College of Arts & Sciences

Dean: Martin Schimpf
Associate Dean: Helen Lojek
Education Building, Room 601
Telephone 208 426-1414
FAX 208 426-3006

General Information

As the university’s largest and most comprehensive academic unit, the College of Arts and Sciences enjoys a broad mission in teaching, research and creative activity, and service. In teaching, the College of Arts and Sciences offers a core curriculum that prepares students by developing their communication, numerical, and analytical skills; enhancing their creative abilities; fostering in them a greater awareness of human values and needs; and encouraging in them a lifelong appreciation of learning for its own sake.

Additionally, the College offers strong graduate programs for students of the arts, humanities, sciences, and interdisciplinary studies, and a full array of elective and service courses for students majoring in other subjects.

In research, the College generates and disseminates knowledge through basic and applied research, scholarship, and creative activity, thereby enhancing the scientific, technological, humanistic, and cultural environment of the state, the region, and the larger society.

In service, the College meets the educational, economic, and cultural needs of the state through research, publications, workshops, and a rich diversity of cultural and entertainment events.

Graduate Programs

The College of Arts and Sciences offers graduate programs leading to doctor and master degrees and graduate certificates in the following fields:

- art education (master of arts); visual art (master of fine arts)
- biology (master of arts and master of science)
- creative writing (master of fine arts)
- earth science (master of science)
- mathematics (master of science)
- mathematics education (master of science)
- English, education, rhetoric and composition (master of arts)
- geology (master of science); GIS (graduate certificate)
- geophysics (doctor of philosophy and master of science)
- geosciences (doctor of philosophy)
- interdisciplinary studies (master of arts and master of science)
- music education, pedagogy, performance (master of music)
- raptor biology (master of science)
- technical communication (master of arts, graduate certificate)

Activities

Departments and centers within the College of Arts and Sciences sponsor a variety of activities that complement and enhance the graduate curriculum. For instance, the English Department is the home of several publishing ventures, including cold-drill (Boise State University’s national award-winning student literary magazine), Ahsahta Press (poetry by western poets and others), the Western Writers Series (booklets about the lives and works of Western authors), Poetry in Public Places (posters distributed throughout the Northwest), and the Idaho Review (a national literary journal published by the M.F.A. in Creative Writing program and featuring the work of the best writers in this country).

The Hemingway Western Studies Center sponsors an annual national book competition and has been designated by the Library of Congress as the Idaho Center for the Book, responsible for initiating and coordinating statewide exhibitions and events related to books and publishing.

The biological sciences department is affiliated with the World Center for Birds of Prey, a research and breeding center for raptors, located near Boise. In addition, the biological sciences department is the home of the Raptor Research Center. Also, the biological sciences department is the home of the Biomolecular Research Center (BRC). The BRC emphasizes molecular studies and the techniques used to investigate medical issues.

CGISS, the Center for Geophysical Investigation of
the Shallow Subsurface, a research center housed within the geosciences department, focuses on investigating engineering applications and environmental problems in the shallow subsurface of the earth. The geosciences are also affiliated with the Permian Research Institute (PRI), and the Geospatial Research Facility (GRF). Both of these research units are designed for students to learn geology and geographical information systems.
Department of Art

Chair: Richard Young  
Liberal Arts Building, Room 252  
Telephone 208 426-4070  
FAX 208 426-1243  
e-mail: artdept@boisestate.edu  
http://www.boisestate.edu/art/

Graduate Faculty: Stephanie Bacon, Laurie Blakeslee, Jim Budde, Niharika Dinkar, Tom Elder, Jill Fitterer, Francis Fox, John Francis, Kathleen Keys, Larry McNeil, Tudor Mitroi, Janice Neri, Johnathan Sadler, Dan Scott, Cheryl Shurtleff-Young, Anika Smulovitz, John Taye, Ron Taylor, Lee Ann Turner, Elizabeth Wiatr, Jennifer Wood, Richard Young

Adjunct Graduate Faculty: Karen Brown

Graduate Degrees Offered

- Master of Fine Arts, Visual Art
- Master of Arts in Art Education

General Information

**Master of Fine Arts:** The Department of Art offers a minimum two year, full-time Master of Fine Arts degree program in the following emphasis areas: painting, drawing, alternative media, photography, printmaking, ceramics, art metals, and sculpture. The degree requires 60 total credits distributed as follows: 9 credits in art history, 30 credits in studio, 6 credits in Graduate Concourse, 3 credits in Graduate Seminar, 6 credits in thesis, and 6 credits in general electives. Students admitted to the program are provided with private studio space. Graduate faculty hold regular studio visits and consultations. The MFA degree program fosters students’ creative, intellectual, and professional development as artists who produce excellent work, are able to discuss and contextualize their work cogently, and who are prepared to enter various career paths available to artists. Course work emphasizes applied study, art history, theory, and criticism. A Visiting Artist Program that brings a wide range of artists and scholars to campus on a regular basis enhances the MFA experience by providing lectures, workshops, and critiques. The program culminates in an exhibition of a body of work, a written thesis that supports the work, and an oral defense of both.

**Master of Arts in Art Education:** The program leading to the Master of Arts in Art Education degree is designed to meet the needs of art educators working in schools, museums and other arts organizations or communities, and gives students the opportunity to gain the knowledge and skills necessary to become reflective and well-informed art educators. It does not lead to initial certification nor does it require certification for admission. Course work focuses on advanced curriculum development, an examination of contemporary issues relating to art and education, and advanced study of art history and studio practices. Students may select from two possible culminating experiences.

**Teaching Assistantships** are available for full-time students and are awarded competitively. Assistantships include an out-of-state tuition waiver, in-state fee waiver, and a stipend. Assistants must enroll for a minimum of nine credit hours each semester and must meet any other requirements as set forth by the Graduate College. Applications are available at the Graduate College website and must be received in the Department of Art on or before January 15.

**Master of Fine Arts, Visual Arts**

**Graduate Program Director:** Cheryl Shurtleff-Young  
PAAW Building, Room 104  
Telephone 208 426-3450  
e-mail: cshurtle@boisestate.edu

**Admission Requirements**

**Fall admission only.** To be considered as a graduate student in the MFA program, applicants must possess a B.A., B.F.A., or a M.A. degree in Art from an accredited institution and have and maintain a minimum grade point average of 3.0. Applicants must also have completed a minimum of 12 credits of undergraduate art history prior to taking courses for graduate credit. Undergraduate coursework in modern and/or contemporary art.
history is highly desirable. Admission is competitive and the achievement of minimum requirements does not guarantee acceptance to the program.

Students must first be admitted to the Graduate College and have official transcripts from all institutions previously attended submitted to Graduate Admission and Degree Services, MG 141, Boise State University, Boise, ID 83725. The Application for Graduate Admission form may be completed and submitted online at the Graduate College website. This form must be submitted to Graduate Admissions at least 4 weeks prior to January 15.

Applicants must also provide the following to the Art Department, Boise State University, 1910 University Drive, Boise, ID 83725-1510 by January 15:

- A portfolio of at least 20 labeled slides of a recent body of work with an accompanying slide list, and an artist statement that addresses the work submitted. Other documentation formats (CD-Rom, DVD, or VHS) are accepted only for Alternative Media applicants whose work originates in any of these media.
- Three letters of recommendation from professionals in the field.
- A statement of purpose outlining your educational and professional background, the overall objectives in your studio work (including intended area of emphasis), why you want to pursue an M.F.A., and why you are interested in the program. If you are applying for a Graduate Assistantship include a separate statement explaining your interest in the award and your qualifications for receiving it.
- Self-addressed, stamped envelope.

Degree Requirements

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<td>Master of Fine Arts, Visual Arts</td>
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Master of Arts in Art Education

Graduate Program Coordinator: Kathleen Keys
PAAW Building, Room 116A
Telephone 208 426-3873
e-mail: KathleenKeys@boisestate.edu
http://www.boisestate.edu/art/

Application and Admission Requirements

Admission Requirements. Fall or Spring admission. An applicant must satisfy the minimum admission requirements of the Graduate College (see Graduate Admissions Regulations in this catalog). Admission is competitive and the achievement of minimum requirements does not guarantee acceptance to the program. To be considered as a graduate student in the MA program, applicants must possess an earned baccalaureate or professional degree in a relevant program from an accredited college or university by the expected date of entry. Applicants must possess a minimum of 3.0 cumulative grade point average (GPA) based on a 4.0 scale in all previous undergraduate work and a minimum of 3.3 cumulative GPA based on a 4.0 scale in all previous relevant graduate work. Artistic proficiency within at least one studio area is required.

Application Procedures. A prospective student
must follow the general graduate application procedure for degree-seeking students (see Applying as a Degree-Seeking Student in this catalog). Students must first be admitted to the Graduate College and have official transcripts from all institutions previously attended submitted to Graduate Admission and Degree Services, MG 141, Boise State University, Boise, ID 83725.

The prospective M.A. in Art Education student must also submit the following to the Department of Art graduate program director by January 15 to be considered for Fall admission, or by October 1 to be considered for Spring admission:

- A statement outlining your educational and professional background, your professional objectives, and philosophy of art or art education and why you are interested in the program.
- Three letters of recommendation in which the applicant’s experience working in art and/or educational settings and potential contribution to the field of art education are described from professionals in art education or related fields.
- A portfolio of at least 20 labeled slides of a recent body of work with an accompanying slide list, and an artist statement that addresses the work submitted.
- An example of academic or professional writing.
- Additional related work samples.
- Evidence of any public or private teaching experiences.
- Evidence of successful completion of basic K-12 art education methods courses; both K-8 and 6-12 or their equivalents. Deficiencies may be completed upon acceptance.
- A self-addressed, stamped envelope.

## Degree Requirements

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<tr>
<th>Master of Arts in Art Education</th>
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<tr>
<td>Course Number and Title</td>
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<tr>
<td>ART 501 THE FINE ARTS: ANALYSIS AND APPRECIATION IN THE EDUCATIONAL PROGRAM (3-0-3(S)(S)</td>
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<td>ART 521 TEACHING THROUGH EXPERIMENTAL ART MEDIA (0-6-3)(SU). Varied and unique experimental art processes and media to be used in conjunction with creative teaching techniques that emphasize critical thinking skills and the development of new or enriched art(s) curricula for K-12. Students will solve procedural problems and adapt art media to teaching experiences. Outside reading and creative exploration will be expected, as well as a final presentation including a written paper. PREREQ: Graduate standing.</td>
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<tr>
<td>ART 533 CONTEMPORARY IDEAS IN ART METALS (0-6-3)(F/S). Advanced exploration of design issues and techniques related to conceptual problems. Content varies</td>
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## Course Offerings

| ART 521 TEACHING THROUGH EXPERIMENTAL ART MEDIA (0-6-3)(SU). Varied and unique experimental art processes and media to be used in conjunction with creative teaching techniques that emphasize critical thinking skills and the development of new or enriched art(s) curricula for K-12. Students will solve procedural problems and adapt art media to teaching experiences. Outside reading and creative exploration will be expected, as well as a final presentation including a written paper. PREREQ: Graduate standing. |
| ART 533 CONTEMPORARY IDEAS IN ART METALS (0-6-3)(F/S). Advanced exploration of design issues and techniques related to conceptual problems. Content varies |
by term with a focus on individual processes or topics. Repeatable for credit. PREREQ: ART 221 and ART 222 or PERM/INST.

ART 535 STUDIO IN ART METALS (0-6-3)(F/S).
Individual problems in Art Metals. Content varies by term with a focus on individual processes or topics. Repeatable for credit. PREREQ: 9 credits of ART 307 and/or ART 533 or PERM/INST.

ART 551 CURRICULUM DEVELOPMENT AND ASSESSMENT IN ART EDUCATION (3-0-3)(F)(Alternate years). Designed for those teaching or planning to teach art at any level, this course includes the history and rationale of American arts curricula K-12, the development of a selected, viable curriculum in a specific area, and the use of curriculum planning techniques appropriate in current educational settings. PREREQ: Graduate status or PERM/INST.

ART 575 GRADUATE SEMINAR (3-0-3)(F/S). Group meetings for the critical examination of works, practices, and issues within contemporary discourse and visual culture. PREREQ: Graduate standing.

ART 576 STUDIO PRACTICES (0-V-V)(F/S). Independent work in the studio under the guidance of the student’s graduate committee members. Periodic critiques of the work are conducted by the graduate committee and by the full graduate faculty. May be repeated for credit.

ART 577 GRADUATE CONCOURSE (3-0-3)(F/S).
Through a variety of seminar meetings, critiques, studio and community-based activities, students will locate their art practices within the contexts of contemporary art and theory, articulate the strategies unique to their work and explore their roles as artists in society. May be repeated for credit.

ART 578-589 SELECTED TOPICS (V-0-V). Media specific studio courses taught by the graduate faculty. Students will have an opportunity to have their art work analyzed and critiqued by practicing fine art professionals. PREREQ: The following courses are reserved for matriculated graduate MA and MFA art students. Exceptions may be allowed by special permission of the course instructor and the director of the program.

ART 578 SELECTED TOPICS--ART EDUCATION
ART 579 SELECTED TOPICS--COMPUTER GRAPHICS
ART 580 SELECTED TOPICS--DRAWING
ART 581 SELECTED TOPICS--PAINTING
ART 582 SELECTED TOPICS--ART METALS
ART 583 SELECTED TOPICS--SCULPTURE
ART 584 SELECTED TOPICS--PHOTOGRAPHY
ART 585 SELECTED TOPICS--CERAMICS
ART 586 SELECTED TOPICS--PRINTMAKING
ART 587 SELECTED TOPICS--GRAPHIC DESIGN
ART 588 SELECTED TOPICS--ILLUSTRATION
ART 589 SELECTED TOPICS--ART HISTORY

ART 590 PRACTICUM/INTERNSHIP (3-0-3). This course is designed primarily for students intending to teach at the college level. Assisting in the preparation and teaching of one or more studio courses; minimum of six contact hours per week required. PREREQ: Consent of instructor and Graduate Program Coordinator.

ART 591 PROJECT (6 credits). The graduate project includes a scholarly paper describing the history and results of original research used to substantiate a special view in the field of visual arts. The project will be:

1) An art exhibition subject to full graduate faculty review; or
2) A comprehensive, illustrated visual arts curriculum in written form appropriate for use in an educational setting.

The required oral comprehensive examination will be prepared, administered, and evaluated by the student’s M.A. graduate advisory committee within the final month of the project presentation. PREREQ: Graduate status.

ART 593 THESIS (V-V-6). Independent research or creative activity at the master’s level resulting in a thesis that must be defended at a final oral examination and archived in the university library. The thesis must be written in clear and effective English and presented in a format that conforms to the standards of the Graduate College. (Pass/Fail.)

ART 594 WORKSHOP (1-3 credits)
ART 595 READING AND CONFERENCE (1-2 credits)
ART 596 INDEPENDENT STUDY (1-3 credits)
ART 597 SPECIAL TOPICS
Department of Biological Sciences

Chair: James Belthoff
Science/Nursing Building, Room 100
Telephone 208 426-3262
FAX 208 426-1040
http://www.boisestate.edu/biology/

Graduate Faculty: Marc Bechard, James Belthoff, Alfred Dufty, Kevin Feris, Greg Hampikian, Julie Heath, Cheryl Jorcyk, Peter Koetsier, James Long, Kristen Mitchell, James Munger, Steven Novak, Julia Thom Oxford, Ian Robertson, Troy Rohn, Marcelo Serpe, James Smith, Juliette Tinker, Merlin White, Denise Wingett, GongXin Yu

Adjunct Graduate Faculty: Christopher Ball, Jonathan Bart, Keith Bildstein, Kenneth Brewer, Jay Carlisle, Matthew Dare, Gary Daughdrill, Susan Earnst, David Eldridge, Mark Fuller, Charles Harris, Cynthia Keller-Peck, Lloyd Kiff, Cecilia Kinter, Steven Knick, Michael Kochert, Daniel Leavell, Matthias Leu, John Lloyd, Carl Marti, Jr., Bill Mattox, Richard Olson, Rebecca Pullen, Roger Rosentreter, Randall Ryan, Rex Sallabanks, Lucinda Salo, Nancy Shaw, Karen Steenhof, Dennis Stevens, Ronald Strohmeyer, Richard Watson, David Whitacre, Eric Yensen

Graduate Degrees Offered

Master of Arts in Biology
Master of Science in Biology
Master of Science in Raptor Biology

General Information

Professional biologists, teachers in public and private schools, and others can use these programs to increase their knowledge base and to advance professionally.

Application and Admission Requirements

Applications are due February 1 for fall admission and October 1 for spring admission. For additional information concerning the department, faculty, and potential projects, visit the departmental web site (www.boisestate.edu/biology). To apply:

Send the following three items to: Graduate Admissions Office, Boise State University, 1910 University Drive, Boise, ID 83725-1110.
A graduate application along with the $55 application fee. Please submit the application PRIOR to submitting any additional items. Apply online at www.boisestate.edu/gradcoll.

Have the Registrar(s) of ALL post-secondary institutions attended send official transcripts to the Graduate Admissions Office. Have Graduate Record Exam (GRE) scores forwarded to the Graduate Admissions Office.

Send the following to: Graduate Program Coordinator, Department of Biological Sciences, Boise State University, Boise, ID 83725-1515.

A cover letter discussing professional goals and reasons for wishing to study biology or raptor biology at Boise State University. MS applicants should also discuss research interests, especially as they mesh with those of faculty members. MA applicants should also discuss what goals they wish to achieve by enrolling, specifically discussing project interests and desired areas of emphasis for course work. Also note any communication you have had with faculty members.

Three letters of recommendation. These should be from faculty, supervisors, or others than can describe the applicant’s qualifications and promise relative to graduate studies and independent research.

Individuals admitted to REGULAR STATUS as graduate students in biology or raptor biology typically have:

an undergraduate GPA of at least 3.00 on a 4-
point system; results that average in the 50th or higher percentile in the verbal, quantitative, and analytical writing portions of the GRE exam; an undergraduate degree in biology or a closely related field.

PROVISIONAL STATUS may be granted to those otherwise promising applicants who do not meet GPA or GRE requirements or who have undergraduate course work deficiencies.

Initial evaluation of applicants will be undertaken by the Biological Sciences Department Graduate Studies Committee; final decisions on admission will depend on qualifications of the candidates and openings that exist within the Biology and Raptor Biology graduate programs.

Each student who has been admitted into our programs will form an advisory committee, which will consist of at least three members: the student’s major professor and two other members. The committee will determine if academic deficiencies exist that must be remedied, help design thesis/project research, help guide appropriate graduate course work, evaluate the thesis/project, and conduct the final defense or comprehensive examination.

The Graduate Studies Committee will, in cooperation with the student’s major professor and advisory committee, assess performance and progress in thesis/project research, course work and teaching assistant duties (where applicable). Continuing enrollment in the program requires a 3.0 GPA and satisfactory progress toward completing the degree.

Financial Aid

Teaching Assistantships that include a stipend, a tuition and fee waiver, and student health insurance may be available on a competitive basis. Additional support for master’s research projects may be available from faculty members in the form of research assistantships. Other forms of financial aid, such as loans or the College Work Study Program, are available to graduate students. Prospective students should contact the Financial Aid Office and consult the Boise State University catalog.

Degree Requirements

The M.S. is a research-based degree. The M.S. candidate will complete a thesis based on original research carried out by the student. Ideally, the thesis should make a significant contribution to the body of scientific knowledge and be of sufficient quality to warrant publication in a peer-reviewed journal.

M.S. students will be expected to produce a written thesis/project proposal and give an oral presentation of that proposal during their first year and, following completion of the thesis/project, give an oral defense of the thesis/project and an exit seminar to present results to the public.

The M.A., Project Option is an application-based degree and is considered to be a terminal degree (except for students intending to attend professional school); students wishing to later pursue a Ph.D. should enroll in the M.S. program. In addition to completing substantial course work, the M.A. candidate will complete a project that may be an application or synthesis of original research carried out by others. Examples of such projects include development of biology-based curricula, compilation and analysis of studies on a range of species, review and the synthesis of a body of ideas or data, and development of a resource management plan based on relevant studies.

The M.A., Examination Option is a course work-based degree and is considered to be a terminal degree (except for students intending to attend professional school); students wishing to later pursue a Ph.D. should enroll in the M.S. program. The M.A. candidate will complete a wide range of relevant course work. At the end of course work, the candidate will be required to pass a comprehensive examination. The examination is to be tailored by each candidate’s committee to emphasize the areas covered by course work. After the candidate has completed the written portion of the examination, the candidate will meet with the committee for an oral review prior to final approval or rejection of the written examination.

Completion of each degree program requires an average grade of B or better for all courses applied to the 30-33 credits required. All requirements for the degree and graduation must be completed within a period of seven years.

Master of Arts in Biology

Graduate Program Coordinator: Ian Robertson
## Master of Science in Biology

**Graduate Program Coordinator:** Ian Robertson  
Science/Nursing Building, Room 226  
Telephone 208 426-2394  
e-mail: iroberts@boisestate.edu

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## Master of Science in Raptor Biology

**Graduate Program Coordinator:** Ian Robertson  
Science/Nursing Building, Room 226  
Telephone 208 426-2394  
e-mail: iroberts@boisestate.edu

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Course Offerings

Additional work will be required to receive graduate credit for undergraduate G courses.

BIOL – BIOLOGY

BIOL 310G PATHOGENIC BACTERIOLOGY (2-6-4)(S) (odd years). Medically important bacteria, rickettsia, and chlamydia are surveyed with emphasis on their pathogenicity, host-parasite relationships, and the clinical and diagnostic aspects of the diseases they produce in humans and animals. PREREQ: BIOL 301 and BIOL 303.

BIOL 344G MOLECULAR AND CELL BIOLOGY LABORATORY (0-8-3)(F). Modern molecular and cellular techniques including cloning, computer analysis of DNA sequences, karyotyping, DNA amplification, and use of Southern and Western blots for transgene detection and expression analysis. Some laboratory time will be arranged. PRE/CoreQ: BIOL 343 and PERM/INST.

BIOL 401G ORGANIC EVOLUTION (3-0-3)(S). Philosophical basis of evolutionary theory. Detailed examination of genetic variation, mechanisms of evolutionary change, adaptation, speciation, and phylogeny. Genetics recommended. PREREQ: BIOL 323 and BIOL 343 or PERM/INST.

BIOL 412G GENERAL PARASITOLOGY (2-3-3)(Offered intermittently). Study of animal parasites with emphasis on those of man and his domestic animals. Lectures cover general biology, life history, structure, function, distribution, and significance of parasites. Laboratory provides experience in identification and detection. PREREQ: BIOL 301 or PERM/INST.

BIOL 415G APPLIED AND ENVIRONMENTAL MICROBIOLOGY (3-3-4)(S). Microbial populations and processes in soil and water. Water- and food-borne pathogens. Microbial and biochemical methods of environmental assessment. PREREQ: BIOL 303, and CHEM 301-302 or CHEM 307-308, or PERM/INST.

BIOL 420G IMMUNOLOGY (3-0-3)(F). Principles of immunology, host defense mechanisms, the immune response, immune disorders, serology, and related topics. PREREQ: BIOL 301.

BIOL 445G HUMAN GENETICS (3-0-3)(S)(Offered intermittently). Discussion of important aspects of human heredity. Topics include the reproductive system, single gene disorders, chromosome abnormalities, hemoglobinopathies, inborn errors of metabolism, somatic cell and molecular genetics, immunogenetics, gene screening, and human variation and evolution. PREREQ: BIOL 343 or PERM/INST.

BIOL 501 BIOMETRY (4-0-4)(F). An application of statistical methods to problems in the biological sciences. Basic concepts of hypothesis testing; estimation and confidence intervals; t-tests and chi-square tests. Linear and nonlinear regression theory and analysis of variance. Techniques in multivariate and nonparametric statistics. PREREQ: MATH 147 or equivalent, or PERM/INST.

BIOL 502 POPULATION AND COMMUNITY ECOLOGY (3-0-3) (F). The structure of populations and communities. Competition, predation, life history strategies, demography, population regulation, and species diversity are examined from experimental and theoretical perspectives. PREREQ: BIOL 323 or equivalent, or PERM/INST.

BIOL 504 TEACHING ASSISTANT SKILLS AND ISSUES (2-0-2). Discussion of learning styles, testing strategies, disability issues, and other topics relevant to being a teaching assistant for undergraduate biology laboratories. (Pass/Fail.) PREREQ: PERM/INST.

BIOL 505 APPLIED RAPTOR BIOLOGY (0-3-2)(F)(Odd years). A study of the techniques appropriate to the study of the ecology, behavior, and physiology of raptors and other birds. Field trips will be taken in addition to regularly scheduled class. PREREQ: Graduate standing in Biology or Raptor Biology or PERM/INST.

BIOL 506 RAPTOR ECOLOGY (3-0-3)(S). Theoretical ecology as applied to birds of prey. Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure; raptor management. PREREQ: BIOL 323 or equivalent, or PERM/INST.

BIOL 509 MOLECULAR ECOLOGY (3-0-3)(F)(Odd years). Theory and methodologies. Use of molecular genetic markers to study ecological phenomena (e.g., mating systems, parentage and kinship, population structure, gene flow, dispersal, natural selection). Emphasis on an hypothesis-testing approach. Appropriateness of particular molecular techniques to specific research questions. PREREQ: BIOL 323 and BIOL 343 or PERM/INST.

BIOL 517 SPECIES AND SPECIATION (3-0-3)(F)(Odd years). Species definitions are fundamental for all investigations in the biological sciences. This course will investigate the numerous species concepts proposed over the last 100 years with an emphasis on primary literature.
BIOL 522 CONSERVATION BIOLOGY (3-0-3)(S)(Odd years). An introduction to the field of conservation biology, the applied science concerned with understanding the effects of human activities on natural biological systems and with developing practical approaches to prevent the loss of biodiversity. Topics covered will include conservation genetics, demographic analysis, habitat degradation, overexploitation, and restoration ecology. Discussion of the social, political, and economic aspects of conservation biology. PREREQ: BIOL 323

BIOL 525 BASIC AND APPLIED DATA ANALYSIS IN BIOLOGY (2-0-2)(F/S). Univariate statistics using computer software (JMP, SAS Institute, Inc.) with applications to biology, natural resources, health care, education, industry, and other professional disciplines. PREREQ: BIOL 323, BIOL 501, or PERM/INST.

BIOL 526 INSECT ECOLOGY (3-0-3)(S)(Even years). An in-depth exploration of insect ecology, evolution and behavior. Topics include life history evolution, insect-plant interactions, predation and parasitism, reproduction, insect societies, chemical ecology, biodiversity and pest management. PREREQ: BIOL 323 or PERM/INST.

BIOL 527 STREAM ECOLOGY (3-3-4)(F)(Odd years). The biology and ecology of flowing waters is emphasized; their biota, management, and ecology at both the community and ecosystem level will be discussed. PREREQ: BIOL 323 or PERM/INST.

BIOL 528 GEOGRAPHIC INFORMATION SYSTEMS IN BIOLOGY (3-0-3)(S). Discussion of the use of Geographic Information Systems to apply spatial data to ecological problems. Analysis of the ways that spatial relations affect patterns, processes, and decision making at multiple scales. Specific topics covered include GAP analysis, habitat modeling, spatially-explicit population modeling, landscape ecology, home range analysis, interpretation of satellite imagery, and natural resource issues. PREREQ: Graduate standing or PERM/INST.

BIOL 529 MODERN METHODS IN ECOLOGY AND BEHAVIOR (2-3-3)(Odd years). Instruction in the theory, practice, and analysis of modern methods used in ecological and evolutionary studies will be provided. Methods to be covered include: cytology, isozyme electrophoresis, DNA restriction site analysis, DNA sequencing, and RAPD analysis. PREREQ: PERM/INST.

BIOL 531 PHARMACOLOGY (3-0-3)(F). Basic pharmacological principles including mechanisms of drug action in relation both to drug-receptor interactions and to the operation of physiological and biochemical systems. Pharmacokinetics, metabolism, receptor theory and an examination of major classes of therapeutic agents used in humans. PREREQ: BIOL 227-228 or BIOL 191-192, and BIOL 301.

BIOL 533 BEHAVIORAL ECOLOGY (3-0-3)(Odd years). This course focuses on the evolutionary significance of animal behavior in relation to the ecology of the organisms. Using theoretical background and recent empirical evidence, mating systems, foraging, parental care, selfishness and altruism, competition, territoriality, and other behavioral patterns will be assessed in relation to the survival and reproduction of animals. PREREQ: BIOL 323 or PERM/INST.

BIOL 534 PRINCIPLES OF FISHERIES AND WILDLIFE MANAGEMENT (3-0-3)(S). Integrative approach to managing game and non-game populations and habitat. Tools to determine population status, strategies to increase or decrease populations, and the implementing of monitoring programs. Current quantitative approaches within context of the ecosystem-based view of wildlife and habitat management. PREREQ: BIOL 323 or PERM/INST.

BIOL 541 MOLECULAR BIOLOGY OF CANCER (3-0-3)(S). A treatment of the basic biology of cancer and the process of tumor progression. Topics examined will include oncogenes, tumor suppressor genes, and the causes of cancer. PREREQ: BIOL 301, BIOL 343.

BIOL 542 MOLECULAR NEUROBIOLOGY (3-0-3)(F). Emphasis will be on the molecular aspects of neurobiology. Topics will include: cells of the nervous system, neurochemical transmission, nerve terminals, membrane structure and function, electrical signaling, neural development, process outgrowth and myelination and glia, and specific neural diseases including Alzheimer’s disease, Parkinson’s disease, and Lou Gehrig’s disease. PREREQ: BIOL 301.

BIOL 543 ADVANCED DEVELOPMENTAL BIOLOGY (1-6-2)(F) (Odd years). Application of molecular and cellular methods to current topics in developmental biology. Analysis of current literature in biology with emphasis on the coordinated regulation of gene expression, cellular differentiation and migration. Laboratory studies include model systems such as chick, zebrafish, sea urchin and mouse, utilizing cell/tissue culture, histology, immunohistochemistry, RT-PCR, protein purification, SDS-PAGE, western blot and others. Previous enrollment in BIOL 344 and ZOOL 351 recommended.

BIOL 546 BIOINFORMATICS (2-3-3)(F). Practical training in bioinformatics methods: accessing sequence data bases, BLAST tools, analysis of nucleic acid and protein sequences, detection of motifs and domains of proteins, phylogenetic analysis, gene arrays, and gene mapping. PREREQ: BIOL 343 or PERM/INST.

BIOL 547 FORENSIC BIOLOGY (3-0-3)(F). Analysis and interpretation of biological evidence in forensic contexts. Topics include entomology, botany, fingerprints, toxicology, DNA, pathology, anthropology and odontology. PREREQ: BIOL 191-192.

BIOL 550 SCIENTIFIC WRITING FOR BIOMEDICAL SCIENCES (1-0-1)(F/S). This writing course is designed for graduate students in biomedical science disciplines who are ready to begin, or who are currently working on, a
Students present original research in context of current literature, review, presentation and discussion of current literature. MATRIX IN DEVELOPMENT AND DISEASE (1-0-1)(F,S). BIOL 567 ADVANCED TOPICS IN EXTRACELLULAR CELLULAR, AND DEVELOPMENTAL BIOLOGY (1-0-1)(F,S). May be repeated once for credit. PREREQ: BIOL 343 and PERM/INST.

BIOL 561 ADVANCED TOPICS IN AQUATIC BIOLOGY (1-0-1)(F/S). An exploration of the current primary literature of aquatic biology. Topics vary, and may include community dynamics of algae, fish, zooplankton, and benthic invertebrates; trophic relationships; stream and reservoir management; primary and secondary production; organic matter and nutrient dynamics; and wetland ecology. May be repeated once for credit. PREREQ: BIOL 323 and PERM/INST.

BIOL 562 ADVANCED TOPICS IN ANIMAL BEHAVIOR (1-0-1)(F/S). Exploration of current animal behavior and behavioral ecology literature through group discussion and presentations. May be repeated once for credit. PREREQ: BIOL 433 or 533 or ZOOL 434 or 534 and PERM/INST.

BIOL 563 ADVANCED TOPICS IN GENETIC ANALYSIS (1-0-1)(S). Presentation and discussion of topics such as human chromosome evolution, forensic DNA analysis, artificial evolution, mutation and disease, genetic patents, drug target development. May be repeated once for credit. PREREQ: BIOL 343 and PERM/INST.

BIOL 564 ADVANCED TOPICS IN MOLECULAR ECOLOGY, EVOLUTION, AND PHYLOGEOGRAPHY (1-0-1)(F/S). Presentations and group discussion of molecular aspects of ecology, evolution, and phylogeography. May be repeated once for credit. PREREQ: BIOL 401 or PERM/INST.

BIOL 565 ADVANCED TOPICS IN MOLECULAR BIOLOGY TECHNIQUES (1-0-1)(F). Discussion of scientific literature with emphasis on modern molecular biology techniques. Students lead discussions and present articles from relevant primary literature. May be repeated once for credit. PREREQ: BIOL 343 and PERM/INST.

BIOL 566 ADVANCED TOPICS IN MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY (1-0-1)(S). Discussion of current research. Students lead discussions and present articles, as well as monitor recent relevant primary literature. Previous enrollment in BIOL 465 or BIOL 565 recommended. May be repeated once for credit. PREREQ: BIOL 343 and PERM/INST.

BIOL 567 ADVANCED TOPICS IN EXTRACELLULAR MATRIX IN DEVELOPMENT AND DISEASE (1-0-1)(F,S). Review, presentation and discussion of current literature. Students present original research in context of current literature, including statement of hypothesis, review of literature, analysis and discussion of original data, in written and oral presentation format. May be repeated once for credit. PREREQ: PERM/INST.

BIOL 577 (ME 577)(MSE 577) BIOMATERIALS (3-0-3)(F/S). Theory of biomaterials science. Medical and biological materials and their applications. Selection, properties, characterization, design and testing of materials used by or in living systems. PREREQ: CHEM 112 or ENGR 245.

BIOL 579 RESEARCH IN BIOLOGICAL SCIENCES (1-0-1)(F/S). Seminars by biologists on a wide range of subjects. Students will attend seminars, write summaries, and search for relevant literature. May be repeated once for credit. (Pass/Fail.)

BOT – BOTANY

BOT 302G PLANT ANATOMY AND MICROTECHNIQUE (3-3-4)(S)(Odd years). A study of the structure and development of vascular plant tissues, regions, and organs. Emphasis will be placed on the Angiosperms. Laboratory work includes preparation of hand and paraffin sections, staining, and observation of plant tissues using various types of light microscopy. PREREQ: BIOL 191-192.

BOT 305G SYSTEMATIC BOTANY (2-6-4)(S). Fundamental problems of taxonomy. Discussion of historical development of classification systems and comparison of recent systems. Instruction on use of keys and manuals. PREREQ: BIOL 191-192 or PERM/INST.

BOT 311G PLANT DIVERSITY AND EVOLUTION (3-3-4)(S)(Even years). A comparative study of the structure, function, reproduction, and development of major plant groups. Phylogeny, paleobotany, and economic importance of various plant groups will be considered. PREREQ: BIOL 191-192 or PERM/INST.

BOT 330G MYCOLOGY (3-3-4)(F). A study of the biology of fungi with emphasis on their classification, morphology and development, identification, ecology, and economic significance. Laboratory work will include projects and field trips. PREREQ: BIOL 191-192 or PERM/INST.

BOT 401G PLANT PHYSIOLOGY (3-3-4)(F)(Odd years). A study of plant biophysical and biochemical processes. Includes coverage of cell, tissue, and organ function, photosynthesis, water relations, mineral nutrition, transport mechanisms, growth and development, secondary metabolites, and plant responses to the environment. PREREQ: BIOL 191-192 and BIOL 301.

BOT 524 PLANT COMMUNITY ECOLOGY (3-6-5)(F)(Even years). Properties, structure, method of analysis, classification, and dynamic nature of plant communities. Strengths and weaknesses of various sampling techniques, role of disturbance events and succession on community structure, and role of biological interaction as factors influencing assembly of communities. Vegetation sampling methods and habitat type classification of local plant communities. Methods of analyzing and reporting data. BOT 305 highly recommended. PREREQ: BIOL 323
BOT 541 PLANT DEVELOPMENTAL BIOLOGY (3-3-4)(S) (Even years). A description of plant development from a molecular and cellular perspective. Topics discussed include gene expression and cell signaling pathways, and their roles in the control of embryogenesis, plant growth, flowering, and fruit maturation. Examination of techniques and model systems used in the study of plant development. Each student will complete a project. PREREQ: BIOL 301.

ZOOL – ZOOLOGY

ZOOL 301G COMPARATIVE VERTEBRATE ANATOMY (2-6-4)(F). The evolutionary development of vertebrate anatomy, fishes through mammals. Dissection of the shark, salamander, and cat plus demonstrations of other vertebrate types. PREREQ: BIOL 191-192 or PERM/INST.

ZOOL 305G ENTOMOLOGY (2-6-4)(F). The general anatomy, physiology and developmental biology of insects, and ecological and evolutionary relationships and interactions of insects with humans. Field trips to collect and identify local species. PREREQ: BIOL 191-192 or PERM/INST.

ZOOL 341G ORNITHOLOGY (2-3-3)(S)(Odd years). Birds as examples of biological principles: classification, identification, ecology, behavior, life histories, distribution, and adaptations of birds. Two weekend field trips. PREREQ: BIOL 191-192 and PERM/INST.

ZOOL 400G VERTEBRATE HISTOLOGY (2-6-4)(S)(Even years). Microscopic anatomy of cells, tissues, and organ systems of vertebrates. Major emphasis will be on mammalian systems. PREREQ: BIOL 301 or ZOOL 301.

ZOOL 403G(KINES 403G) HEAD AND NECK ANATOMY (2-2-3) (F,S). Use of human cadavers to study prosections of head and neck with emphasis on clinical relevance. Integument, osteology, myology, circulatory systems, lymphatics, oral and dental tissues, neuroanatomy, cranial nerves, general innervation, and salivary glands. May be taken for KINES or ZOOL credit but not both. PREREQ: BIOL 191-192 or BIOL 227-228 or PERM/INST.


ZOOL 501 HUMAN PHYSIOLOGY (3-3-4)(S). Functional aspects of human tissues and organ systems with emphasis on regulatory and homeostatic mechanisms. PREREQ: BIOL 301 or PERM/INST.

ZOOL 509 GENERAL AND COMPARATIVE PHYSIOLOGY (3-3-4)(S). Physiological principles common to all forms of animal life are discussed. Physiological adaptations required to live in a variety of environments are presented. PREREQ: ZOOL 230, CHEM 317 or PERM/INST.

ZOOL 515 AVIAN PHYSIOLOGY (3-0-3)(F)(Odd years). The physiology of flight, cardiovascular, pulmonary, digestive, water and electrolyte, egg, and reproductive physiology are covered. Correlations between unique aspects of avian structure and function are emphasized. PREREQ: Graduate standing or PERM/INST.


ZOOL 534 ANIMAL BEHAVIOR (3-3-4)(F)(Even years). This course focuses on the concepts and processes of animal behavior, with particular emphasis on proximate perspectives. The history of the study of animal behavior, behavioral genetics, the nervous system and behavior, hormones and behavior, ontogeny of behavior, learning and motivation, and other aspects of behavior such as migration, orientation, and navigation will be presented. PREREQ: BIOL 323 or PERM/INST.

ZOOL 535 BEHAVIORAL ENDOCRINOLOGY (3-0-3)(F)(Even years). An examination of the endocrine system and the hormonal mechanisms associated with social behavior and aggression, reproductive and parental behavior, biological rhythms, etc. Each student is expected to investigate and lead a discussion on an assigned topic. PREREQ: Graduate Standing or PERM/INST.

SPECIAL TOPICS. Courses are offered in response to student interest and are in addition to formal courses listed above.
Department of English

Department Chair: Michelle Payne  
Associate Chair: Devan Cook  
Liberal Arts Building, Room 228  
Telephone 208 426-3426  
FAX 208 426-4373  
http://english.boisestate.edu/

Graduate Faculty: Bruce Ballenger, John Battalio,  
Ann Campbell, Devan Cook, Martin Corless-Smith,  
Jon P. Dayley, Matthew C. Hansen, Janet Holmes,  
Daryl Jones, Helen Lojek, Mike Markel, Carol A.  
Martin, Michael Mattison, Roger Munger, Marcy  
Newman, Jacqueline O’Connor,  
Steven Olsen-Smith, Michelle Payne, Tom Peele,  
Tara Penry, Bruce Robbins, Mary Ellen Ryder,  
Rena Sanderson,  
Gail Shuck, Tom Trusky, Karen Uehling, Jan  
Widmayer, Mitchell Wieland, Russell Willerton,  
Linda Marie Zaerr

Adjunct Graduate Faculty: Jodi Chilson, Yvonne  
Georgeson, Al Greenberg, Al Heathcock, John  
Keeble, Kevin Wilson

General Information

The program offers maximum flexibility for writers  
seeking a place to focus on their craft. Students  
pursuing the degree specialize in either fiction,  
poetry, or creative nonfiction and work closely with  
the creative writing faculty in workshop and  
conference settings.

The M.F.A. in Creative Writing from Boise State  
University represents a student’s mastery of one of  
the genres of creative writing, as well as a thorough  
grounding in traditional and contemporary letters.  
Students work with a faculty of accomplished  
writers and produce a manuscript of publishable  
quality during their course of study. While the  
M.F.A. is the preferred degree for teachers of  
creative writing, the program at Boise State  
University also prepares students with courses  
offered in professional editing and publishing  
(practicum classes with Ahsahta Press and The  
Idaho Review), form and theory, and book arts, as  
well as with invaluable teaching experience in the  
creative writing classroom.

The Idaho Review, published by the M.F.A.  
program, offers a chance for students to work on a  
national literary journal, either as graduate  
assistants or through course credit or internship. A  
second literary publication, cold drill, is run entirely  
by M.F.A. students, and offers extensive experience  
in designing, managing, and editing a literary  
magazine. Students can also gain editing  
experience working for Ahsahta Press, a nationally  
recognized publisher of poetry. Established in 1974,  
Ahsahta Press publishes up to three volumes each  
academic year. The book arts program offers  
additional opportunities in design and publishing.

The Hemingway Center, administered by the  
Department of English, is another resource to be  
found on campus. It is the home of the Idaho Center  
for the Book, affiliated with the Library of Congress.  
The Center also oversees the Idaho Writers’  
Archive.

The Department of English offers a number of  
Graduate Teaching Assistantships. These  
assistantships include waivers of tuition and fees,  
residential or non-residential, and a stipend of over  
$9,600. Complete applications are due January 15  
for priority consideration. More information is  
available from the Director of Creative Writing.

Application and Admission

Requirements
To be considered for regular status as a graduate student in the Department of English M.F.A. in Creative Writing, an applicant must meet general Graduate College requirements (which includes requesting that official transcripts from all institutions previously attended be sent to the Graduate Admissions Office, MS-1110, Boise State University, Boise, Idaho 83725) and the following department requirements:

A writing sample consisting of thirty manuscript pages of fiction or nonfiction or fifteen poems, sent directly to the Director of Creative Writing.

A Bachelor of Arts in English. However, an applicant may demonstrate a strong background in an area of study available in the graduate curriculum of the Department of English to be considered for admission into the M.F.A. program.

Three letters of recommendation from people who know the applicant’s academic work, sent directly to the Director of Creative Writing.

A GPA of at least 3.0 for the last sixty semester credit hours of undergraduate work.

Scores for the Graduate Record Examination (GRE), sent to the Graduate Admissions Office. The applicant should score at least 500 on the Verbal Section of the GRE. Scores on sections other than the Verbal Section are for information purposes only.

Applicants who do not satisfy one or more of these requirements by the time they wish to begin classes may be admitted with provisional status. They will be advised as to what steps they need to take to qualify for regular status. For more in-depth information, please visit our web site.

Degree Requirements

The 48-credit Master of Fine Arts in Creative Writing degree offers a combination of creative writing, form and theory, professional editing, book arts, composition and rhetoric, linguistics, literature, and technical communication courses.

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<thead>
<tr>
<th>Master of Fine Arts in Creative Writing</th>
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<tbody>
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</table>

Master of Arts in English

Director M.A. in English: Matthew C. Hansen
Liberal Arts Building, Room 205
Telephone 208 426-1215
e-mail: matthewhansen@boisestate.edu
http://english.boisestate.edu/grad/

General Information

The graduate program offered by the Department of English at Boise State University is large enough to provide variety, yet small enough for flexibility in planning a course of study and for a collegial atmosphere. The Department’s graduate faculty teach on all levels in addition to pursuing interests in scholarship, writing, editing, publishing, and related activities.

The Master of Arts in English program includes three emphases:

The original, currently called Master of Arts in English, Literature, has a 15-hour core consisting primarily of literature courses, but also includes 15-21 hours of electives that may be drawn from other areas of the English program as well. It serves students interested in going on for a Ph.D. in literature or
interested in another career where reading, 
writing, and analytical skills are needed;
the Master of Arts in English, English Education, is 
designed for students who wish to become 
certified to teach English in secondary schools 
and who already have an undergraduate 
degree in English studies or who have taken a 
significant number of undergraduate English 
courses after receiving their baccalaureate 
degree in another field;
the Master of Arts in English, Rhetoric and 
Composition is designed for students 
interested in community college teaching 
and/or pursuing a doctoral degree in Rhetoric 
and Composition.
Students should consult with the Director of the 
M.A. in English to help determine which emphasis 
meets their career goals.
The Department of English provides excellent 
computer labs, including three administered by the 
Department itself, for word processing, desktop 
publishing, and network access to on-line resources 
and information about library holdings in the United 
States and abroad.
The Hemingway Center, administered by the 
Department of English, is another campus resource. 
It is the home of the Idaho Center for the Book, 
affiliated with the Library of Congress. The Center 
also oversees the Idaho Writers’ Archive.
The Department of English offers Graduate 
Assistantships in Teaching and in the Writing 
Center. These assistantships offer a waiver of 
tuition and fees, including out-of-state tuition, and in 
addition carry a stipend of over $9,600. Complete 
applications for assistantships are due January 15. 
In order to be considered for an assistantship, 
applicants must also submit all materials required 
for admission to the M.A. in English program by that 
date. Applicants should plan to apply to the 
program, have all undergraduate transcripts sent, 
arrange for letters of recommendation, and take the 
Graduate Record Exam well before this deadline. A 
list of program requirements is below. Information 
on assistantship applications can be obtained from 
the website or by e-mailing the director of the program.
Students who do not wish to enroll in a degree 
program but would like to take a course of interest 
should consult with the Director of the M.A. in 
English about whether the prerequisite of program 
admission can be waived.

Application and Admission 
Requirements
To be considered for regular status as a graduate 
student in the Department of English, an applicant 
must meet general Graduate College requirements 
(which include requesting that official transcripts 
from all institutions previously attended be sent to 
the Graduate Admissions Office, MS-1110, Boise 
State University, Boise, Idaho 83725) and the 
following department requirements:
A Bachelor of Arts in English. In lieu of this, an 
applicant must demonstrate a strong 
background in an area of study available in 
the graduate curriculum of the Department of 
English to be considered for admission into 
the program.
A GPA of at least 3.0 for the last sixty semester 
credit hours of undergraduate work.
Scores for the Graduate Record Examination 
(GRE), sent to the Graduate Admissions 
Office. The applicant must score at least 500 
on the Verbal Section of the GRE. Scores on 
sections other than the Verbal Section are for 
information purposes only.
An essay of from five hundred to seven hundred 
words explaining the applicant’s goals in 
pursuing graduate study in English, sent 
directly to the Director of the M.A. in English.
A writing sample of 8 to 10 pages, preferably 
academic writing completed within the past 
two years. For students who completed their 
undergraduate work more than one year 
before their application, professional writing of 
similar length, such as, but not limited to a 
grant proposal, a newsletter, or a business 
report may be submitted to fulfill this 
requirement. The applicant’s writing sample, 
in all cases, should be accompanied by a brief 
statement of the context for which the writing 
was done. This writing sample should be sent 
directly to the Director of the M.A. in English.
Three letters of recommendation from people who 
know the applicant’s academic work, sent 
directly to the Director of the M.A. in English.

Degree Requirements

<table>
<thead>
<tr>
<th>Course Number and Title</th>
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<tbody>
<tr>
<td>Master of Arts in English, Literature</td>
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</table>
### Master of Arts in English, English Education

**Director M.A. in English:** Matthew C. Hansen  
Liberal Arts Building, Room 205  
Telephone 208 426-1215  
e-mail: matthewhansen@boisestate.edu  
http://english.boisestate.edu/grad/

#### Degree Requirements

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**TOTAL**

33-36

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### Master of Arts in English, Rhetoric and Composition

**Director M.A. in English:** Matthew C. Hansen  
Liberal Arts Building, Room 205  
Telephone 208 426-1215  
e-mail: matthewhansen@boisestate.edu  
http://english.boisestate.edu/grad/

#### Degree Requirements

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**TOTAL**

36
Master of Arts in Technical Communication

Director of Technical Communication: Mike Markel
Liberal Arts Building, Room 234
Telephone 208 426-3088 or 426-1246
e-mail: mmarkel@boisestate.edu
http://www.boisestate.edu/techcomm

General Information

Technical communication is a humanistic discipline in which people create, shape, and communicate technical information so that other people can use it safely, effectively, and efficiently. Although most of the courses in the program involve high-technology tools, the core of technical communication is clear written and oral communication. Fundamental in our approach to technical communication is ethics: the writer’s understanding that the people who read and use the information must be treated with dignity, as ends rather than merely means. Also fundamental is the writer’s awareness that technical communication can affect various constituencies—from co-workers to customers to the general public—and even the environment itself.

Against this backdrop of clear, ethical communication, our students learn the theory of technical communication, drawing on such disciplines as reading and writing theory, linguistics, cognitive psychology, sociology, and gender studies. Then students progress through courses in writing, editing, and ethics. A course in visual rhetoric and information design prepares students for subsequent courses in print and on-screen production. Finally, students take a course in oral communication skills, for technical communicators speak and listen far more than they write. Students also complete a 3-credit internship. In addition, there are a number of elective courses.

Students follow one of two tracks, the first of which culminates in a project or thesis, the second of which culminates in a portfolio.

Application and Admission

Requirements

You are encouraged to apply if you possess a bachelor’s degree with a 3.0 GPA. The full application package will also include official undergraduate transcripts, three letters of reference from employers or professors, and a 1,000-word statement describing your professional goals and the ways in which the program can help you achieve them. Visit our Web site or see the Director of Technical Communication for more information on how to apply.

Degree Requirements

The course of study for the Master of Arts in Technical Communication consists of a minimum of 33 hours to be chosen by you and your advisory committee from one of the two tracks described below. Each track consists of required courses and electives. To fulfill the elective requirements, you may take additional graduate courses in technical communication or another discipline; however, you may apply to the degree no more than 3 credits in subjects other than technical communication. (Note: You may not count ENGL 405G or ENGL 415G toward your degree requirements.)

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**TOTAL** 33

See the course descriptions for prerequisites. Selected prerequisites may be waived or taken concurrently with the consent of your committee.

You may petition your committee to be exempted from up to six hours of required course work. This petition will be evaluated on the basis of your demonstrated experience and professional competence. If you receive an exemption, you will substitute an equivalent number of elective credits. (Note that you will still be permitted to apply to your degree no more than 3 credits from outside technical communication.)

Graduate Certificate in Technical Communication

**Director of Technical Communication:** Mike Markel
Liberal Arts Building, Room 234
Telephone 208 426-3088
http://www.boisestate.edu/techcomm
e-mail: mmarkel@boisestate.edu

**General Information**

The Graduate Certificate in Technical Communication is intended for students enrolled in any graduate degree program and for local professionals. A graduate student in geophysics, for instance, might wish to earn the certificate because he knows that he will be making presentations at professional conferences and writing journal articles. An accountant might wish to improve her technical communication skills to enhance her work performance. The certificate enables students to choose a unified, coherent group of courses in technical communication and related fields from other disciplines that will improve their understanding of the public role of written communication and their on-the-job skills.

**Application and Admission**
Requirements
The minimum requirement for admission to the certificate program is a baccalaureate degree from a regionally accredited college or university and admission to the Graduate College. In addition, applicants must submit to the Director of Technical Communication a 500-word statement explaining how the Graduate Certificate relates to their broader educational goals.

Application Procedures
An applicant to the certificate program should follow the general application procedures for admission to a graduate program (see Application for Admission to a Graduate Program). Once the applicant’s file is complete, it will be reviewed by the Director of Technical Communication, who will provide an admission recommendation to the Dean of the Graduate College. The Dean will make the final admission decision and notify the applicant.

Certificate Requirements

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<tr>
<th>Graduate Certificate in Technical Communication</th>
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<tbody>
<tr>
<td>Course Number and Title</td>
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<tr>
<td>ENGL 401G ADVANCED NONFICTION WRITING (3-0-3)(F/S)</td>
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<td>ENGL 405G PRINT DOCUMENT PRODUCTION (3-0-3)(F/S)</td>
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Course Offerings
ENGL – ENGLISH
ENGL 401G ADVANCED NONFICTION WRITING (3-0-3)(F/S). Advanced practice in nonfiction genres, and study of how writers read and learn from other writers. Experimentation with subjects, voice, organization, and style. Students may take the course twice, for a total of 6 credits. Students seeking graduate credit will produce a greater quantity and high quality of original work, will have a separate and more extensive reading list, and will be expected to participate more fully in class activities. PREREQ: ENGL 312 or PERM/INST.

ENGL 405G PRINT DOCUMENT PRODUCTION (3-0-3)(F/S). An advanced study and application of the principles of producing effective technical documents. Topics include the relationship between layout and readability, techniques for combining textual and nontextual information, and the use of desktop publishing and graphics software. Students will produce basic print documents, such as brochures, data sheets, flyers, and manuals. PREREQ: ENGL 312 or PERM/INST.

ENGL 406G ADVANCED POETRY WRITING (3-0-3)(F/S). Intensive work in writing and critiquing poetry. Students seeking graduate credit will produce a greater quantity and higher quality of original work, will have a separate and more extensive reading list, and will be expected to participate more fully in class activities. May be repeated for up to six credit hours. PREREQ: ENGL 305 or PERM/INST.

ENGL 407G ADVANCED FICTION WRITING (3-0-3)(F/S). Intensive work in writing and critiquing fiction. Students seeking graduate credit will produce a greater quantity and higher quality of original work, will have a separate and more extensive reading list, and will be expected to participate more fully in class activities. May be repeated for up to six credit hours. PREREQ: ENGL 306 or PERM/INST.

ENGL 415G ON-SCREEN DOCUMENT PRODUCTION (3-0-3)(F/S). An advanced study and application of the principles involved in designing, creating, and managing information on the screen. Topics include the relationship between screen layout and readability; techniques for integrating text, graphics, and multimedia; principles of writing and indexing on-screen instructional materials; and the use of online help and Web-authoring software. Students will practice effective hypertext and screen-design techniques in producing basic electronic documents, such as online help and Web sites. PREREQ: ENGL 312 or PERM/INST.

ENGL 500 RESEARCH METHODS IN LITERARY STUDIES (3-0-3)(F/S). An introduction to research techniques and resources in advanced literary study. The course includes the use of bound and electronic reference sources, methods of bibliography and textual criticism, the significance of biographical, archival, and historical evidence in literary study, and standard conventions of scholarly documentation. PREREQ: Admission to Master of Arts in English program or PERM/CHAIR.

ENGL 501 THE TEACHING OF WRITING (3-0-3)(F,S). Theories and methods of teaching writing with focus on secondary school. Emphasis on research about the learning process in writing and the teacher’s role in creating effective writing instruction. COREQ: ENGL 581.
ENGL 502 TEACHING CREATIVE NONFICTION, POETRY, AND FICTION WRITING (3-0-3)(F/S). Theories and practices for teaching secondary school students, college students, and others how to write in genres such as creative nonfiction, poetry, and fiction. Emphasis is on teaching in classroom and workshop settings. PREREQ: Admission to program or PERM/INST.

ENGL 505 LINGUISTICS (3-0-3)(F/S)(Alternate years). Modern linguistic theories and their application to literature and teaching English. An examination of how various grammatical models represent the complexities of language sound, sequence, and structure. Application of theory to language at work. Alternate years. PREREQ: LING 305 or equivalent or PERM/CHAIR.

ENGL 507 SMALL PRESS PRODUCTION (3-0-3)(S). A practicum course that studies the manuscript selection and preparation, design, editing, distribution, and promotion practices of small presses with the intention of preparing students to write, design, and submit manuscripts for publication. Students acquire hands-on experience with Ahsahta Press. PREREQ: Admission to program or PERM/INST.

ENGL 508 WRITING, EDITING, AND DESIGNING FOR PROFESSIONAL ADVANCEMENT (3-0-3)(F/S). A writing course that studies literary journals, trade journals, and little magazines, and that looks at trade book and electronic publication with the intention of preparing students to write, design, and submit manuscripts for publication. PREREQ: Admission to program or PERM/INST.

ENGL 509 BOOK ARTS (3-0-3)(F/S). A historical survey of various aspects of bookmaking, including papemaking, typography, printing, binding, and desktop publishing, as well as book distribution/ marketing, and production of artist's and eccentric bookworks. Course culminates in production of a classroom edition of each student's original writings or art works in an appropriate format devised by the student. PREREQ: ENGL 309 or PERM/INST.

ENGL 510 SEMINAR IN MAJOR AMERICAN OR ENGLISH WRITER (3-0-3)(F/S). A consideration of minor and major artistic creations of an author with attention to major influences on the writer and his/her influences on others. Aspects of investigation to include the life of the author and its relation to his/her work, the society and culture of the times, his/her place and stature in the genres in which he/she worked, his/her use or disregard of tradition, as well as an investigation of contemporary criticism and critical evaluation since the writer's time. Repeatable for credit. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 511 INTRODUCTORY SEMINAR IN TECHNICAL COMMUNICATION (3-0-3)(F/S). An introduction to the current definitions and theories of technical communication, including approaches from such related fields as rhetoric, linguistics, cognitive psychology, sociology, and philosophy. Students will also study the different job specializations within technical communication.

ENGL 512 TECHNICAL RHETORIC AND APPLICATIONS (3-0-3)(F/S). An advanced study of technical communication for those students who are or expect to become professional technical communicators. Topics of study include modern theories of rhetoric, focusing on semantics, syntax, readability, pragmatics, and hypertext. Students will write reports, proposals, manuals, and online documents related to their own backgrounds and fields of interest. PREREQ: ENGL 302 or ENGL 402 or ENGL 511 or PERM/INST.

ENGL 513 TECHNICAL EDITING (3-0-3)(F/S). An advanced course in the editing of technical documents. Major projects are related to each student's field of interest. Topics of study include the theory and ethics of editing, content editing, copy editing, developmental editing, production editing, and online editing. PREREQ: ENGL 512 or PERM/INST.

ENGL 514 TECHNICAL COMMUNICATION ETHICS (3-0-3)(F/S). An examination of the various ethical issues inherent in the practice of technical communication. Topics include the ancient debate about the claims of philosophy and rhetoric; Kant's categorical imperative; the modern standards of rights, justice, utility, and care; the employee's obligations to the employer, the public, and the environment; and the common ethical issues faced by technical communicators, including plagiarism and copyright violation, the fair use of words and graphics, trade secrets, whistleblowing, and codes of conduct. The course will use the case study method.

ENGL 515 VISUAL RHETORIC AND INFORMATION DESIGN (3-0-3)(F/S). A study and application of the rhetorical elements of design, including color, line, form, images, and type. Students will be introduced to desktop publishing, graphics, and Web-authoring software. Students will apply principles of visual rhetoric in creating print and online technical documents. PREREQ: ENGL 513 or PERM/INST.

ENGL 516 TOPICS IN PRINT DOCUMENT PRODUCTION (3-0-3)(F/S). Study and application of the principles and techniques involved in taking print documents from conception to production. Topics will vary but can include desktop publishing, estimating time and cost, selecting paper and binding, working with pre-press and printing companies, and selecting appropriate distribution systems. The course assumes experience with personal computers and desktop publishing software. This course may be taken twice for credit. PREREQ: ENGL 515 or PERM/INST.

ENGL 517 ORAL COMMUNICATION FOR TECHNICAL COMMUNICATORS (3-0-3)(F/S). The theory and practice of several major kinds of oral communication modes used by technical communicators, including interviewing of technical experts and clients, group discussion, and technical presentations that incorporate presentation software. PREREQ: ENGL 515 or PERM/INST.
ENGL 518 WRITING SOFTWARE DOCUMENTATION (3-0-3)(F/S). The study and application of principles for creating effective print and online documentation. Topics can include content design and organization, writing style, graphic design, hypertext, and usability testing. The course also addresses strategies for working successfully as a technical communicator. PREREQ: ENGL 515 or PERM/INST.

ENGL 519 TECHNICAL PUBLICATIONS MANAGEMENT (3-0-3)(F/S). Analysis and application of the principles of management and organizational behavior as they apply to the technical publications field. In a case-study environment focused on the publications process, students learn the techniques and practices of managing technical publications groups within organizational settings, while studying relevant principles of motivational theory and human behavior. PREREQ: ENGL 512 or PERM/INST.

ENGL 520 GENRE (3-0-3)(F/S). A study of a well defined literary category, such as novel, short story, epic, or tragedy. Examination of representative texts in order to discover the evolution of a specific literary genre while at the same time establishing its typical features. Repeatable for credit. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 521 TOPICS IN ON-SCREEN DOCUMENT PRODUCTION (3-0-3)(F/S). Study and application of the principles involved in designing, creating, and managing information on the screen. Topics vary but can include advanced Web design, help systems, and multimedia applications. Students practice effective hypertext and screen-design techniques from the fields of cognitive science, software psychology, and human factors. This course may be taken twice for credit. PREREQ: ENGL 515 or PERM/INST.

ENGL 522 POETRY WRITING WORKSHOP (3-0-3)(F/S). An advanced workshop in poetry. Students will write poems, submit their work for the critique of the workshop and contribute to the discussion of others’ writing. Readings may be assigned to address particular issues of craft and genre. Repeatable for credit; course must be taken a minimum of four times if this is the degree candidate’s genre. PREREQ: Admission to program or PERM/INST.

ENGL 523 FICTION WRITING WORKSHOP (3-0-3)(F/S). An advanced workshop in fiction. Students will write fiction, submit their work for the critique of the workshop and contribute to the discussion of others’ writing. Readings may be assigned to address particular issues of craft and genre. Repeatable for credit; course must be taken a minimum of four times if this is the degree candidate’s genre. PREREQ: Admission to program or PERM/INST.

ENGL 524 CREATIVE NONFICTION WRITING WORKSHOP (3-0-3)(F/S). An advanced workshop in creative nonfiction. Students will write creative nonfiction, submit their work for the critique of the workshop and contribute to the discussion of others’ writing. Readings may be assigned to address particular issues of craft and genre. Repeatable for credit; course must be taken a minimum of four times if this is the degree candidate’s genre. PREREQ: Admission to program or PERM/INST.

ENGL 530 STUDIES IN A LITERARY PERIOD (3-0-3)(F/S). A study of a selected chronological period of American or British literature with focus on major authors, genres, or topics. Repeatable for credit. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 532 FORM AND THEORY OF POETRY (3-0-3)(F/S). An intensive study of aspects of craft in poetry. Course will expose students to particular methods, approaches, and techniques in poetry and their aesthetic effects. May be taken twice for credit. PREREQ: Admission to program or PERM/INST.

ENGL 533 FORM AND THEORY OF FICTION (3-0-3)(F/S). An intensive study of aspects of craft in fiction. Course will expose students to particular methods, approaches, and techniques in fiction and their aesthetic effects. May be taken twice for credit. PREREQ: Admission to program or PERM/INST.

ENGL 534 FORM AND THEORY OF CREATIVE NONFICTION (3-0-3)(F/S). An intensive study of aspects of craft in creative nonfiction. Course will expose students to particular methods, approaches, and techniques in creative nonfiction and their aesthetic effects. May be taken twice for credit. PREREQ: Admission to program or PERM/INST.

ENGL 550 LITERATURE AND CULTURE (3-0-3)(F/S). The interaction between a body of literature and the social, economic, and political forces that characterize the culture in which it originates. The influence of culture on literary form and content. Repeatable for credit. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 554 INTRODUCTION TO RESEARCH METHODS IN RHETORIC AND COMPOSITION (3-0-3)(F/S). An introduction to research methods in Composition and Rhetoric and English Education, including teacher research, ethnography, and case study. Students will learn to develop research questions and choose appropriate research methods, as well as address ethical issues in conducting person-based research. PREREQ: Admission to the Master of Arts in English program or the Master of Fine Arts in Creative Writing program, or PERM/CHAIR.

ENGL 561 THEORIES OF RHETORIC AND COMPOSITION (3-0-3)(F/S). A study of the theoretical context of current writing and writing pedagogy. Influential theories of invention, arrangement, and style, from ancient and modern times, are examined and compared. Special attention is paid to the relationships of current rhetorical and cognitive theories to writing processes and written products. PREREQ: Admission to Graduate Program or
ENGL 563 THE THEORY AND TEACHING OF BASIC WRITING (3-0-3)(F/S). A study of the theory and practice of teaching basic writing. Surveys the history and politics of basic writing and remediation while focusing on specific instructional strategies, writing assignments, and assessment. Prepares students to teach basic writing at the college level, in learning centers, and in other adult learning settings. PREREQ: ENGL 561 or PERM/INST.

ENGL 567 GRAMMAR AND THE TEACHING OF WRITING: THEORY AND PRACTICE (3-0-3)(F/S). A study of the theory and practice of teaching grammar and usage from rhetoric and composition perspectives. The course examines a variety of approaches to instruction in grammar and conventions of discourse communities. Prepares students for teaching writing in secondary schools and two-and four-year colleges, and for further graduate study. PREREQ: ENGL 561, ENGL 598, or PERM/INST.

ENGL 568 THE ESSAY TRADITION (3-0-3)(F/S). An examination of the essay tradition from its origins in Montaigne to its continuation in the writing of modern essayists from a variety of national and ethnic backgrounds. Explores theories of the genre, paying particular attention to the ways the essay has been used to teach writing and thinking. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program, or PERM/CHAIR.

ENGL 570 LITERARY MOVEMENTS (3-0-3)(F/S). A focus on a significant literary movement, the works of its major and minor contributors, its theories and its practice, its relation to its time, its place in literary history, its influence on writers past and present. Repeatable for credit. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.


ENGL 581 LITERATURE FOR USE IN JUNIOR AND SENIOR HIGH SCHOOLS (3-0-3)(F,S). A literary content course for prospective teachers of secondary school English. Primary emphasis on critical reading of literature for adolescents in secondary school. Secondary emphasis on methods of analysis appropriate to students. All genres as well as classic and popular authors. PREREQ: Two literature courses or PERM/INST. COREQ: ENGL 501.

ENGL 582 SELECTED TOPICS IN TEACHING ENGLISH LANGUAGE ARTS (3-0-3)(F/S). Study of current theories and topics in teaching the English Language Arts in composition, language, or literary theory of special interest to the experienced teacher. A specific focus will be announced each time the course is offered. Although targeted primarily at classroom teachers, the course may be appropriate for others who offer instruction, including technical writing trainers and teachers of literacy in GED centers, workplace literacy projects, and community education projects. Alternate years. PREREQ: ENGL 301 or ENGL 381 or ENGL 481 or teaching experience or PERM/INST.

ENGL 583 SELECTED TOPICS IN RHETORIC AND COMPOSITION (3-0-3)(F/S). Investigation of selected theories or topics in rhetoric and composition, drawing from areas such as composition theory; rhetorical theory/history; cultural studies; literacy, media, and race/gender/class/ethnicity studies. Although of primary interest to rhetoric and composition majors, the course may be useful for graduate teaching assistants and for classroom teachers. Repeatable for credit. PREREQ: Admission to the Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 585 SELECTED TOPICS IN LINGUISTICS (3-0-3)(F/S). An investigation of a particular topic in linguistics, drawn generally from psycholinguistics, sociolinguistics, semantics, pragmatics, discourse, syntax, or morphology. Course work will include lecture, discussion, and a paper or project, depending on the nature of the topic. Repeatable once for credit. PREREQ: LING 305 and Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 588 SURVEY OF CRITICAL THEORY (3-0-3)(F/S). A survey of major contemporary theories of literary criticism and their effects on literary studies. PREREQ: Admission to Master of Arts in English program or Master of Fine Arts in Creative Writing program or PERM/CHAIR.

ENGL 590 INTERNSHIP (0-10-3)(F/S). For MATC students, an actual work experience during at least one semester in which the student creates a substantial body of work in technical communication for a specific audience. This body of work should demonstrate at a professional level the application of the principles learned in previous course work. MATC students may take course once for credit. For MFA students, an internship in a publishing entity, such as The Idaho Review or Ahsahta Press. MFA students may take course twice for credit.

ENGL 591 PROJECT (V-0-V). A project may include, but is not limited to, classroom-based research or construction of curriculum with related teaching materials; the project should address relationships between practice and theory and may address an appropriate audience within or beyond the academic community. In technical communication, a project may include, but is not limited to, the construction or revision of a substantial information product such as a manual or large Web site. PREREQ: Admission to candidacy and approval of the student’s graduate committee.

ENGL 593 THESIS (V-0-V). A scholarly paper containing the results of original research. PREREQ: Admission to candidacy and approval of the student’s graduate committee.

ENGL 597 SPECIAL TOPICS. Courses in response to student and faculty interests offered in addition to the
formal courses listed above. Examples of Special Topics courses offered by the Department of English include Literature and Film, Teaching Basic Writing, and XML/XHTML.

ENGL 598 SEMINAR FOR TEACHING ASSISTANTS (3-0-3)(F). Focuses on writing theory and practice, the teaching community, and the Department’s English Composition courses for first semester Teaching Assistants. The seminar will provide information and support for the assistants while they learn to meet their obligations as classroom teachers. PREREQ: PERM/INST.

ENGL 600 ASSESSMENT [Comprehensive Examination] (3-0-3). Based on guidance from their faculty advisory committee, students prepare for and successfully complete their comprehensive essay-style examination.

LING – LINGUISTICS
LING 407G APPLIED LINGUISTICS IN TEACHING ENGLISH AS A SECOND LANGUAGE (3-0-3)(F/S)(Alternate years). Designed to help teachers in the bilingual classroom or teachers of students of limited proficiency in speaking English to understand how to deal with the process of learning English. It will focus on identifying, defining, and remedying the specific problems that confront learners of a second language. PREREQ: LING 305.
Department of Geosciences

Chair: C. J. Northrup
Math/Geosciences Building, Room 121
Telephone 208 426-1581 or 426-1631
FAX 208 426-4061
http://earth.boisestate.edu


Adjunct Graduate Faculty: William P. Clement, Thomas M. Clemo, Vladimir I. Davydov, Lee Liberty, Karen Viskupic

Graduate Degrees Offered
- Doctor of Philosophy in Geophysics
- Doctor of Philosophy in Geosciences
- Master of Science in Earth Science
- Master of Science in Geology
- Master of Science in Geophysics
- Master of Science in Hydrologic Sciences
  (See Interdisciplinary Programs)
- Graduate Certificate in Geographical Information Analysis

Graduate Program Committee
The Graduate Program Committee of the Department of Geosciences consists of the graduate program coordinators for geophysics, geology, and earth science education, plus the chair of the Department. The duties of the Graduate Program Committee are defined by the Department and are consistent with policies set by the University. These duties include development of recommendations for admission of prospective graduate students, decisions on transfer credits and required background courses, decisions on the award of departmental graduate fellowships and assistantships, and appointment of Supervisory Committees for graduate students.

Graduate College Requirements
The general requirements of the Boise State Graduate College also govern the geophysics, geology, and earth science degree programs.

Doctor of Philosophy in Geophysics

Doctoral Program Coordinator: Kasper van Wijk
Math/Geosciences Building, Room 206E
Telephone 208 426-1631
e-mail: kaspervanwijk@boisestate.edu

General Information
The Doctor of Philosophy in Geophysics degree requires completion of a prescribed course of study in geophysics and an area of emphasis outside of geophysics, satisfactory performance on a comprehensive examination, and independent completion of original research that results in a publicly defended dissertation that contributes significantly to geophysical knowledge.

Graduate Teaching and Research Fellowships
Graduate fellowships including tuition and fee waivers are funded from three sources: appropriated state funds, endowments, and research grants and contracts. Applicants to the Ph.D. in Geophysics program who submit all documents required by the admission procedure by January 1 of any given year will be considered for a state appropriated or endowed graduate fellowship to start the following fall semester; notification of successful applicants will be during February and March. Information on graduate fellowships funded by research grants and contracts is available from the Coordinator of the geophysics doctoral program.

Supervisory Committee
The Supervisory Committee is charged with general guidance of the doctoral student, including design and approval of the program of study,
administration of the comprehensive examination, supervision of the dissertation research, and participation in the dissertation defense. The Supervisory Committee consists of a principal advisor who acts as chair, one member from the student's chosen area of emphasis outside of geophysics (see Credit Requirements below), and at least two additional members, all of whom must be members of the University regular or research faculty and must also be members of the Graduate Faculty. One or more additional members may be appointed when such appointments enhance the function of the Committee. In all cases, regular or research faculty members of the Department of Geosciences must constitute a majority of the Supervisory Committee.

Application and Admission Requirements

Applicants are required to have a Bachelor's or Master's degree in a physical science, engineering, computer science, or mathematics from an accredited college or university. Admission will be competitive and will be based on transcripts, professional references, scores on the general test of the Graduate Record Examination (GRE), and evaluation of a technical manuscript provided by the applicant as evidence of technical writing skills. Students whose native language is not English must submit a TOEFL score of 587 or higher for the written exam and 240 or higher for the computer-based examination. Application materials should be requested from the Coordinator, Geophysics Doctoral Program, Boise State University, 1910 University Drive, Boise, ID 83725, telephone 208 426-1631 or e-mail: kaspervanwijk@cgiss.boisestate.edu.

Degree Requirements

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Credit Requirements

Courses applied to meet the 66-credit minimum requirement must be taken for a letter grade (A-F), except that GEOPH 693 Dissertation is initially graded IP (In Progress) and later graded P (Pass) or F (Fail) depending on the outcome of the dissertation defense. All geophysics electives must be graduate GEOPH courses with at least 12 credits at the 600 level. It is highly recommended that all geophysics graduate students take GEOPH 605 (Inversion Theory and Geophysical Applications) early in their program as one of their geophysics electives. Courses that comprise the area of emphasis outside of geophysics will typically be chosen from geology, physics, chemistry, engineering, computer science, or public policy, and must be approved by the Supervisory Committee. Courses taken to satisfy background requirements are not eligible to meet the credit requirements. On-campus graduate students are required to enroll for GEOPH 598 Graduate Seminar each and every time it is offered but GEOPH 598 may not be applied to meet the geophysics elective requirement.

Comprehensive Examination

The objective of the comprehensive examination is to judge depth and breadth of knowledge in geophysics and the area of emphasis. The examination is to be developed and administered by the Supervisory Committee. A student must take the comprehensive examination in the semester following completion of 36 course credits that are to be applied to the program requirements (exclusive of GEOPH 693 Dissertation but inclusive of transfer credits). The outcome of the examination is determined by the Supervisory Committee and must
be pass or fail. A student who fails the comprehensive examination is dismissed from the Ph.D. program.

Dissertation Requirements

The dissertation must be the result of independent and original research by the student and must constitute a significant contribution to geophysical knowledge equivalent to multiple peer-reviewed publications. The style and format of the dissertation are to conform to the standards of the Department of Geosciences and the Graduate College.

Dissertation Defense

A public defense of the dissertation is scheduled after the Supervisory Committee has reviewed a draft that is considered to be nearly a final version. The date of the defense is determined jointly by the Supervisory Committee and the student and must be consistent with any guidelines provided by the Graduate College. A Defense Committee is formed that consists of a non-voting Graduate Faculty Representative (GFR) and the following voting members: the chair and members of the Supervisory Committee and an external examiner. The GFR chairs the Defense Committee and is appointed by the Dean of the Graduate College in accordance with Graduate College guidelines. The GFR must have Full Graduate Faculty status, must be from outside the student’s discipline, and cannot be a member of the Supervisory Committee. The external examiner is a faculty member from another university who is a recognized expert in the field of the dissertation research and is appointed to the Defense Committee by the Dean of the Graduate College. Attendance at the defense by external examiner is not required. A written evaluation of the dissertation must be submitted by the external examiner in the event that he or she does not attend the defense. If a written evaluation is submitted, it must include a pass/fail vote and must be delivered to the chair of the defense committee at least 3 weeks prior to the defense. The written evaluation provided by the external examiner is distributed to the other members of the Defense Committee at least 2 weeks before the defense. The chair of the Defense Committee conducts the defense according to the procedure established for the Department of Geosciences by the Graduate Program Committee. A majority vote is used to decide the outcome (pass or fail). In the event of a split vote, the Dean of the Graduate College will also cast a vote after consultation with the defense chair and the Supervisory Committee. A student who fails the defense may be permitted to try again but failure a second time will result in dismissal from the program.

Final Approval of the Dissertation

If the defense is completed with a result of pass, the Supervisory Committee prepares a statement describing final requirements such as additions or modifications to the dissertation and any additional requirements such as archival of data. When these requirements have been met to the satisfaction of the Supervisory Committee, the approval page of the dissertation is signed by the members of the Committee.

Doctor of Philosophy in Geosciences

Doctoral Program Coordinator: Mark Schmitz
Math/Geosciences Building, Room 205A
Telephone: 208 426-5907
FAX: 208 426-4061
e-mail: markschmitz@boisestate.edu

General Information

Boise State University offers a Doctor of Philosophy in Geosciences through the Department of Geosciences. The degree requires completion of a prescribed course of study in geosciences, satisfactory performance on a comprehensive examination, and independent completion of original research that results in a publicly defended dissertation that contributes significantly to geoscientific knowledge.

Graduate Teaching and Research Fellowships

Graduate fellowships including tuition and fee waivers are funded from three sources: appropriated state funds, endowments, and research grants and contracts. Applicants to the Ph.D. in Geosciences program who submit all documents required by the admission procedure by February 1 of any given year will be considered for a state appropriated or endowed graduate fellowship to start the following fall semester;
notification of successful applicants will be during February and March. Information on graduate fellowships funded by research grants and contracts is available from the coordinator of the doctoral program in geosciences.

Graduate Program Committee

The Graduate Program Committee of the Department of Geosciences consists of the graduate program coordinators for each of the graduate programs in the department, plus the chair of the Department. The duties of the Graduate Program Committee are defined by the Department and are consistent with policies set by the University. These duties include development of recommendations for admission of prospective graduate students, decisions on transfer credits and required background courses, decisions on the award of departmental graduate fellowships and assistantships, and appointment of Supervisory Committees for graduate students.

Supervisory Committee

The Supervisory Committee is charged with general guidance of the doctoral student, including design and approval of the program of study, administration of the comprehensive examination, supervision of the dissertation research, and participation in the dissertation defense. The composition of the Supervisory Committee is recommended by the Graduate Program Committee and approved and appointed by the Graduate College.

Application and Admission Requirements

An applicant must follow the general application procedures for admission to a graduate program (see Graduate Admission Regulations). Applicants are required to have a Bachelor’s or Master’s degree in a geosciences or a related discipline from an accredited college or university. Admission will be competitive and will be based on transcripts, professional references, scores on the general test of the Graduate Record Examination (GRE), and evaluation of a letter of intent which describes the applicant’s professional interests and plans for the future. Students whose native language is not English must submit a TOEFL score of 587 or higher for the written exam and 240 or higher for the computer-based examination. Application materials should be requested from the coordinator.

Degree Requirements

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Graduate Seminar

On-campus graduate students are required to enroll for GEOS 598 graduate seminar each and every semester it is offered but GEOS 598 may not be applied to meet the Geosciences elective requirement.

Comprehensive Examination

The objective of the comprehensive examination is to judge depth and breadth of knowledge in Geosciences, and it is developed and administered by the Supervisory Committee. A student must take the comprehensive examination prior to the end of their fourth semester. The outcome of the examination is determined by the Supervisory Committee and must be one of the following: pass or fail.

Dissertation Requirements

The dissertation must be the result of independent and original research by the student and must constitute a significant contribution to geoscientific knowledge equivalent to multiple peer-reviewed publications. The style and format of the dissertation are to conform to the standards of the Department of Geosciences and the Graduate
College.

Dissertation Defense
A public defense of the dissertation is scheduled after the Supervisory Committee has reviewed a draft that is considered to be nearly a final version. The Supervisory Committee and the student determine the date of the defense jointly and must be consistent with any guidelines provided by the Graduate College. The defense is conducted according to the procedure established by the Department of Geosciences and governed by the policies of the Graduate College.

Final Approval of the Dissertation
If the defense is completed with a result of pass, the Supervisory Committee prepares a statement describing final requirements such as additions or modifications to the dissertation and any additional requirements. When these requirements have been met to the satisfaction of the Supervisory Committee, the members of the Committee sign the approval page of the dissertation.

Graduate College Requirements
The general requirements of the Boise State Graduate College also govern the Doctor of Philosophy in Geosciences degree program.

Master of Science in Earth Science
Graduate Program Coordinator: David Wilkins
Math/Geosciences Building, Room 223
Telephone 208 426-2390
e-mail: dwilkins@boisestate.edu

General Information
The curriculum for the Master of Science in Earth Science is targeted towards in-service teachers and stresses current developments in the earth science disciplines. In addition to subject matter knowledge, emphasis is placed on the varied methods that can be used for teaching earth science. Because of the varied backgrounds of candidates, the student’s degree program can be designed to allow flexibility in choosing course offerings. Special Topics courses and seminars are frequently offered, expanding the program choices. Programs of study for each student are designed in consultation with the Earth Science Graduate Program Coordinator and the student’s supervisory committee.

Application and Admission Requirements
Application for admission may be made by graduates of accredited institutions holding a baccalaureate degree in earth science education, geology, or related discipline. Regular admission may be awarded to applicants who have earned a minimum grade point average of 3.0 during the last two years of academic work; admission will be based on grade point, GRE scores, and letters of recommendation. Continued enrollment in the program requires a minimum of 3.0 grade point (B) average and satisfactory progress toward the degree.

Degree Requirements

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<th>Master of Science in Earth Science</th>
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<td>Course Number and Title</td>
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Credit Requirements
All 33 credits must be taken for a letter grade, except for GEOS 591 Project or 593 Thesis credits.
which will be graded Pass/Fail.

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Master of Science in Geology

**Graduate Program Coordinator:** Mark Schmitz
Math/Geosciences Building, Room 205A
Telephone 208-426-5907
e-mail: markschmitz@boisestate.edu

**General Information**

The program leading to the degree of Master of Science (M.S.) in geology is designed to prepare students for professional careers or further graduate studies in earth, environmental, or hydrological sciences. Completion of the program requires completion of an individually tailored curriculum approved by the graduate program committee, and original research that culminates in a publicly defended thesis. Opportunities for research span a wide range of fundamental and applied science topics in earth, environmental and hydrological sciences. Students are encouraged to contact individual faculty members for further information.

**Application and Admission Requirements**

Application for admission may be made by graduates of accredited institutions holding a baccalaureate degree in geology or related discipline. Regular admission may be awarded to applicants who have earned a minimum grade point average of 3.0 during the last two years of academic work; admission will be based on grade point, GRE scores, and letters of recommendation. Continued enrollment in the program requires a minimum 3.0 grade point (B) average and satisfactory progress toward the degree.

**Degree Requirements**

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<th>Course Number and Title</th>
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**Credit Requirements**

All 30 credits must be taken for a letter grade, except for GEOS 593 Thesis credit which will be graded Pass/Fail.

**Thesis Requirements**

A thesis representing research of sufficient quality to warrant publication in a peer-reviewed journal is required of all candidates for the Master of Science in Geology. Actual publication is not required, but is held out as a goal for all graduate students. The research results must be presented at a formal public defense, and the final written thesis must be approved by the supervisory committee, by the Coordinator of the geology graduate program, and by the Dean of the Graduate College. In order to provide sufficient time for thorough evaluation of thesis research, a student should allow 3-6 months between preparation of the first draft of the thesis and the day of the formal defense. Frequent communication between the student, the supervisory committee, and the Coordinator is essential throughout this period.

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Master of Science in Geophysics
Graduate Program Coordinator: Kasper van Wijk  
Math/Geosciences Building, Room 206E  
Telephone 208 426-1631  
e-mail: kaspervanwijk@boisestate.edu

General Information
The Master of Science in Geophysics degree requires 30 total credits distributed as follows: 12 graduate geophysics course credits, 12 credits in approved science or engineering courses, and at least 6 thesis research credits leading to an approved thesis. The overall goal of the graduate geophysics program is to provide a balanced education in the following areas:

- geophysical theory and methods including the quantification of error and resolution;
- problem definition, characteristics of an acceptable scientific solution, and an understanding of the effort required to reach an acceptable solution;
- the interrelationship of geophysics with other scientific and engineering disciplines;
- oral and written technical communication;
- project management and teamwork;
- an introduction to the geoscience profession beyond the classroom including the establishment of professional contacts.

Achievement of these educational objectives requires that a graduate student be exposed to classroom and laboratory instruction, thesis research, seminars, field trips, preparation of proposals and papers, presentations at professional meetings, short-term work assignments on sponsored projects, and interaction with a wide variety of faculty, research staff, students, and off-campus scientists and engineers. Current research emphases at Boise State include the following:

- applications of surface and borehole geophysical methods to hydrogeological, environmental, and engineering problems;
- geophysical measurement of the engineering properties of earth materials;
- determination of the relationship between geophysical and hydrological parameters;
- use of marine sedimentology and borehole geophysics to study the interaction between the oceans and continental climate;

- investigation of physical process dynamics during cold season flooding.

The geophysics program is well equipped with modern digital field instrumentation and computational facilities, and is closely tied to the Center for Geophysical Investigation of the Shallow Subsurface (CGISS) at Boise State.

The Boise State University Master of Science program in geophysics interacts cooperatively with Idaho State University (ISU) in that up to 12 credits earned in approved courses at ISU can be applied to a Master of Science in Geophysics at BSU or ISU. In addition, faculty at BSU and ISU may form joint supervisory committees when expertise from outside of the student’s resident institution is judged to be beneficial. These cooperative efforts by BSU and ISU add flexibility and geographic accessibility to graduate education in geophysics within Idaho.

Graduate Assistantships, Teaching and Research Fellowships
Graduate assistantships and fellowships including tuition and fee waivers are funded from three sources: appropriated state funds, endowments, and research grants and contracts. Applicants to the M.S. Geophysics program who submit all documents required by the admission procedure by February 1 of any given year will be considered for a state appropriated or endowed graduate assistantships and fellowships to start the following fall semester; notification of successful applicants will be during February and March. Information on graduate fellowships funded by research grants and contracts is available from the Coordinator of the geophysics graduate program.

Supervisory Committee
Each admitted student will be assigned a supervisory committee whose purpose is to design the program of courses, guide the student’s research, conduct the thesis defense, and approve the final thesis. The supervisory committee consists of at least three members: a chair from BSU who takes on the primary advising role, and at least two members chosen in any combination from BSU, ISU, or other institutions (selection based on a direct interest in the student’s research). The Coordinator of the geophysics graduate program works closely with each supervisory committee and will serve as temporary advisor to each new student until a supervisory committee can be assigned.
Application and Admission Requirements

Applicants should have a B.S. or equivalent degree from an accredited institution in one of the following fields: geophysics, geology, hydrology, physics, chemistry, mathematics, or engineering. Evaluation for admission requires three personal references, transcripts from all colleges and universities attended, and scores on the GRE General Test. Students whose native language is not English must submit a TOEFL score of 587 or higher for the written exam and 240 or higher for the computer-based examination. A copy of a report resulting from a previous university course, professional position, or research experience is also requested as evidence of the applicant’s ability to complete a significant project and write an acceptable scientific report. Preference is given to those applicants whose records indicate a high probability for successful completion of publishable graduate research. Application materials should be requested from the Coordinator, Geophysics Graduate Program, Boise State University, 1910 University Drive, Boise, ID 83725.

Degree Requirements

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TOTAL 30

Credit Requirements

All 30 credits must be taken for a letter grade, except for GEOPH 593 Thesis credit which will be graded Pass/Fail. On-campus geophysics graduate students are required to take GEOPH 598 Graduate Seminar for a letter grade each and every semester it is offered. Credit for GEOPH 598 does not count toward the total degree requirement of 30 credits. Transfer credits may not be used for requirements A, B, or D. A maximum of 9 transfer credits may be applied to meet requirement C except that up to 12 credits of requirement C may be satisfied with transfer credits from the University of Idaho and/or Idaho State University. Certain courses are ineligible for requirement C including courses applied to a previously obtained degree, courses used to meet admission requirements, and courses required to remedy background deficiencies. The purpose of requirement C is to provide an opportunity for elective courses within geophysics or in an associated field of science or engineering; these are often courses which are appropriate to a student’s thesis or future employment goals. In all cases, the courses applied to meet requirement C must be approved by the student’s supervisory committee and by the Coordinator of the geophysics graduate program, and the majority of the 30-credit total requirement (i.e., at least 16 credits) must be earned in residence at Boise State.

Thesis Requirements

A thesis representing research of sufficient quality to warrant publication in a peer-reviewed journal is required of all candidates for the Master of Science in Geophysics. Actual publication is not required, but is held out as a goal for all graduate students. The research results must be presented at a formal public defense, and the final written thesis must be approved by the supervisory committee, by the Coordinator of the geophysics graduate program, and by the Dean of the Graduate College. In order to provide sufficient time for thorough evaluation of thesis research, a student should allow 3-6 months between preparation of the first draft of the thesis and the day of the formal defense. Frequent
communication between the student, the supervisory committee, and the Coordinator is essential throughout this period.

Master of Science in Hydrologic Sciences
(See Section on Interdisciplinary Programs)

Graduate Certificate in Geographical Information Analysis
Graduate Program Coordinator: David Wilkins
Math/Geosciences Building, Room 223
Telephone 208 426-2390
e-mail: dwilkins@boisestate.edu

General Information
This certificate program is interdisciplinary in its application of geospatial technologies towards solving problems with spatial elements, and is open to graduate students of any major where geospatial information technologies and analysis may be applied. The prescribed and elective coursework is designed to meet the demands in industry and research where demonstrable literacy is required in these technologies. Applicants must be seeking a graduate degree for admission to this program.

Certificate Requirements

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<th>Graduate Certificate in Geographical Information Analysis</th>
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Course Offerings
Additional course work will be required to receive graduate credit for undergraduate G courses.

GENSCI – GENERAL SCIENCE
GENSCI 501 HISTORY OF SCIENCE (3-0-3)(F/S). This is a survey of humanity’s efforts to understand the natural world. “Ancient Science” is presented as an introduction to the evolution of science since the 16th century. “Modern Science” is presented with emphasis on the development of modern scientific thought. Historical illustrations of the nature of scientific research in the evolution of science are presented.

GEOG – GEOGRAPHY
GEOG 560 INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS (2-2-3)(F/S). Designed for graduate students with no background in geographic information systems, or GIS, who wish to use these techniques in their research. Introduces the student to GIS concepts and principles. Lab fee. PREREQ: PERM/INST.
GEOG 561 REMOTE SENSING AND IMAGE PROCESSING (2-2-3)(F/S). Introduces students to acquisition, interpretation, and analysis of digital imagery. Applications presented in different contexts including forestry, geology, ecology, and urban planning. Lab exercises focus on digital image processing, georeferencing, and image interpretation and analysis. Lab fee. PREREQ: GEOG 560 or PERM/INST.
GEOG 562 GEOGRAPHIC INFORMATION ANALYSIS (2-2-3) (F/S). For graduate students with previous GIS experience or course work. Covers the operations and spatial analysis capabilities of a GIS, including spatial data models and data structure, spatial data management, and the spatial statistical analyses used to solve various problems. Lab fee. PREREQ: GEOG 561 or PERM/INST.
GEOG 563 GEOSPATIAL PROJECT (1-6-3)(F/S). For graduate students with extensive previous GIS experience or course work. Students will independently identify a problem, design, implement and complete a project...
utilizing geospatial techniques and analysis of that problem. This course and the project are intended to supplement thesis or dissertation research. Lab fee. 
PREREQ: GEOG 562 or PERM/INST.

GEOG 570 (GEOS 570) EARTH SYSTEM SCIENCE AND GLOBAL WARMING (3-0-3)(F/S). Survey of interactions among physical biogeochemical processes involved in climate and climate feedback. Explore in detail scenarios of global warming for the next century and their reliability. May be taken for GEOG or GEOS credit but not both. 
PREREQ: PERM/INST.

GEOPH – GEOPHYSICS

GEOPH 410G BOREHOLE GEOPHYSICS (2-3-3)(Offered as justified). Principles of geophysical, geological, and hydrological measurements in boreholes with emphasis on applications to hydrogeology and petroleum geology. Geological interpretation and formation evaluation of conventional petroleum industry well logs. Integration of borehole geophysics, seismic reflection data, and geology for water resource studies and petroleum exploration. 
PREREQ: GEOPH 301 or GEOPH 305 or PERM/INST.

GEOPH 501 PROPERTIES AND PROCESSES IN GEOPHYSICS I (3-2-4)(F). Study of the physical processes that operate within the solid Earth and the subsurface properties that govern those processes. Emphasis on mechanical deformation and seismic and electromagnetic wave propagation. Required core class for all geophysics graduate students. PREREQ: GEOPH 303 or PERM/INST.

GEOPH 502 PROPERTIES AND PROCESSES IN GEOPHYSICS II (3-2-4)(S). Study of the physical processes that operate within the solid Earth and the subsurface properties that govern those processes. Emphasis on thermal processes and the dynamics of fluids. Required core class for all geophysics graduate students. PREREQ: GEOPH 303 and GEOS 412, or PERM/INST.

GEOPH 515 STRATIGRAPHIC INTERPRETATION OF SEISMIC DATA (3-0-3)(S). Seismic sequence and seismic facies analysis, isochronous reflections, seismic stratigraphy of depositional systems, sea level cycles, seismic modeling, hydrocarbon indicators, lithology from velocity and seismic amplitude variation with offset, use of shear waves and vertical seismic profiling. Interpretation project involving seismic modeling. PREREQ: GEOPH 465 or GEOPH 565.

GEOPH 516 (CE 516)(GEOS 516) HYDROLOGY (3-0-3)(S). Interdisciplinary earth science concerned with movement and occurrence of water. Watershed-based hydrologic phenomena including hydrologic cycle water-cycle analysis, precipitation, evapotranspiration, snow-melt, streamflow, floods, routing and surface runoff events. Application of analytical techniques to solve water resource problems. May be taken for CE, GEOPH, or GEOS credit, but not in more than one department. 
PREREQ: MATH 175 or PERM/INST.

GEOPH 517(GEOS 517) WATERSHED PROCESSES (3-0-3)(F). Investigation of the theoretical and empirical foundations of physical processes that govern the morphology of watersheds focusing on hillslope and fluvial processes. Our objective is to extract basic physical concepts from laws and equations that are used to describe and model various geomorphic phenomena. The course will involve a mix of lectures, student led discussions, and fieldwork. PREREQ: GEOS 313, MATH 175, and PHYS 211.

GEOPH 525 EARTHQUAKE SEISMOLOGY (3-0-3)(F). Earthquake source theory, waves from a point dislocation source in a radially symmetric Earth, reflection and refraction at a plane interface, surface waves, free oscillations, theory of the seismograph, interpretation of seismograms, travel-time curves, hypocenter determination, fault-plane solutions, magnitude, properties of the Earth’s interior, seismotectonics and seismic hazards. Field and laboratory exercises. PREREQ: GEOS 101, MATH 333.


GEOPH 555 GRAVIMETRIC AND MAGNETIC METHODS (2-2-3)(F/S). Comprehensive discussion of modern gravimetric and magnetic methods of subsurface investigation. Applications to exploration geology (mining and petroleum), engineering geology, hydrogeology, and crustal geology. PREREQ: GEOPH 303, GEOS 101 or PERM/INST.

GEOPH 560 ELECTRICAL AND ELECTROMAGNETIC METHODS (2-2-3)(F/S). Comprehensive discussion of modern electrical and electromagnetic methods of subsurface investigation, including ground penetrating radar. Applications to exploration geology (mining and petroleum), engineering geology, hydrogeology, and crustal geology. PREREQ: GEOPH 303, GEOS 101 or PERM/INST.

GEOPH 565 SEISMIC METHODS (2-2-3)(F/S). Comprehensive discussion of modern seismic methods of subsurface investigation. Applications to exploration geology (mining and petroleum), engineering geology, hydrogeology, and crustal geology. PREREQ: GEOPH 303, GEOS 101 or PERM/INST.
GEOPH 575 GEOPHYSICAL APPLICATIONS OF DIGITAL SIGNAL PROCESSING (2-2-3)(F/S). Review of digital linear system theory. Digital representation of geophysical data. Geophysical applications of convolution, fast-Fourier transform (FFT), correlations, least squares filters, deconvolution, multi-channel and two-dimensional operations. Emphasis is on processing of seismic reflection data, potential field maps, and earthquake seismograms. Computer laboratory exercises. PREREQ: GEOPH 301 or GEOPH 305, or PERM/INST.

GEOPH 601 (GEOS 601) GRADUATE ORIENTATION (2-0-2)(F). General orientation to the graduate program in Geology and Geophysics. Introduction to the requirements of the programs and development of technical writing skills through the preparation of abstracts, proposals for research funding, and thesis proposals. May be taken for either GEOPH or GEOS credit, but not both. PREREQ: PERM/INST.

GEOPH 605 INVERSION THEORY AND GEOPHYSICAL APPLICATIONS (3-0-3)(F). Application of the concepts of inverse theory to problems in geophysics and geophysical imaging. Continuous (integral) and discrete methods, with emphasis on latter. Review of linear algebra, eigenvalue decomposition, basis functions, basis vectors, metrics, objective functions, transformation and representation, error analysis, linear and nonlinear inverse methods, gradient descent methods, grid searches, simulated annealing. Computer laboratory exercises. PREREQ: MATH 301.

GEOPH 610 GEOPHYSICAL METHODS IN GEOTECHNICAL ENGINEERING (2-2-3)(F/S). Application of geophysical methods to problems in geotechnical engineering including in situ measurement of the mechanical properties of soil and rock, depth and rippability of bedrock, prediction of seismic ground amplification, nondestructive testing of foundations and roadways, location of underground utilities, and detection of tunnels, caves, impending sinkholes or collapse features, and fracture zones. Scheduled offering based on student interest. PREREQ: CE 305, GEOPH 305, GEOPH 605; or PERM/INST.

GEOPH 613 GEOPHYSICAL METHODS IN GROUNDWATER HYDROLOGY (2-2-3)(F/S). Application of geophysical methods to problems in groundwater hydrology including in situ estimation of aquifer parameters, evaluation of groundwater resources, delineation of thermal and chemical pollution of groundwater, and mapping of salt water intrusion. Scheduled offering based on student interest. PREREQ: GEOPH 305, GEOPH 605, GEOS 512, or PERM/INST.

GEOPH 623 (CE 623)(GEOS 623) ADVANCED HYDROGEOLOGY (3-0-3)(F). Treatment of groundwater occurrence and flow, theory fundamental mechanisms, hydrologic parameters, flow regimes and systems, geologic controls. May be taken for either CE, GEOPH, or GEOS credit, but not for more than one department. PREREQ: MATH 275, MATH 333, and GEOS 412 or GEOS 512 or CE 412 or CE 512, or PERM/INST.

GEOPH 624 (CE 624)(GEOS 624) APPLIED HYDROGEOLOGY (3-0-3)(S). Quantitative determination of hydrologic parameter values and groundwater flow conditions. Conceptual models and geologic context, boundary condition, analytical and numerical solution techniques, measurement methods, applications to engineering and environmental problems. May be taken for either CE, GEOPH, or GEOS credit, but not for more than one department. PREREQ: CE 623 or GEOPH 623 or GEOS 623 or PERM/INST.

GEOPH 630 ESTIMATION OF EARTHQUAKE GROUND MOTION (2-2-3)(F/S). Procedures for estimation of earthquake ground motion for applications such as the siting and design of critical facilities, city and land use planning, building codes, and evaluation of insurance needs. Topics include seismicity, seismotectonic features, regional seismic attenuation, ground motion parameters, response spectra, local amplification, and estimation of uncertainty. Students interested in earthquake ground motion are also encouraged to consider GEOPH 610 as a related course. Scheduled offering based on student interest. PREREQ: GEOPH 525; GEOS 314, or PERM/INST.

GEOPH 641 (GEOS 641) GEODYNAMICS (3-0-3)(F/S). Identifies and quantitatively analyzes the processes governing the dynamic behavior of Earth at a variety of spatial and temporal scales. Offered upon sufficient student interest. May be taken for either GEOPH or GEOS credit, but not both. PREREQ: PERM/INST.

GEOPH 650 DESIGN OF GEOPHYSICAL WASTE SITE CHARACTERIZATION PROGRAMS (2-2-3)(F/S). Application of design principles to geophysical characterization of sites for landfills and hazardous waste disposal. Discussion includes an introduction to governmental policies, procedures, and regulations. Scheduled offering based on student interest. PREREQ: CE 320, GEOPH 305, GEOPH 605, GEOS 412 or PERM/INST.

GEOPH 653 DESIGN OF GEOPHYSICAL MONITORING SYSTEMS FOR SURFACE OR SUBSURFACE PROCESSES (2-2-3)(F/S). Application of design principles to in situ geophysical monitoring systems for time-dependent surface or subsurface processes such as slope instability and migration of contaminants in groundwater. Scheduled offering based on student interest. PREREQ: GEOPH 305-305G, GEOPH 502, GEOPH 605; or PERM/INST.

GEOPH 680 SELECTED TOPICS IN GEOPHYSICAL DATA ANALYSIS (2-2-3)(F/S). Theory and implementation of one or more methods of geophysical data analysis. Methods are chosen based on class interest from the large number of modern processing, modeling, and statistical methods. Scheduled offering based on student interest. PREREQ: GEOPH 605 or PERM/INST.

GEOPH 693 DISSERTATION

GEOS - GEOSCIENCE

GEOS 451G PRINCIPLES OF SOIL SCIENCE (3-0-3) (F/S)(Offered as justified). Major aspects of soil science,
including the physical, chemical, and biological characteristics of soils, will be presented in the classroom lectures. Demonstration laboratory exercises and field trips will be required. PREREQ: Background in geology and chemistry.

GEOS 511 ADVANCED ENVIRONMENTAL GEOLOGY (3-0-3)(S). Land-use planning, techniques for investigation of surficial materials and water resources. Geologic hazards, surficial deposits and their engineering and hydrologic properties, ground and surface water, waste disposal. Term reports required, field trips required. PREREQ: GEOS 221 or PHYS 212.

GEOS 512 (CE 512) HYDROGEOLOGY (3-0-3)(F). The study of subsurface water and its relationship to surface water, the hydrologic cycle, and the physical properties of aquifer systems. Flow nets and flow through porous and fractured media. Methods of determination of aquifer characteristics and performance and groundwater modeling. May be taken for either CE or GEOS credit, but not both. PREREQ: MATH 175, and PHYS 211.

GEOS 516 (CE 516)(GEOPH 516) HYDROLOGY (3-0-3)(S). Interdisciplinary earth science concerned with movement and occurrence of water. Watershed-based hydrologic phenomena including hydrologic cycle water-cycle analysis, precipitation, evapotranspiration, snow-snowmelt, streamflow, floods, routing and surface runoff events. Application of analytical techniques to solve water resource problems. May be taken for CE, GEOPH, or GEOS credit, but not in more than one department. PREREQ: MATH 175 or PERM/INST.

GEOS 517(GEOPH 517) WATERSHED PROCESSES (3-0-3)(F). Investigation of the theoretical and empirical foundations of physical processes that govern the morphology of watersheds focusing on hillslope and fluvial processes. Our objective is to extract basic physical concepts from laws and equations that are used to describe and model various geomorphic phenomena. The course will involve a mix of lectures, student led discussions, and fieldwork. PREREQ: GEOS 313, MATH 175, and PHYS 211.

GEOS 518 HYDROLOGIC ANALYSIS (3-0-3)(F)(Alternate Years). An overview of applied hydrologic techniques useful to scientists and engineers. Topics include hydrologic modeling, frequency analysis, and watershed assessment. PREREQ: GEOS 416 or PERM/INST.

GEOS 523 ADVANCED GEOMORPHOLOGY (3-0-3)(F/S). Study of Quaternary dating methods, applications of geomorphology to environmental problems, mapping and landscape analysis using GIS, soils, geomorphic response to Quaternary climate change, and climatic, tectonic and autecyclic controls on geomorphic processes. Field trips and a field-based research project required. PREREQ: PERM/INST.

GEOS 525 WHOLE EARTH GEOCHEMISTRY (3-0-3)(F/S). Basic tools and topics of modern geochemistry with an emphasis on solid-earth applications. Essentials of thermodynamics, kinetics, radiogenic and stable isotopes, and trace element chemistry necessary to study Earth processes in the crust, mantle, hydrosphere and atmosphere. PREREQ: PERM/INST.

GEOS 526 (CE 527) AQUEOUS GEOCHEMISTRY (3-0-3)(F/S). Basic tools and topics of aqueous geochemistry with an emphasis on low temperature processes in natural waters. Essentials of thermodynamics, kinetics, aqueous speciation, mineral-water interaction, and elemental cycling as applied to surficial earth processes and environmental challenges. May be taken for either GEOS or CE credit, but not both. PREREQ: PERM/INST.

GEOS 530 (CE 530) VADOSE ZONE HYDROLOGY (3-0-3)(F). Laboratory and field methods for characterizing physical and hydraulic properties of soils, solution of variably saturated flow problems using analytical and numerical techniques. Computer simulations of flow and transport in variably saturated soils. May be taken for either CE or GEOS credit, but not both. PREREQ: CE 412, or GEOS 412, or CE 512, or GEOS 512, or PERM/INST.

GEOS 531 GEOLOGY AND TECTONICS OF WESTERN NORTH AMERICA (3-0-3)(F/S). Class traces the timeline of processes and events that shaped the continental architecture of Western North America by integrating all relevant aspects of geology and geophysics. A research paper is required. PREREQ: Graduate standing or PERM/INST.

GEOS 533 (CE 533) CONTAMINANT TRANSPORT (3-0-3)(S). The fate and transport of dissolved solutes and non-aqueous phase liquids in groundwater systems. Students will analyze field data and develop conceptual models for contaminated sites. The role of engineers and hydrologists in environmental litigation will be addressed through case studies. May be taken for either CE or GEOS credit, but not both. PREREQ: CE 412, or CE 512, or GEOS 412, or GEOS 512, or PERM/INST.

GEOS 540 TECTONICS SEMINAR (2-0-2)(F/S). Examination of specific orogenic systems, tectonic environments, and tectonic processes. PREREQ: GEOS 314 and 323, or PERM/INST.

GEOS 541 PLATE TECTONICS (3-0-3)(F/S)(Offered on demand). Reviews and clarifies geologic and geophysical foundations of plate tectonic theory. Characteristics of modern tectonic environments and their use in interpreting the Earth’s geologic history. PREREQ: PERM/INST.

GEOS 542 CURRENT LITERATURE IN STRUCTURE AND TECTONICS (1-0-1)(F/S). Examination, presentation, and discussion of current literature in structure and tectonics. PREREQ: GEOS 314 or PERM/INST.

GEOS 552 NATURE OF SCIENCE (3-0-3)(F/S). Explores basic questions of how the Earth works from the perspective of the scientist. Emphasis on the conceptual approach to science. Interactive lectures and short writing assignments. Open to students with varied backgrounds. PREREQ: GEOS 102.

GEOS 560 VOLCANOLOGY (3-0-3)(F)(Alternate years). Study of volcanic processes and deposits, with focus on advances in volcanology since 1980 eruption of Mt. St.
PERM/INST.

Preparation of visual aids and geologic illustrations will be provided by the instructor. Weekly progress meetings, on an individual problem or select a problem from a list of problems, may be taken for either GEOG or GEOS credit, but not both. PREREQ: PERM/INST.

GEOS 561 EARTH SCIENCE TEACHING TECHNIQUES (3-0-3 or 4-0-4)(F/S). This course is a study of the objectives, methods, and materials of instruction in Earth Sciences. Emphasis will be placed on the preparation and presentation of lectures, laboratory exercises and field trips. This course provides the student with internship experience in the laboratory and lecture classroom. PREREQ: Graduate status or PERM/INST.

GEOS 570 (GEOG 570) EARTH SYSTEM SCIENCE AND GLOBAL WARMING (3-0-3)(F/S). Survey of interactions among physical biogeochemical processes involved in climate and climate feedback. Explore in detail scenarios of global warming for the next century and their reliability. May be taken for either GEOG or GEOS credit, but not both. PREREQ: PERM/INST.

GEOS 580 SELECTED TOPICS IN WATERSHED HYDROLOGY (1-3 credits)(F). Detailed investigation of selected hydrologic processes and applications. Topics will vary each year and may include runoff generation, snow hydrology, watershed management, hydrologic modeling, sediment transport, land-use hydrology and field methods among others. Repeatable for credit. PREREQ: PERM/INST.

GEOS 591 PROJECT (0-3 to 0-6). Identification and presentation of an educational need through systematic study and the fulfillment of that need by the development of a usable product; such as, an audio-visual unit, a curriculum guide or resource unit, a collection of teaching strategies, or the preparation of a handbook or computer software. (Pass/Fail.)

GEOS 593 THESIS (0-3 to 0-5). The scholarly pursuit of original work on a field or laboratory project or the formulation of new and logical interpretations of existing data collected through library research. A final report suitable for presentation at a meeting of Earth Science professionals is required. PREREQ: Admission to candidacy.

GEOS 596 DIRECTED RESEARCH (0-1 to 0-4). Field, laboratory or library research project. Students may work on an individual problem or select a problem from a list provided by the instructor. Weekly progress meetings, final report. PREREQ: PERM/INST.

GEOS 597 SPECIAL TOPICS (V-V-V)(F/S). A selection of classes that deal with specialized topics and are designed for small groups of students.

GEOS 598 GRADUATE SEMINAR (0-1 to 0-3). The preparation and presentation of oral and written reports on topics in earth science and or science education. Presentation of oral reports may take the form of debate. Preparation of visual aids and geologic illustrations will be emphasized. PREREQ: Admission to candidacy or PERM/INST.

GEOS 599 PROJECT (0-3 to 0-5). The scholarly pursuit of original work on a field or laboratory project or the formulation of new and logical interpretations of existing data collected through library research. A final report suitable for presentation at a meeting of Earth Science professionals is required. PREREQ: Admission to candidacy.

GEOS 600 ASSESSMENT [Comprehensive Examination] (0-0-1). Culminating assessment activity comprising a comprehensive examination to judge depth and breadth of knowledge in Geosciences. (Pass/Fail.)

GEOS 601 (GEOPH 601) GRADUATE ORIENTATION (2-0-2)(F). General orientation to the graduate program in Geology and Geophysics. Introduction to the requirements of the programs and development of technical writing skills through the preparation of abstracts, proposals for research funding, and thesis proposals. May be taken for either GEOPH or GEOS credit, but not both. PREREQ: PERM/INST.

GEOS 605 TOPICS IN GEOMORPHOLOGY (3-0-3)(F/S). Topical investigation of geomorphic processes, including the influences of geology, hydrology, biology, climate, tectonics, and time on landscape evolution and ecosystems development. Includes field investigations. May be repeated for credit. PREREQ: PERM/INST.

GEOS 607 PALEOCLIMATOLOGY AND PALECEANOGRAPHY (3-0-3)(F/S). Will survey the driving forces of atmospheric and oceanic circulation, and how this information can be retrieved from the geological record from physical, biotic, trace element, and isotopic proxies. PREREQ: PERM/INST.

GEOS 611 BASIN ANALYSIS (3-0-3)(S). Study of the formation and evolution of sedimentary basins. Emphasis on the concepts and qualitative tools necessary to understand how sedimentary basins are formed, their specific stratigraphic architectures, and modern approaches to correlation. PREREQ: PERM/INST.

GEOS 615 TIME-SERIES ANALYSIS OF THE GEOLOGIC RECORD (3-0-3)(F/S). Analysis of modern methods for the quantification of time in the geologic record, including bio-, chemo-, magneto- and physical stratigraphy, high precision geochronology, and orbital tuning. Application to elucidating the records of tectonic reconstruction, paleobiological evolution, and paleoclimate change. PREREQ: PERM/INST.

GEOS 623 (CE 623)(GEOPH 623) ADVANCED HYDROGEOLOGY (3-0-3)(F). Treatment of groundwater occurrence and flow, theory fundamental mechanisms, hydrologic parameters, flow regimes and systems, geologic controls. May be taken for either GEOS, GEOPH, or CE credit, but not for more than one department. PREREQ: MATH 275, MATH 333, and GEOS 412 or GEOS 512 or GE 412 or CE 512, or PERM/INST.

GEOS 624 (CE 624)(GEOPH 624) APPLIED HYDROGEOLOGY (3-0-3)(S). Quantitative determination of hydrologic parameter values and groundwater flow conditions. Conceptual models and geologic context, boundary condition, analytical and numerical solution techniques, measurement methods, applications to engineering and environmental problems. May be taken for either GEOS, GEOPH, or CE credit, but only in one department. PREREQ: CE 623 or GEOPH 623 or GEOS 623 or PERM/INST.

GEOS 636 STABLE ISOTOPE GEOCHEMISTRY (3-0-3)(F/S). Comprehensive overview of theory, methods, and
applications of stable isotope geochemistry to a wide range of earth science problems. PREREQ: PERM/INST.

GEOS 638 RADIgenic ISOToPE GEOCHEMISTRY AND GEOCHRONOLOGY (3-0-3)(F/S). Comprehensive overview of theory, methods, and applications of radiogenic isotope geochemistry and geochronology to a wide range of earth science problems. PREREQ: PERM/INST.

GEOS 641 (GEOPH 641) GEODYNAMICS (3-0-3)(F/S). Identifies and quantitatively analyzes the processes governing the dynamic behavior of Earth at a variety of spatial and temporal scales. May be taken for either GEOPH or GEOS credit, but not both. PREREQ: PERM/INST.

GEOS 643 ADVANCED STRUCTURAL GEOLOGY (2-3-3)(F)(Alternate years). Geometric, kinematic and dynamic analysis of plutonic rocks and metamorphic tectonites. Structural elements in plutons, their formation and interpretation as indicators of the tectonic environment during emplacement. Mesoscopic and microscopic study of rock fabrics, the mechanisms and processes of their formation and deformation, and their use as kinematic and strain indicators. PREREQ: PERM/INST.

GEOS 645 PHYSICS AND CHEMISTRY OF MOUNTAIN BUILDING (3-0-3)(F/S). An introduction to modern methods for analyzing the pressure-temperature-time paths and histories of metamorphic terrains comprising modern and ancient mountain belts; subjects to include quantitative geothermobarometry, chemical diffusion and closure temperature theory, geochronology and thermochronology, the thermal structure and evolution of mountain belts. PREREQ: PERM/INST.

GEOS 647 ADVANCED IGNEOUS PETROLOGY (3-0-3)(S)(Odd years). A study of igneous rocks with emphasis on their origin and the processes responsible for their diversity. Exercises will make use of the petrographic microscope and the departmental computer facilities. A field trip is required. PREREQ: PERM/INST.

GEOS 651 BIOGEOCHEMICAL CYCLES (3-0-3)(F/S). A detailed investigation of the global cycling of elements and water and the coupled physical, chemical and biological processes and controls. PREREQ: PERM/INST.

GEOS 653 GROUNDWATER MICROBIOLOGY (3-0-3)(F/S). An exploration of the interface of microbiology and hydrogeology and aqueous geochemistry with an emphasis microbial processes and ecology and redox transformations produced by natural and contaminant-related disequilibrium in the subsurface. PREREQ: PERM/INST.

GEOS 655 COUPLED BIOGEOCHEMICAL KINETICS AND TRANSPORT (3-0-3)(F/S). A detailed investigation of the smaller scale (kilometer to micrometer) flow of elements and water through coupled physical, chemical and biological processes, with an emphasis on the interplay of mass and energy transfer rates and biogeochemical kinetic constraints. PREREQ: PERM/INST.

GEOS 657 REACTIVE TRANSPORT MODELING (3-0-3)(F/S). The application of geochemical and reactive transport computer codes to coupled flow and reactive transport problems with an emphasis on subsurface systems. PREREQ: PERM/INST.

GEOS 693 DISSERTATION (0-V-V). Original research and analysis of results culminating in the preparation of a dissertation. (Pass/Fail.)

Idaho State University Courses:
- GEOS 648 Research Problems
- GEOS 650 Thesis
Department of Mathematics

Chair: Douglas Bullock  
Math/Geosciences Building, Room 235  
Telephone 208 426-1172  
FAX 208 426-1356  
http://math.boisestate.edu  
e-mail: office@math.boisestate.edu

Graduate Faculty: Liljana Babinkostova, Stephen Brill, Douglas Bullock, Alex Feldman, Stefan Geschke, Stephen Grantham, Jens Harlander, Alan Hausrath, Randall Holmes, Uwe Kaiser, Otis Kenny, Charles Kerr, Margaret Kinzel, Kyungduk Ko, Jaechoul Lee, Jodi Mead, Rama Mishra, Leming Qu, Kathleen Rohrig, Marion Scheepers, Mary Jarratt Smith, Sharon Walen, Grady Wright, Barbara Zubik-Kowal

Graduate Degrees Offered  
Master of Science in Mathematics  
Master of Science in Mathematics Education

Master of Science in Mathematics  
Graduate Program Coordinator: Jodi Mead  
Math/Geosciences Building, Room 218B  
Telephone 208 426-2432  
e-mail: mead@math.boisestate.edu

General Information

The Master of Science in Mathematics degree provides a solid foundation in the theoretical and applied aspects of mathematics and the opportunity for concentration in an area of special interest. Students complete a required core sequence in mathematics and choose electives from a selection of graduate courses that reflect faculty expertise. The choice of culminating activity depends on student goals and may be a comprehensive examination, a project, or a thesis. Students interested in applying for a graduate teaching or research assistantship should contact the graduate program coordinator for further information.

Application and Admission Procedures

An applicant must follow the general application procedures for degree-seeking students (see the Graduate Admission Regulations section of this catalog) and must (1) arrange to have three letters of recommendation submitted directly by the references to the graduate program coordinator and (2) submit GRE general test scores. In addition, all applicants interested in consideration for a graduate teaching assistantship must submit scores for the GRE subject test in mathematics. Applicants whose native language is not English must submit TOEFL scores and may be interviewed if applying for a graduate teaching assistantship. Once the file for an applicant is complete, it will be evaluated by the Mathematics Graduate Committee and an admission recommendation (regular, provisional, or denial) will be forwarded to the dean of the Graduate College who will make the final admission decision and notify the applicant.

Conditions for Admission. The conditions for admission are the minimum admission requirements of the Graduate College (see the Graduate Admission Regulations section of this catalog) where the required baccalaureate degree must be in mathematics or a closely related field involving substantial course work in mathematics. These conditions are necessary for admission to the program but do not guarantee admission.

Supervisory Committee

Each admitted student intending to do a thesis will be assigned a three-member supervisory committee consisting of a major advisor who serves as chair and two additional members. The role of the supervisory committee is to guide the student in all aspects of his or her graduate study. All other admitted students will be assigned an advisor who carries out the same role. The Mathematics Graduate Committee maintains oversight of the program by monitoring the academic progress of each student and the performance of the graduate teaching assistants.

Degree Requirements

The Master of Science in Mathematics degree requires completion of a two-course graduate core
sequence in mathematics, a prescribed number of additional graduate courses, and a culminating activity that may be a comprehensive examination, a project, or a thesis. An individual program may include no more than 10 credits representing dual-listed courses and G-courses. All courses must be approved for application to the degree requirements by the supervisory committee working within constraints developed by the Mathematics Graduate Committee.

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**Comprehensive Examination.** The comprehensive examination consists of two written two-hour tests (one test covering the content of MATH 515 and MATH 516 and one test covering the content of another two related courses) and a one-hour oral test over material drawn from any of the courses completed by the student. These three tests cannot be taken until after the student is admitted to candidacy and must be taken in the same semester.

**Project.** The project must be related to the internship experience and must be presented and discussed at a public oral presentation.

**Thesis.** The thesis must be an original contribution by the student to mathematical knowledge. The student must present and defend the thesis research at a final oral examination.

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**Master of Science in Mathematics Education**

**Graduate Program Coordinator:** Sharon Walen  
Math/Geosciences Building, Room 233  
Telephone 208 426-4095  
e-mail: swalen@boisestate.edu

**General Information**

The curriculum of the Master of Science in Mathematics Education is designed to enhance the preparation of middle school, junior high school, and high school mathematics teachers. Since high quality preparation of teachers requires the integration of mathematical content and pedagogy, courses within the program are designed to extend candidates’ understanding of both mathematical content and issues related to the teaching and learning of that content. Because of the varied backgrounds of the candidates, a student’s course of study will be individually designed in consultation with the graduate committee to expand his or her existing knowledge and to assist the candidate in situating his or her particular grade-level content within the larger body of mathematics.

Because of the differing goals of candidates for the degree, there are two options available to students. The High School option is available to all candidates who meet admission requirements and the Junior High School option, directed primarily at junior high school and middle school teachers, is available to all candidates meeting admission requirements except those holding Standard Certification in Mathematics.

This degree will not lead to certification in Mathematics. Persons seeking secondary Idaho teaching certification should consult with the Associate Chair of the Department of Mathematics to design a program leading to certification.

**Application and Admission**
Requirements

An applicant should follow the general application procedures for graduate degree-seeking students (see the Graduate Admission Regulations section of this catalog). A candidate’s letter of application should indicate the desired program and area of specific interest within mathematics education. In addition, an applicant must arrange to have three letters of recommendation submitted directly by the references to the Graduate Program Coordinator. Once the applicant's file is complete, it will be evaluated by the Mathematics Education Committee and an admission recommendation (regular, provisional, or denial) will be forwarded to the Dean of the Graduate College. Provisional admission may be granted to students whose background is deemed deficient. In the case of a recommendation for provisional admission, the Committee will also recommend the stipulations that must be satisfied by the student to advance to regular status. The Dean will make the final admission decision and notify the applicant and the Committee.

Conditions for Admission. The conditions for admission are the minimum admission requirements of the Graduate College (see the Graduate Admission Regulations section of this catalog) where the required baccalaureate degree must be in mathematics secondary education, mathematics, elementary education or a closely related field. These conditions are necessary for admission but do not guarantee admission.

Supervisory Committee

The Mathematics Education Committee will assign each admitted student intending to do a thesis, upon consulting with the student, a three-member supervisory committee consisting of an advisor who will serve as chair and two additional members. The role of the supervisory committee is to guide the student in all aspects of his or her graduate study, including choice of course work to meet the degree requirements, and design, execution, and final evaluation of the thesis. All other admitted students will be assigned an advisor who carries out the same role. The Mathematics Education Committee maintains oversight of the program by monitoring the academic progress of each student.

Degree Requirements

General M. S. requirements as stated in Boise State University’s Graduate Catalog apply. Any transfer credits, whether from another university or from another graduate program at Boise State University, must be approved by the Mathematics Education Committee. A 400/500 cross-listed course cannot apply towards the degree if already taken for an undergraduate degree.

The Master of Science in Mathematics Education requires course work and a culminating experience consisting of either a thesis or a project.

Thesis Option. The thesis option is for those students particularly interested in research and who may want to pursue a doctorate in the future. It requires 30-33 graduate credits comprised of at least 27 course credits and 3-6 credits of thesis work. The thesis must be an original contribution by the student to the state of mathematics education or mathematical knowledge. Each student choosing the thesis option must pass a public oral defense of the completed thesis.

Project Option. The project option is designed for most practicing teachers. It requires 30-33 graduate credits comprised of at least 27 course credits and a 3-6 credit project. Each student choosing the project option must give a public oral presentation about the completed project.

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Note: The total number of G credits may be no more than one-third of the total credits.

### Course Offerings

**MATH – MATHEMATICS**

Additional work will be required to receive graduate credit for undergraduate G courses.

Graduate offerings in mathematics are limited to those courses for which there is sufficient student demand as determined by the Department of Mathematics.

**MATH 490G MATHEMATICS IN SECONDARY SCHOOLS (4-0-4)(F)**. Objectives, content, and methods of secondary school mathematics programs. **PREREQ:** MATH 270 and six hours of mathematics completed at or above the 300-level or PERM/INST.

**MATH 501 FOUNDATIONS OF MATHEMATICS (3-0-3)(SU)**. The language and methods of reasoning used throughout mathematics, and selected topics in discrete mathematics. **PREREQ:** MATH 143 or MATH 147.

**MATH 502 LOGIC AND SET THEORY (3-0-3)(S)(Even years)**. This course is structured as three five-week components: formal logic, set **theory**, and topics to be determined by the instructor. The logic component will include: formalization of language and proof, the completeness theorem, the Lowenheim-Skolem theorem. The set theory component will include: cardinality, Cantor's theorem, well orderings, ordinals, the transfinite recursion theorem, the Axiom of Choice and its equivalents. **PREREQ:** MATH 143 or MATH 147.

**MATH 505 ABSTRACT ALGEBRA (3-0-3)(F)(Odd years)**. Topics in group theory, ring theory and field theory with emphasis on finite and solvable groups, polynomials and factorization, extensions of fields. **PREREQ:** MATH 301 and MATH 305.

**MATH 506 ADVANCED ALGEBRA (3-0-3)(S)(Even years)**. The study of algebraic topics taken from mappings, semi-groups, groups, Sylow Theorems, group actions, rings, ascending and descending chain conditions, polynomial rings, fields, field extensions, Galois theory, Modules, Tensor products. **PREREQ:** MATH 405 or MATH 505.

**MATH 507 COMPUTATIONAL NUMBER THEORY (3-0-3)(S)(Odd years)**. Foundations and contemporary applications of number theory including basic concepts of computational mathematics (probabilistic algorithms versus deterministic algorithms, computational complexity), fundamental algorithms, fundamental hypothesis of computational number theory – the Extended Riemann Hypothesis, quantifying number theoretic results, open problems, and applications. **PREREQ:** MATH 306.

**MATH 509 FOUNDATIONS OF PUBLIC KEY CRYPTOLOGY (3-0-3)(S)(Even years)**. One-way functions, pseudo-random number generators, and zero-knowledge proofs. Applications to encryption schemas whose security is based on computing the order of a group, encryption schemas whose security is based on solving an equation in a group, signature schemas. **PREREQ:** MATH 305 or MATH 306.

**MATH 511 INTRODUCTION TO TOPOLOGY (3-0-3)(S)(Even years)**. Sets, metric and topological spaces, product and quotient topology, continuous mappings, connectedness and compactness, homeomorphisms, fundamental group, covering spaces. **PREREQ:** MATH 301 and MATH 411 or MATH 511.

**MATH 513 DIFFERENTIABLE MANIFOLDS (3-0-3)(F)(Even years)**. Survey of differential topology and geometry, manifolds, vector bundles, transversality, isotopy, connections, curvatures. Special topics could be characteristic classes, cobordism theory, immersion theory, the Gauss-Bonnet theorem. **PREREQ:** MATH 275, MATH 333 and MATH 414 or MATH 514.

**MATH 514 ADVANCED CALCULUS (4-0-4)(F)**. Infinite series, sequences and series of functions, uniform convergence, theory of integration (Riemann and Stieltjes), further topics as time permits. **PREREQ:** MATH 275, MATH 301, MATH 314.

**MATH 515 REAL ANALYSIS (3-0-3)(S)**. Introduction to the fundamental elements of real analysis and a foundation for writing graduate level proofs. Topics may include: Banach spaces, Lebesgue measure and integration, metric and topological spaces. The exact content is to be determined by the instructor. **PREREQ:** MATH 414 or MATH 514.

**MATH 516 FUNCTIONAL ANALYSIS (3-0-3)(F)**. Introduction to the fundamental elements in functional
MATH 547 HISTORY OF MATHEMATICS (3-0-3)(F/S/SU). The course is designed for mathematics teachers in the secondary school. The course consists of two parts: the first part traces the development of algebra, geometry, analytic geometry and calculus to the 19th century; the second part gives a brief introduction to, and history of, some of the developments in mathematics during the last century. May not be used for the Master’s degree in Mathematics. PREREQ: PERM/INST.


MATH 562 PROBABILITY AND STATISTICS (4-0-4)(F)(Odd years). Provides a solid foundation in statistical theory and its use in solving practical problems in the real world. Topics include moment-generating functions, multivariate probability distributions, hierarchical models and mixture distributions, functions of random variables, central limit theorems, estimation, hypothesis testing, multiple linear regression, the analysis of variance, analysis of categorical data, non-parametric statistics. PREREQ: MATH 275, MATH 301, and MATH 361.

MATH 564 MATHEMATICAL MODELING (3-0-3)(F/SU). Introduction to mathematical modeling through case studies. Deterministic and probabilistic models; optimization. Examples will be drawn from the physical, biological, and social sciences. A modeling project will be required. May not be used for the master’s degree in Mathematics. PREREQ: MATH 361 or PERM/INST.


MATH 567 NUMERICAL METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS (3-0-3)(F)(Odd years). Techniques for finding approximate solutions of ordinary differential equations using MATLAB or other technical computing environment, including multistep and Runge-Kutta methods for non-stiff and stiff problems. Programming assignments. PREREQ: MATH 333 or MATH 333.

MATH 568 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (3-0-3)(F)(Even years). Finite difference, finite element, and spectral methods for solving elliptic, parabolic, and hyperbolic partial differential equations numerically. Programming assignments. PREREQ: MATH 436 or MATH 536.

MATH 571 DATA ANALYSIS (4-0-4)(S)(Even years). The application of probability and statistical theory to the analysis of a wide range of data. Elements of the topic include: data preparation, data cleaning, dimension reduction, outlier detection, regression, classification, basis expansions and regularization, kernel methods, model selection and model averaging, tree-based methods, neural networks, clustering, inference, prediction, missing value. PREREQ: MATH 361.

MATH 572 COMPUTATIONAL STATISTICS (3-0-3)(F)(Even years). Introduction to the trend in modern
statistics of basic methodology supported by state-of-art computational and graphical facilities, with attention to statistical theories and complex real world problems. Includes: data visualization, data partitioning and resampling, data fitting, random number generation, stochastic simulation, Markov chain Monte Carlo, the EM algorithm, simulated annealing, model building and evaluation. A statistical computing environment will be used for students to gain hands-on experience of practical programming techniques. PREREQ: MATH 361.

MATH 573 TIME SERIES ANALYSIS (3-0-3)(S)(Odd years). Introduction to time series analysis with an emphasis on application to interdisciplinary projects using SAS/ETS; autoregressive-moving average models, seasonal models, model identification, parameter estimation, model checking, forecasting, estimation of trends and seasonal effects, transfer function models, and spectral analysis. PREREQ: MATH 361.

MATH 574 LINEAR MODELS (3-0-3)(F)(Odd years). Introduction to the Gauss-Markov model with use of relevant statistical software. Includes linear regression, analysis of variance, parameter estimation, hypothesis testing, model building and variable selection, multicollinearity, regression diagnostics, prediction, general linear models, split plot designs, repeated measures analyses, random effects models. PREREQ: MATH 361.

MATH 579 TEACHING COLLEGE MATHEMATICS (1-0-1). Development of skills in the teaching of college mathematics. Effective use of class time, syllabus and test construction, learning styles, and disability issues. Lecturing, use of group work, and other teaching techniques. (Pass/Fail.) PREREQ: PERM/INST.

SELECTED TOPICS SERIES:

MATH 580 TOPICS IN SET THEORY.
MATH 581 TOPICS IN LOGIC.
MATH 582 TOPICS IN TOPOLOGY.
MATH 583 TOPICS IN COMPUTATIONAL MATHEMATICS.
MATH 584 TOPICS IN COMPUTATIONAL ALGEBRA.
MATH 585 TOPICS IN CRYPTOLOGY.
MATH 586 TOPICS IN STATISTICS.
MATH 587 TOPICS IN DIFFERENTIAL EQUATIONS.
MATH 588 TOPICS IN INVERSE THEORY.

MATH 598 SEMINAR IN MATHEMATICS (3-0-3). The content will vary within a format of student presentation and discussion of relatively advanced mathematical topics selected from texts or mathematical journals. This will not be a seminar in mathematics education.

MATHED – MATHEMATICS EDUCATION

MATHED courses are designed to provide extra experience in mathematics for practicing teachers. They may be used to meet course requirements for master’s degrees in education. They are not available for undergraduate credit.

MATHED 510 MATHEMATICS CURRICULUM 7-12 (2-0-2)(SU). The history of the 7-12 mathematics curriculum; content, special problems, and trends in mathematics programs; organization of the curriculum. Study of reports and recommendations; curriculum development projects. PREREQ: At least one year’s experience teaching in middle or secondary school mathematics.

MATHED 511 SURVEY OF RESEARCH IN MATHEMATICS EDUCATION I (2-0-2)(SU). Survey of current research in and discussion of issues relating to the teaching and learning of mathematics. PREREQ: Teaching certification or PERM/INST.

MATHED 512 SURVEY OF RESEARCH IN MATHEMATICS EDUCATION II (2-0-2)(SU). Continuation of MATHED 511. PREREQ: MATHED 511.

MATHED 523 THE TEACHING OF ALGEBRA (2-0-2)(SU). Contemporary approaches to teaching secondary school algebra; treatment of selected topics in secondary school algebra; methods and materials; research relevant to the teaching of algebra. PREREQ: MATH 147 or MATH 257 or teaching certification in mathematics.

MATHED 524 THE TEACHING OF GEOMETRY (2-0-2)(SU). Contemporary approaches to teaching secondary school geometry; treatment of selected topics in geometry; methods and materials; research relevant to the teaching of geometry. PREREQ: MATH 147 or MATH 257 or teaching certification in mathematics.

MATHED 525 THE TEACHING OF CALCULUS (2-0-2)(SU). Contemporary approaches to teaching secondary school calculus; use of symbolic algebra and graphing software; treatment of selected topics in calculus including limit, derivative, and integral. PREREQ: MATH 175.

MATHED 557 ADVANCED PROBLEM SOLVING AND NUMBER THEORY FOR TEACHERS (3-0-3)(SU). Advanced study of number systems from whole numbers through the reals with an emphasis on problem solving and number theory. The course will make use of appropriate models to support the development of the content. This course is appropriate for teachers seeking to strengthen and extend their mathematical knowledge. PREREQ: MATH 147 or MATH 257 or teaching certification in mathematics.

MATHED 558 ADVANCED GEOMETRY AND PROBABILITY FOR TEACHERS (3-0-3)(SU). In-depth study of geometry and probability, including work with mathematical models. This course is appropriate for teachers seeking to strengthen and extend their mathematical knowledge. PREREQ: MATH 147 or MATH 257 or teaching certification in mathematics.

MATHED 570 ADVANCED MATHEMATICS THROUGH TECHNOLOGY (3-0-3)(SU). This course focuses on selecting and using appropriate technology in teaching P-12 mathematics and places an emphasis on instructional design and implementation of technology specific to the mathematical classroom. This course is appropriate for teachers seeking to strengthen and extend their mathematical knowledge. PREREQ: MATH 147 or MATH
257 or teaching certification in mathematics.

MATHED 598 SEMINAR IN MATHEMATICS EDUCATION
(2-0-2)(SU). The content will vary within a format of student presentation and discussion of relatively advanced mathematics education topics selected from texts or journals. This will not be a seminar in mathematics.
Department of Music

Chair: Mark Hansen
Morrison Center for the Performing Arts, Room C-100
Telephone 208 426-1596
FAX 208 426-1771
http://www.boisestate.edu

Graduate Faculty: Joe Baldassarre, John B. Baldwin, Jeanne M. Belfy, Lynn Berg, J. Wallis Bratt, Marcellus Brown, Michael Fischer, James Andrew Goodman, James Jirak, Linda Kline-Lamar, David Mathie, Nicole Molumbby, Del Parkinson, Craig Purdy, Laura Rushing-Raynes, Michael Samball, David Saunders,
Adjunct Graduate Faculty: Irena Ravitskaya, Samuel Smith

Graduate Degrees Offered
- Master of Music, Music Education
- Master of Music, Performance
- Master of Music, Pedagogy

Master of Music
Graduate Program Coordinator: Jeanne Belfy
Morrison Center for the Performing Arts, Room C-309
Telephone 208 426-1216
e-mail: jbelfy@boisestate.edu

General Information
The Master of Music is a professional degree in music with emphasis in either 1) music education 2) performance or 3) pedagogy. The emphasis in education is designed to meet the needs of music education specialists who work in the public school system, grades K-12, or who aspire to further graduate study and teaching in music education. Music education students take courses specifically related to research and current trends, history, and philosophy in music education, as well as graduate courses in music theory and history. They are also required to progress in an applied area and participate in a music ensemble. Declaring an area of emphasis of either elementary, choral, or secondary instrumental, students structure elective credits to reflect their area, and conclude their studies with a culminating activity related to their emphasis.

Performance and pedagogy majors seek to improve their performance and studio teaching skills, possibly in preparation for a performance career, further graduate study, private studio teaching, and/or collegiate applied teaching. Their course work centers around applied study, music theory and history, and pedagogy and literature courses, and culminates in a graduate recital or other appropriate culminating project.

The Department offers four full graduate teaching and service assistantships, and a flexible number of additional assistantships are available through the Blue Thunder Marching Band program. A cooperative program for string students exists with the Boise Philharmonic Orchestra. Contact the Graduate Program Coordinator for further information.

Application and Admission Requirements
Admission will be granted to applicants who hold a Bachelor’s degree in music (BM, BA, or BS with a music major) from an accredited college or university, and who give promise of meeting the standards set by the Department of Music and the University. Students seeking Music Education Emphasis must possess the B.M.Ed. or equivalent with certification, and submit a teaching portfolio to include a formal writing sample, lesson plan samples including assessment tools, program sample, teaching video, and three letters of reference from professionals who are familiar with the applicant’s teaching. Students seeking admission to the Performance or Pedagogy Emphases must perform a satisfactory audition, in person, before the performance faculty of his/her major performance area (keyboard, winds, strings, etc.). Audition details are available from the Department of Music.

Before a graduate student can be admitted to Regular Status, predictive examinations in music history and music theory must be completed. The purpose of predictive examinations is to determine the student’s strengths and weaknesses so that an individual academic program can be formulated that will best serve the student’s needs. Any course
used to remove deficiencies does not count toward the degree. A student who has deficiencies will be granted Provisional Status in the graduate program. When deficiencies have been removed, the student may then seek Regular Status. A description of material covered on these examinations is available from the Department of Music.

### Degree Requirements

#### Master of Music, Music Education

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<th>Course Number and Title</th>
<th>Credits</th>
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**TOTAL** 32-33

*Total Music Theory and Music History credits earned may include but not be limited to Special Topics.*

#### Master of Music, Pedagogy

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**TOTAL** 31

*Total Music Theory and Music History credits earned may include but not be limited to Special Topics.*

#### Master of Music, Performance

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**TOTAL** 32-33

*Total Music Theory and Music History credits earned may include but not be limited to Special Topics.*
Course Offerings

MUS-APL – MUSIC APPLIED, PERFORMANCE CLASSES, RECITALS
MUS-APL 529 JAZZ IMPROVISATION (1-0-1)(F/S).
Private lessons in jazz improvisation. Intended primarily for instrumental majors, this performance-oriented course deals with the principles of jazz harmony and scalar theory. These principles will be applied to selected exercises and standard jazz literature. Students should possess above-average technical facility on their instrument and should have a working knowledge of music theory. Extra fee, non-waivable, per private lesson fee schedule, required. PREREQ: Graduate Standing and MUS 103 or PERM/INST.

MUS-APL 544 LECTURE/RECITAL (0-V-3). A full lecture/recital elected as the culminating project for the Master of Music degree, Music Education or Performance/Pedagogy emphasis major. The lecture is to demonstrate scholarly study on a selected topic and the recital is to present supportive musical examples. (Pass/Fail.) PREREQ: PERM/INST/CHAIR.

MUS-APL 546 GRADUATE SOLO PERFORMANCE RECITAL (0-V-3). A full recital to be presented as the culminating project for the Master of Music degree, Performance/Pedagogy emphasis. (Pass/Fail). PREREQ: PERM/CHAIR.

MUS-PRV – MUSIC PRIVATE LESSONS PERFORMANCE STUDIES
Students will be assigned on the basis of an audition. Performance, Technical Study, Musical Interpretation, Literature, and Teaching Technique will be stressed. All 500-level MUS-PRV courses are repeatable. See undergraduate Private Lesson Performance Studies course numbering system for explanation of course numbers.

MUS-PRV 501 (0-.5-1), 502 (0-.5-2), 504 (0-1-4).
Woodwind instruments private lessons.

MUS-PRV 511 (0-.5-1), 512 (0-.5-2), 514 (0-1-4).
Brass instruments private lessons.

MUS-PRV 521 (0-.5-1), 522 (0-.5-2), 524 (0-1-4).
Percussion instruments private lessons.

MUS-PRV 531 (0-.5-1), 532 (0-.5-2), 534 (0-1-4).
Voice private lessons.

MUS-PRV 541 (0-.5-1), 542 (0-.5-2), 544 (0-1-4).
Keyboard instruments private lessons.

MUS-PRV 551 (0-.5-1), 552 (0-.5-2), 554 (0-1-4).
Fretted string instruments private lessons.

MUS-PRV 561 (0-.5-1), 562 (0-.5-2), 564 (0-1-4).
Bowed string instruments private lessons.

MUS-ENS – MUSIC ENSEMBLE
All MUS-ENS courses may be repeated for credit.

MUS-ENS 321G MARCHING BAND (0-V-1)(F). Designed to promote participation in and repertoire knowledge of literature for marching bands. The marching band performs at all home and at least one away football game and occasionally at other university or civic events. Open to all students with the approval of the director. Graduate music students will be expected to assume leadership roles or will be assigned extra duties within the band and/or its organization.

MUS-ENS 501 UNIVERSITY SINGERS (0-2-1)(F,S).
Open to all, a campus and community choir that focuses on improving vocal technique and musicianship skills. No audition. Major choral works from all periods, public performances.

MUS-ENS 503 CHAMBER SINGERS (0-2-1)(F,S). Ten select singers specializing in vocal chamber music, emphasizing Medieval, Renaissance, and Baroque music. Active performance schedule both on campus and in the community. Membership by audition. PREREQ: Audition and/or PERM/INST.

MUS-ENS 505 MEISTERSINGERS (0-2-1)(F,S).
Advanced 42-voice concert-touring chorus, highest standards, very active performing schedule. Membership by audition. PREREQ: Audition and/or PERM/INST.

MUS-ENS 511 VOCAL JAZZ CHOIR (0-2-1)(F,S).
Designed to promote participation in and repertoire knowledge of literature for vocal jazz choirs. Public performances. PREREQ: Audition and/or PERM/INST.

MUS-ENS 512 WOMEN'S CHORALE (0-2-1)(F,S).
Specializing in choral literature for treble voices from all time periods, teaching vocal technique, musicianship, and sight-reading. Public performances. Membership by minimal audition. Public performances are given each semester. PREREQ: Audition and/or PERM/INST.

MUS-ENS 515 OPERA THEATER (0-5-1). Advanced study/experience in singing-acting technique and movement through performing in productions from the opera and/or musical theater repertoire. May be repeated for up to 4 credits maximum. PREREQ: PERM/INST.

MUS-ENS 518 EARLY MUSIC ENSEMBLE (0-3-1)(F,S).
Course explores European vocal and instrumental music from the Middle Ages, Renaissance and Baroque periods through performance. Graduate music students will be expected to assume leadership roles or will be assigned extra duties within the ensemble. Concert performances by students enrolled in the course are expected each semester. May be repeated for credit.

MUS-ENS 520 SYMPHONIC WINDS (0-5-1)(F,S).
Rehearsal attendance and performance with the select concert band of the University. PREREQ: Audition and/or PERM/INST.

MUS-ENS 522 TREASURE VALLEY CONCERT BAND (0-3-1) (F,S).
Rehearsal attendance and multiple performances with this full symphonic band comprising professionals and advanced adult musicians. PREREQ: PERM/INST.
MUS-ENS 526 JAZZ ENSEMBLE (0-3-1)(F,S). Rehearsal attendance and performance with the university big band jazz ensemble. PREREQ: Audition and/or PERM/INST.

MUS-ENS 540 PERCUSSION ENSEMBLE (0-2-1)(F,S). Rehearsal attendance and performance with the University percussion ensemble. PREREQ: PERM/INST.

MUS-ENS 550 ORCHESTRA (0-5-1)(F,S). Rehearsal attendance and performance with the university orchestra. Graduate students are expected to assume leadership roles or will be assigned extra duties within the orchestra and/or its organization. Audition required for new students. PREREQ: PERM/INST.

MUS-ENS 560 CHAMBER ENSEMBLE (0-V-1)(F,S). Participation in a faculty coached, official departmental chamber ensemble, resulting in a minimum of one public performance per semester. PREREQ: PERM/INST.

MUS-ENS 570 TROMBONE CHOIR (0-2-1)(F,S). Study and performance of the literature, including original and transcribed works for multiple tenor and bass trombones. Public performances each semester. PREREQ: PERM/INST.

MUS-ENS 585 DUO PIANO ENSEMBLE (0-2-1)(F,S). Survey of duo-piano literature, rehearsal and performance problems, resulting in public performance each semester. PREREQ: PERM/INST.

MUS – MUSIC, GENERAL

MUS 355G ROCK MUSIC: ITS PERFORMANCE AND HISTORY (3-0-3)(S)(Odd years). Survey of history and theory of rock music from primitive beginnings in nineteenth century to the present with primary focus on music from 1950 through 1970. Includes a final performance component. Graduate students will be expected to engage in current research on the subject matter. PREREQ: MUS 220 and PERM/INST.

MUS 423G SIXTEENTH-CENTURY COUNTERPOINT (3-0-3)(F)(Odd years). Study of 16th century compositional techniques. Compositions will be written in 2 to 4 voices, 5 species, C clefs and Latin texts. Analysis of/listening to music of the period. Additional compositions and/or research for graduate credit. PREREQ: MUS 220 or equivalent.

MUS 424G COUNTERPOINT SINCE 1600 (3-0-3)(F)(Even years). (3-0-3)(S). Study and writing in contrapuntal styles from Baroque period to present day. Invertible counterpoint, canon, fugue, invention, and analysis of procedures in representative works. Additional compositions and/or research for graduate credit. PREREQ: MUS 220.

MUS 454G SECONDARY GENERAL MUSIC METHODS (2-0-2)(S)(Odd years)(Alternate years). Methods and materials emphasizing the development of discriminating listening skills, expressive singing, reading and notating music, creating music, and understanding music’s role in contemporary society.

MUS 465G DICTION FOR SINGERS I (2-0-2)(F)(Odd years). A course designed for singers, devoted to the understanding of the International Phonetic Alphabet (IPA) system and the learning of the rules of pronunciation in Italian, Latin, and Spanish languages. Graduate students will additionally transcribe an entire song cycle or the songs of a proposed graduation recital. Required for all vocal performance majors and Master of Music vocal performance majors and strongly recommended for all voice emphasis majors. PREREQ: 1 year of MUS-PRV voice performance studies.

MUS 466G DICTION FOR SINGERS II (2-0-2)(S)(Even years). A continuation of MUS 465G Diction for Singers I, with emphasis on German, French, and English languages. Graduate students will additionally transcribe an entire song cycle or the songs of a proposed graduation recital. Required for all vocal performance majors and Master of Music vocal performance majors and strongly recommended for all voice emphasis majors. PREREQ: MUS 465G or PERM/INST.

MUS 472G ADVANCED METHODS FOR ELEMENTARY MUSIC TEACHING (3-0-3)(F)(Even years). Primarily for music majors. Emphasis on methods and materials for individualized instruction, special education, related arts, and listening lessons, as well as a study of the major contributions made to music education from the fields of educational philosophy and psychology. PREREQ: MUS 374.

MUS 501 HISTORY OF MUSIC IN THE UNITED STATES (3-0-3)(F,S). Designed for either the non-specialist or specialist in music, this course will survey the role which music has played in the development of American culture. Vernacular and art music, as well as social and historical interrelationships with music will be examined and discussed. History elective.

MUS 502 SURVEY OF JAZZ (3-0-3)(S). Explores interpretation of America’s original musical art form through listening and through discussion of socio-cultural contexts of jazz. Survey covers stylistic influences of nineteenth-century Africa and western Europe through current living exponents of jazz. In-depth book reviews and research papers on the subject are required. History elective. PREREQ: MUS 100 or MUS 101.

MUS 503 INTRODUCTION TO MUSIC RESEARCH (3-0-3)(F/S). This course will provide an introduction to the basic research literature pertinent to the student’s major area of emphasis; an interpretation of research findings; and the means to develop skills and techniques needed for the writing of an extended research paper, thesis and/or dissertation, articles for publication and book/performance reviews.

MUS 504 SURVEY OF ETHNOMUSICOLOGY AND WORLD MUSIC (3-0-3)(S)(Even years). This course considers the role of music in society and culture, and examines several musical traditions beyond the scope of Western art music. History elective. PREREQ: Admission to Master of Music program or PERM/INST.

MUS 505 SEMINAR IN CHORAL MUSIC:
PERFORMANCE PRACTICES AND STYLES (3-0-3)(F/S). An historical, generic survey of the repertoire in choral literature. Emphasis will be placed on facets of interpretation through a study of representative compositions from the standpoint of performance practice, analytic techniques, and the reading of primary sources of pertinent information.

MUS 506 SEMINAR IN INSTRUMENTAL MUSIC: PERFORMANCE PRACTICES AND STYLES (3-0-3)(F/S). Analysis and study of works from the Baroque through the present era. Particular attention will be paid to performance practices of ornamentation, style, tempo, scoring, dynamics, etc. Band transcriptions also included.

MUS 510 ADVANCED FORM AND ANALYSIS (3-0-3)(S). Analysis of harmonic and formal structures of the larger binary and ternary forms; the sonata, the symphony, the concerto, Baroque forms. Theory elective.

MUS 511 20TH-CENTURY MUSICAL STUDIES (3-0-3)(F/S). A study of 20th-century compositional techniques and performance practices through analysis, discussion of aesthetics, listening, performance, and creative writing. Contemporary techniques (and their notation), such as quartal harmonies, serialization, improvisation, electronic music, microtones, and multi-media will be explored, and their application to the secondary school music classroom will be discussed. Theory elective.

MUS 512 ELECTRONIC MUSIC APPLICATIONS (3-0-3)(F/S). A historical overview of electronic music and music technology. Hands-on experience with digital and analog synthesizers, effects processors, sampling, tape decks, computers and related software, and MIDI. Emphasis will be placed on the application of fundamental techniques of electronic music to creative composition. Theory elective.

MUS 515 SEMINAR IN MEDIEVAL THROUGH BAROQUE PERFORMANCE PRACTICES (3-0-3)(F/S). The study of music literature in Western Europe from the late Middle Ages through the Baroque period through the historical survey of performance practices and their practical application. History elective.

MUS 517 SEMINAR IN MODERN MUSIC: FORM AND STYLE: (1750-1980)(3-0-3)(F/S). The study of art music in the Western World from 1750 through the present, with emphasis on selected masterworks, including score analysis, performance practice, textual background and historical context. History elective.

MUS 520 MAJOR INSTRUMENT LITERATURE (3-0-3)(F/S). Advanced survey of the major instrument literature. The student will prepare a research paper on several typical or important works in the repertoire. Repeatable for credit for different instruments.

MUS 521 ADVANCED CONDUCTING (3-0-3)(F/S). Designed for secondary music teachers, this course provides opportunity to discover and analyze technical conducting problems, both instrumental and choral, in music of the various historical eras, which forms a significant part of the secondary school repertoire.

MUS 523 MAJOR INSTRUMENT PEDAGOGY I (3-0-3)(F). An advanced and in-depth investigation of pedagogical techniques, materials and principles used in the private teaching studio. Readings in the philosophy of teaching will be included. Repeatable for credit for different instruments.

MUS 524 MAJOR INSTRUMENT PEDAGOGY II (3-0-3)(S). Development of lesson plans and supervised studio teaching in both private and group settings. Recommended preparation: MUS 563. Repeatable for credit for different instruments.

MUS 525 CHORAL LITERATURE (2-0-2)(F). Survey course exploring choral works from all time periods. Though secular works will be discussed, special emphasis will be placed on tracing the development of the Mass, Motet, and Requiem throughout history. Strategies for teaching and performing these works will be discussed. Special projects include programming for elementary, secondary, and collegiate choirs.

MUS 526 ADVANCED METHODS AND TECHNIQUES FOR THE CHORAL INSTRUCTOR (3-0-3)(F/S). A study of causes and solutions for problems occurring in the choral rehearsal. Areas to be covered include instrumental methods and techniques, organization and repertoire planning.

MUS 527 ADVANCED METHODS AND TECHNIQUES FOR THE INSTRUMENTAL INSTRUCTOR (3-0-3)(F/S). A study of causes and solutions for problems occurring in the instrumental rehearsal. Areas to be covered include instrumental methods and techniques, organization and repertoire planning.

MUS 528 ADMINISTRATION OF SCHOOL MUSIC (3-0-3)(F/S). An advanced seminar in problems of music supervision and administration covering areas such as budget, scheduling,
curriculum, personnel and philosophy.

MUS 576 HISTORY AND PHILOSOPHY OF MUSIC EDUCATION (3-0-3)(F/S). Includes both an introduction to the history of music education in the United States, from colonial New England to the present; and alternate views about the philosophy of music, including aesthetic experience, aesthetic education, and the nature and meaning of music.