Other Graduate Courses
The 400- and 500-level courses listed below are offered by Southern Illinois University for graduate credit.

AGRICULTURE
Courses (AGRI)
401-3 Fundamentals of Environmental Education. (Same as Forestry 401 and Recreation 401) A survey course designed to help education majors develop an understanding of environmental education principles and teaching both inside and outside the classroom. Requires field trip transportation fee not to exceed $25 per course registration. Prerequisite: ten hours of biological science or ten hours of recreation and/or education, or consent of instructor.

423-3 Environmental Interpretation. (Same as Forestry 423 and Recreation 423) Principles and techniques of natural and cultural interpretation. Two hours lecture, three hours laboratory. Requires field trip transportation fee not to exceed $40 per course registration. Prerequisite: ten hours biological science or ten hours of recreation.

450-2 Farming Systems Research and Development. An introduction to farming systems, which is an interdisciplinary approach to agricultural research and development emphasizing small farms. The whole farm is viewed as a system of interdependent components controlled by the farm household. Focuses on analyzing interactions of these components as well as the physical, biological and socioeconomic factors not controlled by the household. Techniques of analysis are applicable domestically and internationally.

595-1 to 6 Instruction in Agricultural Sciences. Acquaints the student with different teaching environments and styles. Students will be expected to participate in instructing agricultural sciences courses. Special approval needed by the instructor.

ENGINEERING TECHNOLOGY
Courses (ET)
There is no graduate program offered through engineering technology. See manufacturing systems for graduate program description. Four-hundred-level courses in this listing may be taken for graduate credit unless otherwise indicated in the course description.

The student is required to purchase photographs and maps for certain courses, and a suitable slide rule is strongly recommended for most courses. Cost is approximately $10 to $25.

403A-4 Electronic Circuit Analysis. This course studies fundamental solid-state electronic concepts, the application and design of transistor amplifiers, and operational amplifiers, and the analysis and design of field effect transistor (FET) amplifiers. Course topics include the ideal operational amplifier, diodes, rectifiers, analysis and design of bipolar transistors (BJT) amplifiers, and the analysis and design of field effect transistor (FET) amplifiers. A laboratory emphasizes electronic circuit design and analysis. Prerequisite: ET 304B.

403B-4 Electricity Application and Design. This course focuses on system-level design and application of electronic circuits. Circuits include linear integrated circuits, quasi-linear circuits, integrated digital circuits, and pulse waveform generating and timing circuits. Topics include power amplifiers, Schmitt triggers, comparators, timers and active filters. A design laboratory allows students to implement several design projects with increasing complexity. Prerequisite: ET 403A.

413-4 Field Survey Problems. Perform extensive field projects in the areas of engineering, hydrographic, land and control surveying. To be held at Crab Orchard National Wildlife Refuge. Course must be taken concurrently with 414. Prerequisite: 263 and one of 361, 362 or 363.

414-2 Field Project Planning and Computations. Planning, organization, computations, and drafting of field survey projects including the needed mapping utilizing calculators, computers, and CAD. This course must be taken concurrently with 413. Prerequisite: 263 and one of 361, 362 or 363.

437A-4 Wireless Communication Fundamentals. This course introduces students to wireless communication theory and application. This course covers topics in radio wave propagation, high frequency transmission lines, waveguides, and antennas. Students study wireless systems and frequency spectrum. This course covers electromagnetic waves, radio frequency power losses and transmission line efficiency. A laboratory gives experiences in high frequency measurement. Prerequisite: ET 304B.

437B-4 Wireless Communication Systems. This course introduces students to radio frequency signals, transmitters, receivers, and various types of modulation used in wireless communications. It covers RF signal analysis and modulation theory. Students study theory, design and application of circuit blocks. Laboratory design exercises produce functional communication system blocks that are assembled into high frequency receiver for demonstration. Prerequisite: ET 403A and ET 437A.
438B-3 Sequential Digital Control and Data Acquisition. Concepts and components used in data acquisition and sequential control systems. The course covers sensors, signal conditioning, analog-to-digital/digital-to-analog conversion devices, relay logic design and programmable logic controllers. A laboratory demonstrates lecture topics and gives students experience with data acquisition and control languages and ladder logic programming within a design team. Prerequisite: ET 438A, ENGR 222B or CS 202.

439-4 Microprocessor Applications and Design. This course introduces embedded systems design and microcontroller programming. Students study microcontroller architectures and design applications. The course emphasizes interfacing microcontrollers with sensors and actuators. Software tools like Matlab and Simulink aid in visualization and Model-Based Design. A laboratory provides programming/design experience. Prerequisite: ET 238, ENGR 222B, or CS 202.

445-3 Computer-Aided Manufacturing. (Same as Industrial Technology 445) Introduction to the use of computers in the manufacturing of products. Includes the study of direct and computer numerical control of machine tools as well as interaction with process planning, inventory control and quality control. Laboratory. Prerequisite: IT 105 or IT 110, IT 208 or ET 209.

455-3 Industrial Robotics. (Same as IT 455) Study of robotics within a wide variety of application areas. Topics covered include classification of robots, sensor technology, machine vision; control systems, including programmable logic controllers (PLCs); robot safety and maintenance; and economic justification of robotic systems. Prerequisite: IT 445 or concurrent enrollment.

FASHION DESIGN AND MERCHANDISING

Courses (FDM)

431-3 Ethnic Dress. The study of ethnic dress in non-western cultures, with attention to aesthetics, symbolism and uses of ethnic dress. Cultures studied may vary with each offering. May be repeated for credit.

432-3 Historic Clothing: Western Cultures. Development of clothing in Western civilization to 1850. Consideration of social, economic, aesthetic factors and technical innovations influencing clothing.

433-3 History of Western Costume, 1860 to Present. Evolution of Western costume from 1860 through the present time. Emphasis on the interrelationship between costume, social, political, economic, and technical change.

434-3 Fashion Product Analysis. Examines how quality and value of apparel products are visually evaluated by industry and consumers. Prerequisite: FDM 101, 241.

436-3 Fashion Motivation. Psychologcal motivation for wearing clothing, societal functions of clothing, cultural differences in dress. Prerequisite: FDM 102.

481-3 Contemporary Issues in Fashion. A forum geared toward seniors and graduate students in fashion design and merchandising that focuses on current issues in the softgoods industry. May re-enroll for a maximum of six credits.

482-3 Fashion Merchandising. Focus on the entire process of fashion merchandising: strategic planning; branding; trend forecasting; consumer research; product development; buying, pricing, and costing; product sourcing or manufacturing; retail operations; and presentation to the consumer. Prerequisite: FDM 381.

490-1 to 4 Readings. Supervised reading for qualified students in the area of Fashion Design and Merchandising.

493-1 to 5 Advanced Occupational Skills. Modern occupational practice in fashion design and merchandising for experienced professionals seeking advanced techniques.

494-1 to 4 Workshop. Current work education issues for teachers, supervisors and administrators.

495-2 to 12 Instructional Internship. Internship in approved education and/or training centers. Intern instructor will increasingly assume responsibilities for preparing, presenting and guiding occupational learning in fashion design and merchandising.

496-2 to 12 Professional Internship. Provides a supervised experience in a professional setting in the fashion industry. Activities must be related to the student's academic program and career objectives. Reports and assignments are required to be completed by the student. Mandatory pass/fail.

497-1 to 6. Practicum. Application of work education skills and knowledge. Cooperative arrangements with corporations and professional agencies to study under specialist. Prerequisite: twenty hours in specialty.

498-1 to 5 Special Problems. Investigation of work education problems in fashion design and merchandising.

INDUSTRIAL TECHNOLOGY

There is no graduate degree program offered through industrial technology. See Manufacturing Systems for graduate program descriptions.

Courses (IT)

405-4 Applied Robotics and Control Lab. Laboratory experiments to familiarize the student with writing robotic programs for performing specific tasks, developing and debugging PLC code, integrating robotic programming and PLC programming in the control of a robotics cell, developing basic programming skills using computer simulation
packages; milling and lathing applications of CNC machining. Prerequisite: IT 445 or ET 445 and IT 455 or concurrent enrollment in both.

425-3 Advanced Process Design and Control. Extension of other process courses offered. Meets the need of those students who enter the field of manufacturing by giving more emphasis on planning, estimating and control of industrial processes. Laboratory. Prerequisite: 208, 209.

430-3 Health and Injury Control in a Work Setting. (Same as Health Education 430) Assesses the health and injury control programs present in a work setting. Emphasis given to employee programs in health, wellness and injury control that are effective. Field trips to work sites are included.

440-3 Manufacturing Policy. Review of all areas covered by the industrial technology program. Includes problems which simulate existing conditions in industry. Students present their solutions to the class and to the instructor in a formal manner. Prerequisite: IT 375, 392.

445-3 Computer-Aided Manufacturing. (Same as Engineering Technology 445) Introduction to the use of computers in the manufacture of products. Includes the study of direct and computer numerical control of machine tools as well as interaction with process planning, inventory control and quality control. Laboratory. Prerequisite: Industrial Technology 105 or Industrial 110, Industrial 208 or Engineering technology 209.

450-3 Project Management. This course is designed to provide students with an overview of the project management process followed by an in-depth examination of the activities needed to successfully initiate, plan, schedule, and control the time and cost factors of the project. Prerequisite: None.

455-3 Industrial Robotics. (Same as ET 455) Study of robotics within a wide variety of application areas. Topics covered include classification of robots, sensor technology, machine vision; control systems, including programmable logic controllers (PLCs); robot safety and maintenance; and economic justification of robotic systems. Prerequisite: IT 445 or concurrent enrollment.

465-3 Lean Manufacturing. This course will cover the principles and techniques of lean manufacturing. Major topics covered include lean principles, 5S, value stream mapping, total productive maintenance, manufacturing/office cells, setup reduction/quick changeover, pull system/Kanbans, continuous improvement/Kaizen, lean six sigma, lean simulation, and other modern lean manufacturing techniques and issues.

470A-3 Six Sigma Green Belt. Study the knowledge areas of Six Sigma Green Belt. Topics include six sigma goals, lean principles, theory of constraints design for six sigma, quality function deployment, failure mode and effects analysis, process management, team dynamics, project management basics, data and process analysis, probability and statistics, measurement system analysis, and process capability.

470B-3 Six Sigma Green Belt. Study the knowledge areas of Six Sigma Green Belt. Topics include exploratory data analysis, correlation and regression, hypothesis testing, single-factor ANOVA, design of experiments basics, implement and validate solutions, statistical process control, and control plans. Prerequisite: IT470A, or consent of instructor.

475-3 Quality Control. Study the principles and techniques of modern quality control practices. Topics include total quality management, fundamentals of statistics, control charts for variables and other quality related issues and techniques. Prerequisite: senior standing.

480-3 Six Sigma Black Belt. Study the knowledge areas of Six Sigma Black Belt. Topics include analysis of variance, fractional factorial experiments, Taguchi robustness concepts, response surface methodology, robust design and process, and other advanced six sigma principles and techniques. Prerequisite: IT470A, B, or consent of instructor.

485-3 Quality Control II. Study the principles and techniques of modern quality control practices. Topics include fundamentals of probability, control charts for attributes, acceptance sampling systems, reliability and other quality related issues and techniques. Prerequisite: senior standing.

490-3 Six Sigma. Six Sigma is a data-driven management system with near-perfect-performance objectives that has been employed by leading corporations. Its name is derived from the statistical target of operating with no more than 3.4 defects per one million chances, but its principles can be applied in business of all types to routinely reduce costs and improve productivity. This overview describes what Six Sigma is, and what its techniques and tools are. Prerequisite: 475.

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MEDICAL EDUCATION PREPARATION

No graduate degree program is offered through medical education preparation. Four-hundred-level courses may be taken for graduate credit only with written permission of the relevant department and the graduate dean.

Courses (MEDP)

400A-1 MEDPREP Seminar-Orientation. Seminar on social, professional, and scientific issues of interest to students planning a career in medicine or dentistry. Required of first-year MEDPREP participants. Restricted to MEDPREP students. Must be taken in a, b, c sequence. Mandatory Pass/Fail.

400B-1 MEDPREP Seminar-Medical/Dental Seminar I. Seminar on social, professional, and scientific issues of
interest to students planning a career in medicine or dentistry. Required of first-year MEDPREP participants. Restricted to MEDPREP students. Must be taken in a,b,c sequence. Mandatory Pass/Fail.

400C-1 MEDPREP Seminar-Medical/Dental Seminar II. Seminar on social, professional, and scientific issues of interest to students planning a career in medicine or dentistry. Required of first-year MEDPREP participants. Restricted to MEDPREP students. Must be taken in a,b,c sequence. Mandatory Pass/Fail.

401A-1 to 3 per topic MEDPREP Skills-Academic Enrichment. Focus on skills critical for academic success in preprofessional and professional training. Required of all students. Restricted to MEDPREP students.

401B-1 to 3 per topic MEDPREP Skills-Prematriculation (P/F only). Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401C-1 to 3 per topic MEDPREP Skills-Quantitative Skills (P/F only). Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401D-1 to 3 per topic MEDPREP Skills-Problem Solving (P/F only). Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401E-1 MEDPREP Skills-Convocation (S/U only). Focus on skills critical for academic success in preprofessional and professional training. Required of all students. Restricted to MEDPREP students.

401F-1 to 3 per topic MEDPREP Skills-Verbal Reasoning and Writing I. Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401G-1 to 3 per topic MEDPREP Skills-Verbal Reasoning and Writing II. Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401H-1 to 3 per topic MEDPREP Skills-Verbal Reasoning and Writing III. Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students.

401I-1 MEDPREP Skills-Career Development Skills (P/F only). Focus on skills critical for academic success in preprofessional and professional training. Required of all students. Restricted to MEDPREP students.

402A-1 to 2 per topic MEDPREP Special Problems-MCAT/DAT Orientation. Seminars, workshops, lectures, and field experiences related to preparing the student for medical/dental school and careers in medicine or dentistry. Restricted to MEDPREP students.

402B-1 to 2 per topic MEDPREP Special Problems-Research Seminar. Seminars, workshops, lectures, and field experiences related to preparing the student for medical/dental school and careers in medicine or dentistry. Restricted to MEDPREP students.

402C-1 to 2 per term; up to 12 total MEDPREP Special Problems-Clinical Experience, mandatory P/F. Seminars, workshops, lectures, and field experiences related to preparing the student for school and careers in medicine/dentistry. Restricted to MEDPREP students.

402D-3 MEDPREP Special Problems-Problem-Based Learning (P/F only). Seminars, workshops, lectures, and field experiences related to preparing the student for medical/dental school and careers in medicine or dentistry. Restricted to MEDPREP students.

402E-1 to 2 per topic MEDPREP Special Problems-Independent Readings. Seminars, workshops, lectures, and field experiences related to preparing the student for medical/dental school and careers in medicine or dentistry. Restricted to MEDPREP students.

402F-1 to 2 per topic MEDPREP Special Problems-Independent Research. Seminars, workshops, lectures, and field experiences related to preparing the student for medical/dental school and careers in medicine or dentistry. Restricted to MEDPREP students.

403A-1 to 3 MEDPREP Biology Applications-Medical Genetics. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403B-1 to 3 MEDPREP Medical Pharmacology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403C-1 to 3 MEDPREP Biology Applications-Cardiovascular Physiology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration) or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403D-1 to 3 MEDPREP Biology Applications-Embryology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403E-1 to 3 MEDPREP Biology Applications-Medical Immunology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403F-1 to 3 MEDPREP Biology Applications-Hormonal Regulation. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403G-1 to 6 MEDPREP Biology Applications-Biology Applications. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.
403H-1 to 6 MEDPREP Biology Applications-Neural Science. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

403I-1 to 3 MEDPREP Biology Applications-Biology Problem Solving. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

404A-1 to 3 per topic MEDPREP Chemistry Applications-Inorganic Chemistry Applications. Content may be supplemental (to concurrent preprofessional chemistry courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

404B-1 to 3 per topic MEDPREP Chemistry Applications-Inorganic Chemistry (For Dental Students). Content may be supplemental (to concurrent preprofessional chemistry courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

404C-1 to 3 per topic MEDPREP Chemistry Applications-Organic Chemistry Applications. Content may be supplemental (to concurrent preprofessional chemistry courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

404D-1 to 3 per topic MEDPREP Chemistry Applications-Organic Chemistry for Dental Students. Content may be supplemental (to concurrent preprofessional chemistry courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

404E-1 to 3 per topic MEDPREP Chemistry Applications-Biochemistry. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program.

404F-1 to 3 per topic MEDPREP Chemistry Applications-Chemistry Problem Solving. Content may be supplemental (to concurrent preprofessional chemistry courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students.

405A-1 to 6 per topic MEDPREP Physics Applications. Content may be supplemental (to concurrent preprofessional physics courses), additional (permitting acceleration), or preparational for the MCAT. Restricted to MEDPREP students.

405B-1 to 3 per topic MEDPREP Physics Applications-Physics Problem Solving. Content may be supplemental (to concurrent preprofessional physics courses), additional (permitting acceleration), or preparational for the MCAT. Restricted to MEDPREP students.

503B-1 to 3 Medical Pharmacology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT. Restricted to MEDPREP students enrolled in Master's level program.

503E-1 to 3 MEDPREP Medical Immunology. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program.

504E-1 to 3 Biochemistry. Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program.

SCIENCE

Courses (SCI)

500-2 Science Information Sources. Methods and procedures to efficiently exploit the scientific literature are discussed. The two-hour class discussion will be supplemented by practical exercises in library usage. Prerequisite: consent of instructor.


502-4 (2,2) Research Scanning Electron Microscopy. (a) Theory of design for scanning electron microscope, lenses, vacuum systems, alignment, specimen preparation for biologists and materials scientists, darkroom. (b) Laboratory practical experience in use of scanning electron microscope and specimen preparation. Laboratory fee $100.

503A-1 to 3 Science for Elementary School Teachers. In-depth studies of selected basic concepts in general science for teachers of upper-level elementary grades. Topics include cells and simple organisms, characteristics of vertebrates, plate tectonics, solar system, nature of matter and magnetism. Prerequisite: currently teaching in an elementary school.

503B-1 to 3 Science for Elementary School Teachers. In-depth studies of selected basic concepts in general science for teachers of upper-level elementary grades. Topics include human biology, characteristics of high plants, Earth's building blocks, the atmosphere, forces and simple machines. Prerequisite: currently teaching in an elementary school.

504-9 (1 to 3 per topic) Selected Topics in Science for Teachers. The course consists of selected basic concepts in general science for practicing teachers. Within a given
semester a broad area is selected within either the biological sciences or the physical/earth sciences. Topics currently include: (a) Basic stream ecology; (b) Biological assessment of polluted streams; and, (c) Wetland ecosystems. Other topics may be added as deemed necessary. This course may not be used for graduate credit by College of Science majors. Prerequisite: currently teaching in an elementary school.