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### **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

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## **AUTOMOTIVE ENGINEERING TECHNOLOGY**

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

E205 Trafton • 507-389-6385 • Fax 507-389-5002

Chair and Graduate Coordinator: Kirk Ready, Ed.S.

Ann Goebel, MS, Bruce Jones, Ph.D.; Andrzej Markowski, Ph.D.; Harry Peterson, Ph.D.; Paul Sullivan, Ph.D.

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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 Multi-disciplinary Studies. Also, 10 credits of AET coursework 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.

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## COURSE DESCRIPTIONS

### **535 (1-4) Automotive Design and 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.

### **568 (4) Automotive Research and Design**

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.

Pre: AET 366, STAT 154

### **592 (1-4) Seminar: Automotive**

Selected automotive topics.

### **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.

### **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.

### **647 (1-3) Advanced Emission Design & Measurement**

A continuation of AET 637.

### **648 (1-3) Advanced High Performance Engineering**

A continuation of AET 638.

### **677 (1-4) Individual Study**

### **692 (1-4) Seminar: Automotive**

Selected automotive topics.

### **694 (1-2) Alternate Plan Paper**

### **697 (1-5) Internship: Automotive**

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

### **699 (2-4) Thesis**

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## BIOLOGY MS

### **BIOLOGY EDUCATION MS**

(DISCIPLINE-BASED)

*College of Science, Engineering, & Technology  
Biological Sciences Department  
S242 Trafton Science Center • 507-389-2786*

Chair: Bill Bessler, Ed.D.

Graduate Coordinator: Steve Mercurio, Ph.D.

Daryl Adams, Ph.D., Neil Ballard, Ph.D., Michael Bentley, Ph.D., Hyung Tae Choe, Ph.D., Christopher Conlin, Ph.D., John Frey, D.A., Merrill Frydendall, Ph.D., Fred Goetz, Ph.D., Don Gordon, Ph.D., Ronald Hybertson, Ph.D., Keith Klein, Ph.D., Penny Knoblich, DVM, Ph.D., Robert Lebowitz, Ph.D., Mark Lyte, Ph.D., Gregg Marg, Ph.D., Donovan Nielsen, Ph.D., Bertha Proctor, Ph.D., Henry Quade, 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 Biology Department is located in Trafton Hall - one of the best science buildings in the state university system. Trafton 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 13 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 doc-