

from the late sixteenth to mid-nineteenth century: Mannerism, Baroque, Rococo, Neoclassicism and Romanticism.

Pre: consent

566 (3) Realism to Postmodernism

Historical survey of art, architecture and urban planning in Europe and America from the mid-nineteenth century to the present: Realism, Impressionism, Expressionism, Surrealism, Abstract Expressionism, Minimalism, Op Art, Pop Art, and Postmodern issues and trends. (F)

Pre: consent

568 (3) Design: History and Theory

Survey of Graphic Design, Industrial Design and Architecture from historical and theoretical perspectives. Design issues examined from formal and contextual point of view, using analysis strategies that consider style, composition, historical context, functional/propagandistic significance and communicative ability.

Pre: consent.

569 (3) Asian Art

Historical survey of the art and architecture of China, India, Korea and Japan from pre-history to the 19th century.

Pre: consent

570 (3) Print Studio

Continued investigation of advanced print making techniques and concepts. (F,S)

Pre: Art 470 or consent

575 (3) Photography

Expanding technical knowledge and visual awareness while building a portfolio in selected areas. (F,S)

Pre: consent

580 (3) Sculpture

Continuing development of a strongly personal means of aesthetic expression in three dimensions. (F,S)

Pre: Art 480 or consent

590 (1-6) Workshop

In depth investigation of a selected topic. (F,S)

592 (1-6) Art History Seminar

Specific problems in art emphasizing both individual research and contributions to the seminar group on advanced, in-depth topics.

Pre: consent

594 (3) Topics

Lecture/discussion/studio course on a selected area of discourse relating to the study of Art History, Art Criticism, Art Education or Art Studio. May focus on a specific artist, style period, cultural group or technical or methodological problem.

600 (1-9) Graphic Design

Advanced graduate level graphic design and graphic communication problems. May be repeated. (F,S)

Pre: Art 500 or consent

601 (3) Introduction to Research in Art

Introduction to the modes of research appropriate to art including creative research studies and investigative thesis research.

Pre: consent

605 (1-9) Graduate Art Studio

Graduate level course for all studio specializations. May be repeated.

Pre: one 500 level course in the studio specialization.

610 (1-9) Drawing

Continued exploration of drawing techniques and concepts at the graduate level.

May be repeated. (F,S)

Pre: Art 510 or consent

630 (1-9) Fibers

Advanced graduate level textile fabrication. Should produce a consistent body of work. May be repeated. (F,S)

Pre: Art 530 or consent

640 (1-9) Painting

Graduate painting, emphasizing development of individual vision. May be repeated. (F,S)

Pre: Art 540 or consent

645 (1-9) Watercolor

Independent creative development. May be repeated.

Pre: Art 545 or consent (F,S)

650 (1-9) Ceramics

A graduate course emphasizing further development and refinement of a body of work in preparation for a thesis and examination. May be repeated. (F,S)

Pre: Art 550 or consent

670 (1-9) Print Studio

Graduate level printmaking. May be repeated. (F,S)

Pre: Art 570 or consent

675 (1-9) Photography

Refinement of technical skills, seeing, and critical abilities while producing a significant body of work. May be repeated. (F,S)

Pre: Art 575 or consent

677 (1-9) Individual Study

Creative and technical problems or research in selected area. All students must file a special form in department office at time of registration. (F,S)

Pre: consent

680 (1-9) Sculpture

Continuing development of a strongly personal means of aesthetic expression in three dimensions. May be repeated. (F,S)

Pre: Art 580 or consent

692 (1-6) Art History Grad Seminar

Specific problems in art emphasizing both individual research and contributions to the seminar group on advanced, in-depth topics appropriate for graduate students.

Pre: consent

694 (1-2) Alternate Plan Paper

Alternate plan paper in lieu of thesis, done in cooperation with major professor. (Credit is "incomplete" until final approval by student's graduate committee.) (F,S)

Pre: consent

697 (1-12) Internship

Field experience in professional setting relating to the specialization: graphic design, museum or arts administration, etc. (F,S)

Pre: consent

699 (3-6) Thesis

Required of all candidates for the Master of Science or Master of Arts degrees. May be creative project or brochure exhibition option. (Credit is "incomplete" until final approval by student's graduate committee.) (F,S)

Pre: consent

AUTOMOTIVE ENGINEERING TECHNOLOGY

*College of Science, Engineering & Technology
Department of Automotive and Manufacturing
Engineering Technology*

205 Trafton E • 507-389-6383 • Fax 507-389-5002

Chair and Graduate Coordinator: Dr. Harry Petersen, Ph.D.

Ann Goebel, MS; Gary Mead, MS; Bruce Jones, Ph.D.; Andrzej Markowski, Ph.D.; Paul Sullivan, Ph.D.

Although there is no graduate degree program in Automotive Engineering Technology, graduate work is possible. By combining courses in AET with courses in other programs, a student may create a graduate program leading to a Master of Science degree in Multidisciplinary Studies. Also, 10 credits of AET course work can be used to meet the requirements of the Master of Science: Manufacturing Engineering Technology degree. For further information, contact the department chairperson at 507-389-6383.

COURSE DESCRIPTIONS

AET 535 (1-4) Automotive Design & Construction

Involves designing and building of prototype vehicles. Topics include: vehicle design decisions, rules, budgets, chassis design, body and aerodynamics, drive train choices, construction techniques, and test procedures. An actual experimental car will be built in this class. May be repeated.

BIOLOGY

AET 568 (4) Automotive Research Methods & Design of Experiments

Automotive research techniques and equipment form the basis for this course. Environmental measurement, air flow testing, engine dynamometer testing, and vehicle performance measurement are covered. Emphasis is placed on research procedures, data acquisition and interpretation, and technical report writing. Current research projects from the automotive industry are also examined.

Prerequisite: AET 366, STAT 154

AET 592 (1-4) Seminar: Automotive

Selected automotive topics.

AET 637 (1-3) Automotive Emission Design and Measurement

An in-depth laboratory experience involving the evaluation of existing automotive emission control systems and the design or modification of those systems. Emission testing using chemical analysis and chassis dynamometer as required in state and federal test procedures is also included.

AET 638 (1-3) High Performance Engineering

This course is intended for individuals wishing to be employed in professional automotive racing as a product development engineer, technical representative for a race product supplier, or race engineer. An in-depth study of vehicle dynamics and engine design utilizing on-board data acquisition, air flow measurement, and the engine dynamometer.

AET 647 (1-3) Advanced Automotive Emissions and Measurement

A continuation of AET 637.

AET 648 (1-3) Advanced High Performance Engineering

A continuation of AET 638.

AET 677 (1-4) Individual Study

AET 694 (1-2) Alternate Plan Paper

AET 697 (1-5) Internship: Automotive

Automotive work experience in an area pertinent to the student's objective. Registration required prior to beginning employment.

AET 699 (2-4) Thesis

BIOLOGY MS

BIOLOGY EDUCATION MS

(DISCIPLINE-BASED)

College of Science, Engineering, & Technology

Department of Biological Sciences

242 Trafton Science Center S • 507-389-2786

Chair: Gregg Marg, Ph.D.

Graduate Coordinator: Steve Mercurio, Ph.D.

Daryl Adams, Ph.D.; Michael Bentley, Ph.D.; William Bessler, Ed.D.; Christopher Conlin, Ph.D.; John Frey, DA; Marilyn Hart, Ph.D.; Keith Klein, Ph.D.; Penny Knoblich, DVM, Ph.D.; John Krenz, Ph.D.; Mark Lyte, Ph.D.; John Madsen, Ph.D.; Alison Mahoney, Ph.D.; Gregg Marg, Ph.D.; Brock McMillian, Ph.D.; Donovan Nielsen, Ph.D.; Bertha Proctor, Ph.D.; Christopher Ruhland, Ph.D.; Robert Sorensen, Ph.D.; Edward Williams, Ph.D.; Dorothy Wrigley, Ph.D.

The Biological Sciences graduate program is designed flexibly to allow students, with their advisors, to mold and focus their program of study on professional interests and specific needs. To do this, students can draw from a broad range of graduate courses and select from a diverse and well-trained faculty for direction in research.

The Department of Biology is located in Trafton Science Center one of the best science buildings in the state university system. Trafton Science Center presents an open, collaborative atmosphere for graduate study and research, and includes well-equipped research and classroom laboratories. Another attractive feature is Biology's proximity to other science departments, whose faculty members provide opportunities for multidisciplinary study in chemistry, mathematics, computer science, physics and electrical engineering.

The department's modern facilities provide opportunities for research and teaching, with 18 research laboratories, plus support areas. Among those are a media kitchen, environmental chambers, animal complex, greenhouse, dishwashing facility, herbarium, museum and a garage for field equipment. The department's equipment is suitable for biological investigations ranging from ecosystem analysis to subcellular physiology.

Instrumentation available includes transmission and scanning electron microscopes, ICP, ultracentrifuges, diode array spectrophotometers, graphite furnace AA, scintillation counter, gas chromatographs with FID, ECD and MSD, ultrafreezers, computer-controlled physiology data acquisition, Coulter counter, fermentation facility, freeze dryers, thermocyclers (PCR) and other equipment necessary for modern biological research opportunities.

All members of the biology graduate faculty hold doctorates and have extensive research experience. Areas of concentration in research and teaching are Biology Education, Microbiology, Human Biology/Physiology, Environmental Science, Ecology, and Plant Science. Sub areas of teaching specialization include cellular biology, developmental biology, plant and animal ecology, genetics, parasitology, immunology, entomology, and aquatic biology.

Approximately 25 graduate teaching assistantships (TA) are available each year to qualified applicants. A minimum 3.0 GPA in undergraduate courses in math, chemistry, biology and physics and a 600 TOEFL are required for consideration of a TA. Research assistantships are also offered, depending on external funding. Applications should be submitted by February 3 to the Biological Sciences Department. Although the first selection of assistantships occurs in March for the following academic year, the department encourages applications year-round because periodic openings occur.

Admission. In addition to completing the minimum requirements for the College of Graduate Studies and Research, admission to the Biology program must be approved by the Biology Graduate Committee prior to completion of 16 credits of graduate coursework.

For admission to the Biology Program, applicants must provide a one-page statement of career interests and goals. In addition, the applicant must have an undergraduate degree in Biology from an accredited, four-year institution or in another field of science with evidence of having had the following equivalent undergraduate biology core: Biology I (BIO 105), Biology II (BIO 106), Genetics (BIO 211), and two of the following: General Ecology (BIO 215), Cell Biology (BIO 320) or physiology course including laboratory. Students lacking one or more of the above courses may be admitted to the program on the condition that the deficiencies will be rectified during their first year in the program.

In addition, a booklet, "Graduate Studies in Biology," is issued to help each student and advisor keep the graduate program on schedule.

Requirements. The Written Comprehensive Examination may be required at the discretion of the Examining Committee. The Oral comprehensive Examination is required for each degree candidate and it will include an open seminar on the candidate's research. The candidate will distribute seminar announcements to department faculty at least one week prior to the seminar.

BIOLOGY MS

(Thesis Plan - 30 credits)

(Alternate Plan Paper - 34 credits)

Required Core (11 credits)

BIOL 601 Biometrics (2)

BIOL 602 Research Methods/Proposal (2)

BIOL 695 Graduate Seminar (1) (3 Seminar credits required)

BIOL 619 Selected Topics (2-3) (4 Selected Topics credits required)

ENVI 619 Selected Topics (3)

(may be taken to satisfy 3 credits of the BIOL 619 requirement)

Required Electives (19-23 credits)

Choose any 500/600 level Biology courses in consultation with an advisor

Required Thesis or Alternate Plan Paper

BIOL 694 APP (1-2)

BIOL 699 Thesis (3-6)

BIOLOGY EDUCATION MS

(DISCIPLINE-BASED)

(Thesis Plan - 30 credits)

(Alternate Plan Paper - 34 credits)

Teaching licensure is a prerequisite to pursuing this degree which is for teachers interested in enrichment in a teaching area. This degree does not lead to initial teaching licensure. Students who desire initial licensure should consult the Master of Arts in Teaching (MAT) program. Please see the section concerning the MAT program that is listed in this bulletin.

Required Core (11 credits)

BIOL 601 Biometrics (2)

BIOL 602 Research Methods/Proposal (2)