

EENG 5900. Special Problems. 1–3 hours. Independent research of a specific problem in a field of electrical engineering. A report is required defining the problem and a solution. Prerequisite(s): consent of instructor.

EENG 5932. Internship. 1–3 hours. Supervised work in a job that meets specific educational objectives of the department and is beneficial to the student's career development. Required submission of a final report summarizing industrial experience gained through the internship. Prerequisite(s): consent of department.

EENG 5940. Advanced Topics in Electrical Engineering. 1–3 hours. Contemporary topics at the advanced graduate elective level. Faculty present advanced elective topics not included in the established curriculum. Prerequisite(s): consent of instructor. May be repeated for credit as topics vary.

EENG 5950. Master's Thesis. 3–6 hours. To be scheduled only with consent of department. No credit assigned until thesis has been completed and filed with the School of Graduate Studies. Prerequisite(s): consent of department.

Electrical Engineering Technology

see *Undergraduate Catalog*

Elementary Education

see Teacher Education and Administration

Emergency Administration and Planning

see *Undergraduate Catalog*

Engineering Technology

Construction Engineering Technology – see *Undergraduate Catalog*

Electrical Engineering Technology – see *Undergraduate Catalog*

Engineering Technology – see *Undergraduate Catalog*

Engineering Systems, Master's Courses, MSES

MSES 5010. Seminar in Engineering Systems. 3 hours. In-depth examination of current theories, research, trends and processes of industry. Readings, individual study and research, information exchange and guest lectures provide an understanding of selected industrial topics. May be repeated for credit.

MSES 5020. Design of Experiments. 3 hours. A study of industrial analytical techniques used to develop new products and new technologies, including the use of engineering software for design purposes.

MSES 5030. Product Design and Development. 3 hours. Formal development of the process of designing a product, including ideas generation, engineering development, modeling and analysis, and project planning and management.

MSES 5040. Analytical Methods for Engineering Systems. 3 hours. Procedures for confidently detecting variances from specification in manufactured products; applications of matrix manipulations for multivariate analysis, engineering applications of residues calculated from circular integrals, integration and differentiation of 3-dimensional engineering functions.

MSES 5060. Technology Innovation. 3 hours. Topics include understanding innovation, processes of technology innovation, techniques of technology innovation (TRIZ), planning for innovation, using innovation technology, and engineering technologies case analyses.

MSES 5100. Nontraditional Manufacturing Processes. 3 hours. Analysis of selected contemporary and emerging manufacturing/production processes utilizing high-level automation, productivity-enhancing technologies and/or specialty technologies; emphasis on process structure, organization, economics and application within the industrial environment.

MSES 5120. Computer-Integrated Manufacturing. 3 hours. (2;2) Computerization in manufacturing/production from an integrated systems perspective; emphasis on selected contemporary and emerging applications such as design/documentation, engineering analysis, process planning, machine tool programming, automated material handling and inspection, and factory networking.

MSES 5130. Product Reliability and Quality. 3 hours. Processes and techniques of assuring the quality of industrial products; reliability and maintainability, sampling probability and statistical process control; quality control management.

MSES 5150. Applications of Electron Microscopy and Failure Analysis. 3 hours. (2;2) Scanning and transmission electron microscopy applications in failure analysis will be discussed along with ductile, brittle, fatigue and corrosion related failure mechanisms. Applications of fracture mechanics, elevated temperature failures of welded and cast components will be discussed.

MSES 5200. Advanced Construction Scheduling. 3 hours. Analysis and control of construction projects using advanced techniques for planning, scheduling and resources control. Subjects include various methods of project scheduling and monitoring, resource management, time-cost tradeoffs, organizing and managing schedule data, forecasting and trend analysis, and presentation of schedule information.

MSES 5220. Building Information Modeling. 3 hours. (2;3) Study of the concept and applications of the building information model (BIM) and electronic data interchange (EDI) between building software applications for architectural design, structural analysis, estimating, construction scheduling, project management and facility management. Topics expand beyond traditional 3D modeling to include state-of-the-art 5D modeling that incorporates the dimensions of cost and time into the BIM for a total building life cycle view.

MSES 5230. Risk Management in Construction. 3 hours. Review of the concepts of risk and uncertainty in the construction and their impact on management decisions in construction industry, and a study of the systems, tools and techniques used in construction project risk management. Subjects also include development of risk mitigation procedures, safety planning and execution, and the role of insurance and bonds in the industry.

MSES 5300. Embedded Controllers. 3 hours. (2;2) The study of the technical aspects of real-time software systems: software development methodologies, operating system and real-time kernel concepts.

MSES 5310. Industrial Process Controls. 3 hours. (2;2) Use of programmable controllers and microcomputers as controllers in industrial processes; topics include sensors and transducers, data acquisition, control devices and the nature of digital control.

MSES 5320. Introduction to Telecommunications. 3 hours. An introduction to the technology, standards, systems and practices of the telecommunications industry to include equipment, switched and dedicated communications lines, and voice and data communications.

MSES 5330. Instrumentation System Design. 3 hours. (2;2) The major objectives of this course are instrumentation design techniques, transducer selection, and interfacing control and measurement signals to the system. The use of graphical and structured programming techniques in the design of virtual instrument systems will constitute a significant portion of the course. Completion of a capstone project incorporating a summation of learning experiences from the entire curriculum is a requirement of the course. Must be taken the last term/semester offered prior to graduation. Prerequisite(s): completion of ELET required courses; course is to be taken within the last 12 hours of the degree plan.

MSES 5340. Digital Logic Design Techniques. 3 hours. (2;2) Study of the design, simulation and implementation of digital logic circuits including combinational and sequential logic, algorithmic state machines, hardware test techniques, software used in design, simulation and an introduction to the use of VHDL programming language. Oral and written documentation required.

MSES 5800-MSES 5810. Studies in Engineering Systems. 1–3 hours each. Organized classes specifically designed to accommodate the needs of students and the demands of program development that are not met by regular offerings. Short courses and workshops on specific topics, organized on a limited-offering basis, to be repeated only upon demand. May be repeated for credit.

MSES 5900-MSES 5910. Special Problems. 1–3 hours each. Open to graduate students capable of developing a problem independently.

MSES 5930. Research Problems in Lieu of Thesis. 3 hours. Independent, applied research that addresses significant problems in the field, emphasizing statistical methods and research design, supervised by a member of the engineering technology graduate faculty and approved by the department chair; for students who are doing a project in lieu of a thesis; no credit given until the problem is completed and approved. Prerequisite(s): approval of research proposal by major advisor and department chair.

MSES 5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit.

Manufacturing Engineering Technology – see *Undergraduate Catalog*

Mechanical Engineering Technology – see *Undergraduate Catalog*

Nuclear Engineering Technology – see *Undergraduate Catalog*

English

English, ENGL

ENGL 5000. Old English. 3 hours. A study of Old English grammar and phonology; the reading of selections from prose and poetry in West Saxon; a survey of the literature of the Old English period. Prerequisite(s): 12 semester hours in advanced English, including a course from Group D. See *Undergraduate Catalog* for Group D course listing.

ENGL 5010. Beowulf. 3 hours. A study of *Beowulf*, its language and its place in the Germanic epic tradition; some attention to other heroic poetry. Prerequisite(s): ENGL 5000.

ENGL 5030. Studies in Medieval Literature. 3 hours. A detailed study of the works of one or more of the major writers or literary genres of the medieval period in England, with a study of the major literary and social forces that helped to shape the cultural context of the period.

ENGL 5100. Studies in British Literature of the Romantic Period. 3 hours. A detailed study of the work of one or more of the major Romantic poets, together with wide reading in the general literature of the period.

ENGL 5140. Form and Theory: Poetry. 3 hours. Rhetorical criticism of poetry to show how poems achieve identification with the audience; emphasis on student mastery of critical analysis.

ENGL 5145. Form and Theory: Prose. 3 hours. Rhetorical criticism of prose fiction to show how short stories and novels achieve effect.

ENGL 5162. Creative Writing: Essay. 3 hours. A close analysis of the contemporary essay; writing of essays using rhetorical principles in conjunction with invention, humor and polemics. Prerequisite(s): by permission of the department.

ENGL 5170. Rhetorical Theory. 3 hours. A consideration of rhetorical theory from the Greeks to modern times. Emphasis upon 20th-century advances and innovations. The relationship between literary criticism and rhetorical theory; persuasive techniques in literary discourse; the place of rhetorical theory in the teaching of writing.

ENGL 5200. Studies in British Literature of the Victorian Period. 3 hours. A study of the works of one or more of the major British writers of the Victorian period and of the intellectual and philosophical interests of the time.

ENGL 5250. Studies in British Literature of the Eighteenth Century. 3 hours. An appraisal of a significant group of writers or a literary genre of either the Restoration or the 18th century, together with attention to the historical, intellectual and social background.

ENGL 5260. Studies in Nineteenth-Century British Literature. 3 hours. A detailed survey of the works of the Romantic and Victorian periods, with a general consideration of social and intellectual interests of the time.