible. The student's graduate committee will include at least one member of the Water Resources Curriculum Committee.

Coursework and Thesis

Each student must complete a minimum of 28 hours of graduate level coursework and a thesis under Plan A (4 credit hours) to qualify for the master of science in civil engineering/water resources.

The student must obtain at least 18 credit hours of graduate level coursework in engineering, emphasizing a concentration of core courses in a particular area of emphasis in civil engineering. The core course areas of emphasis for this program are hydrologic and hydraulic engineering. The particular set of courses for a given area of emphasis will be designated by the faculty in the water resources area for these areas of emphasis with the approval of the Civil Engineering Graduate Committee.

Interdisciplinary Component

9 hours

A. Technical Hydrology (3 hours)
- GEOL 5444. Geohydrology 3
- GEOL 5550. Numerical Methods in Groundwater Geol. I 3
- GEOL 5570. Advanced Geohydrology 3
- REWM 5285. Wildland Hydrology 3
- REWM 5280. Stream Habitat Management 3

B. Law/Natural Resource Economics 3
please refer to the general degree requirements for a list of courses

C. Water Quality (three hours)
- GEOL 5450. Water Quality Modeling 3
- GEOL 5777. Geochemistry of Natural Waters 3
- MOLB 4410. Water Microbiology 3
- MOLB 4500. Microbial Ecology 3
- ZOO 4440. Limnology 3

Entomology/Water Resources

Department of Renewable Resources
2013 Agriculture Building
Phone: (307) 766-2263
Web Address: www.uwyo.edu/RenewableResources

The purpose of this program is to enhance the cross-disciplinary linkage between entomology and water resources, and to provide students an entomology degree program which emphasizes the important issues in water resources. Aquatic insects are increasingly being used as bioindicators of aquatic ecosystem health. This is an area of environmental assessment that is rapidly expanding, as is the job market for scientists with this blend of skills.

Coursework and Thesis

Each student must complete a minimum of 26 credit hours of graduate level coursework and 4 thesis credit hours of ENTO 5960 to qualify for a master of science degree in entomology/water resources. Specific coursework will be determined by the student's graduate committee; however, each student is required to enhance his/her background and expertise in the water resources area through specialized coursework and a seminar as shown below.

A. ENTO 5678. Aquatic Entomology (3)
B. Interdisciplinary component
9 hours
(see Water Resources degree requirements)

Plan A Thesis Requirement

Only Plan A thesis students are eligible for the master of science in entomology/water resources. In addition to coursework and a Plan A thesis, students must pass a final written and oral examination. The student's graduate committee will include at least one member of the Water Resources Curriculum Committee to help ensure adherence to the master of science in entomology/water resources degree requirements and that research efforts are in the water area.

Geography/Water Resources

Department of Geography
207 Arts and Sciences Building
Phone: (307) 766-3311
E-mail: dkopulos@uwyo.edu
Web Address: www.uwyo.edu/geog

The master of arts in geography/water resources is consistent with traditional emphases and long-term goals of the Department of Geography in natural resource management and studies of the Rocky Mountain-Great Plains environment.

Prerequisites

15 credit hours in geography, including: 3 hours in Maps and Mapping, 3 hours in Human Geography, and 3 hours in Physical or Environmental Geography. These credits will not count toward the master's degree.

Plan A Thesis Requirement

Only students with a Plan A thesis option are eligible. In addition to coursework and a Plan A thesis, students must pass a final oral examination. The student's committee may also require a written exam. The student's graduate committee will include at least one member of the Water Resources Curriculum Committee.

Coursework and Thesis

Each student must complete a minimum of 30 hours of graduate level coursework and a thesis under Plan A (G&R 5960 for four credit hours). Specific requirements are outlined below, with course credit hours shown in parentheses.

A. Core requirements
GEOG 4280 or 5000 level (4)
Any two of the following methods courses (6-8 credit hours):
GEOG 4000. Terrain Analysis 3
GEOG 4150. Cartography and Digital Map Design 4
GEOG 4200. Geographic Information Sciences I 3
GEOG 4210. Geographic Information Sciences II 3
GEOG 4860/5000 level 1-6
GEOG 4865/5000 level- Research seminar (4 credit maximum allowed in the core requirement)
GEOG 5790. Research Methods..... 1-3
All students must have committee approval to initiate research on their theses/professional papers and must successfully complete an oral defense of their theses/professional papers. The student's committee may also require a written examination.

B. Interdisciplinary Component
9 hours
(see Water Resources degree requirements)

C. REWM 5250. Seminar in Water Res 1

Geology/Water Resources & Geophysics/Water Resources

Department of Geology and Geophysics
122 S.H. Knight Geology Building
Phone: (307) 766-3386
E-mail: acadcoord.geol@uwyo.edu
Web Address: home.gg.uwyo.edu

The purpose of this program is to formalize and broaden strong department offerings at the master of science level in ground water geology, natural waters geochemistry, mathematical hydrology, and fluvial geomorphology.

Coursework and Thesis

Each student must complete a minimum of 26 hours of graduate level coursework and a Plan A thesis. In addition, the following specific core courses are required for the master of science in geology/water resources and geophysics/water resources degrees.

A. GEOL 5444. Geohydrology 3

B. 1 of the following:
GEOL 4830. Introduction Quantitative Methods in Geology 3
GEOL 4880. Surfacial Processes 3
GEOL 5050. Introduction to Isotope Geology 3

C. GEOL 5777. Geochemistry of Natural Waters 3
GEOL 5444 can be used to satisfy the 3 hour technical course requirement or GEOL 5777 can be used to satisfy the 3 hour water quality course requirement.

Admission Requirements

In addition to the department admission requirements, the undergraduate degree program earned by the incoming candidate must meet the minimum undergraduate requirements for the UW Arts and Sciences Plan 1 geology program in mathematics, physics, and chemistry. The transcript should also demonstrate a strong background in physical geology.

Plan A Thesis Requirement

Only students with a Plan A thesis option are eligible. Students must pass a final oral exam. The student's graduate committee will include at least one member of the Water Resources Curriculum Committee.

Interdisciplinary Component

9 hours
(see Water Resources degree requirements)

Rangeland Ecology and Watershed Management/ Water Resources

Department of Renewable Resources
2013 Agriculture C Building
Phone: (307) 766-3114
E-mail: windsong@uwyo.edu
Web Site: www.uwyo.edu/uwrenewable

The purpose of this program is to enhance the cross-disciplinary linkage between range and forest management and water resources, and to provide students with a degree program in rangeland ecology and watershed management which emphasizes the important issues in water resources.

Coursework and Thesis

Water Resources requirements*: 10
Statistics: 3
Range Management Seminar (REWM 5620): 1
Other recommended graduate courses or substitution courses with adviser consent: 12
Plan A thesis credit: 4
Minimum: 30

*Water Resources Requirements

Interdisciplinary component
9 hours
(see Water Resources degree requirements)
REWM 5250. Seminar in Water Resources (1)

Soil Science/Water Resources

Department of Renewable Resources
2013 Agriculture C Building
Phone: (307) 766-3114
E-mail: windsong@uwyo.edu
Web Address: www.uwyo.edu/uwrenewable

The purpose of this program is to enhance the cross-disciplinary linkage between soil science and water resources, and to provide students a soil science degree program which emphasizes the important issues in water resources.

Coursework and Thesis

Each student must complete a minimum of 26 credit hours of graduate level coursework and 4 thesis credit hours of SOIL 5960 to qualify for a master of science degree in soil science/water resources. Specific coursework will be determined by the student's graduate committee; however, each student is required to enhance his/her background and expertise in the water resources area through specialized coursework and a seminar as shown below.

A. Core courses - Students must take or have taken equivalent courses in the four soils disciplines: physics, pedology, chemistry, and microbiology.

SOIL 5100. Soil Physics (4)
SOIL 5120. Genesis, Morphology and Classification of Soils (3)
SOIL 5130. Chemistry of the Soil Environment (3)
SOIL 5140. Soil Microbiology (4)

B. Enhancement courses - Students must take at least one of the following courses:
SOIL 5110. Modeling Flow Transport in Soil and Groundwater Systems
SOIL 5150. Forest and Range Soils
SOIL 5160. Soil Fertility and Fertilizers
SOIL 5170. Analytical Methods for Ecosystems Research

C. Interdisciplinary component
9 hours
(see Water Resources degree requirements)

D. REWM 5250. Sem in Water Resources.....1

E. SOIL 5720. Graduate Seminar in Soil Science 1

Plan A Thesis Requirement

Only Plan A thesis students are eligible for the master of science in soil science/water resources. In addition to coursework and a Plan A thesis, students must pass a final oral examination. The student's graduate committee will include at least one member of the Water Resources Curriculum Committee to help ensure adherence to the master of science in soil science/water resources degree requirements and that research efforts are in the water area.

Zoology and Physiology/ Water Resources

Department of Zoology and Physiology
428 Biological Sciences Building
Phone: (307) 766-4207
E-mail: zprequest@uwyo.edu
Web Address: www.uwyo.edu/zoology

The purpose of this program is to broaden the master of science program in the water resources area by having students take 10 semester hours of coursework associated with water resources.

Coursework and Thesis

Each student must complete a minimum of 26 hours of graduate level coursework and 4 hours of Plan A thesis credit to qualify for the master of science in zoology and physiology/water resources. Specific coursework requirements will be determined by the student's graduate committee. The student must obtain at least 10 credit hours as indicated. Depending upon the student's undergraduate background and career interests, the graduate committee may require that these 10 credits be part of, or in addition to, the 26 credit hours required for a master of science in zoology and physiology.

Interdisciplinary Component

9 hours
(see Water Resources degree requirements)

The Willard C. and Elaine N. Rhoads Scholarship for Graduate Students in Water Resources at the University of Wyoming

The Willard C. and Elaine N. Rhoads Scholarship for Graduate Studies in Water Resources was established to honor Willard Rhoads, a member of the Research Review and Priorities Committee for the Wyoming Water Resources Center and a long-time member of the Wyoming Water Development Commission. Funds for the Rhoads Scholarship were donated to the University of Wyoming by Mrs. Rhoads and her family and friends, with some matching funds provided by the university. Two annual awards for the academic year will be made in the amount of $1,000 to a master's degree candidates for use in furthering research on Wyoming's water resources.

Eligibility Requirements and Evaluation Procedures

The applicant must be accepted into the interdisciplinary water resources major program administered jointly by the Graduate School and the student's academic department.

The applicant must agree to take a minimum of 9 credit hours (including thesis credits) in each of the two semesters for which the award applies.

Applicants for the scholarship can apply more than once, with the exception of past recipients.

The recipient will be chosen by a selection committee appointed by the Water Resources Curriculum Committee.

Applicants meeting the eligibility requirements above will be judged on the basis of promise of academic excellence as evident in grades for graduate level courses, and a recommendation from the student's graduate adviser.

Funds for the academic year will be dispersed to the recipient equally in the fall and spring semesters for half of the total amount.

Application Guidelines

Applicants meeting the above requirements should submit the following:

Application deadline is April 1.

A letter from the applicant listing the name of the scholarship for which he/she is applying, which includes a statement that the applicant agrees to enroll for a minimum of nine hours of graduate level courses (including thesis credits) in each of the two semesters for which the award applies, and a statement of academic and career goals related to water research. The applicant must also state the purpose for which the scholarship funds will be used.

An official transcript of grades for graduate level courses earned at the University of Wyoming or other institutions.

A note from the Graduate School or the academic department, verifying that the applicant has been accepted into a water resources interdisciplinary major program.

A confidential letter of recommendation from the applicant's graduate adviser addressing the applicant's promise for attaining academic and career goals through his/her research in water resources. Up to two additional letters of recommendation can be provided at the applicant's discretion.

The applicant should arrange for all materials to be sent to:

K.J. Reddy
Chair, Rhoads Scholarship Committee
Department of Renewable Resources
Dept. 3354, 1000 E. University Ave.
Laramie , WY 82071-3354

Water Resources Program Executive Committee Members:

K.J. Reddy, Chair, Renewable Resources
Don McLeod, Agricultural and Applied Economics
Carol Frost, Geology and Geophysics
William Gribb, Geography
Wayne Hubert, Zoology and Physiology
Drew Johnson, Civil and Architectural Engineering
David Legg, Renewable Resources