Engineering

School

S (https://www.stmarytx.edu/grad)chool of Science, Engineering and Technology (https://www.stmarytx.edu/academics/set)

School Dean

Winston F. Erevelles, Ph.D. (werevelles@stmarytx.edu)

Department

Engineering (https://www.stmarytx.edu/academics/set/graduate/computer-engineering)

An advanced education is the most effective way to take control of your career and make significant strides in your chosen profession. Here you can learn more information about the graduate programs in the School of Science, Engineering and Technology (SET). Select one of the the school's seven master's of science (M.S.) programs to find one that fits for you.

Master of Science (M.S.) Admission Requirements:

- Have a Bachelor of Science (B.S.) degree in computer engineering, electrical engineering, or a closely related discipline. Applicants who earned a bachelor's degree in a closely related discipline, such as physics or mathematics, may be admitted with the provision that they take the prerequisite courses listed below. The Graduate Program Director will evaluate applicants from other disciplines on an individual basis.
- Have a minimum Grade Point Average (GPA) of 3.00 (A = 4.00) for their bachelor's degree.
- Have minimum GRE quantitative score of 148.
- International students must submit minimum TOEFL scores of 80 on the Internet-based test or at least 6.0 on the IELTS. Students who score 6.0 on the IELTS or 80-82 on the TOEFL will be required to enroll in EN6301 Academic Writing for International Students during the first semester of attendance.
- Submit a completed application form, a written statement of purpose indicating the applicant's interests and objectives, two letters of recommendation concerning the applicant's potential for succeeding in the graduate program, and official transcripts of all college level work.

Applicants who fail to meet any of the above requirements may be admitted on a conditional status. The Graduate Program Director will evaluate these cases on an individual basis.

Certificate Admission Requirements:

Applicants must have a Bachelor of Science degree in Software Engineering, Computer Science, Computer Engineering or a closely related discipline.

Applicants whose Bachelor of Science degree is not in Software Engineering, Computer Science or Computer Engineering are required to demonstrate proficiency in the following subjects or take the corresponding prerequisite courses at St. Mary's University or other institutions:

Prerequisite Requirements	
C/C++ Programing Java [1]	
One of the following	
EG 1302	Programming for Engineers [2]
EG 3392	Java and Applications [2]
CS 1310	Programming I [2]
Data Structure and Algorithms	
One of the following	
EG 2342	Data Structures & Algorithms [2]
CS 1311	Programming II [2]
or CS 2315	Algorithms
Mathematics	
MT 3323	Discrete Math Structures [2]

1 Other programing languages may be acceptable

2 Corresponding course at St. Mary's

Programs in Engineering

- M.S. in Computer Engineering (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/computer-engineering-ms)
- M.S. in Electrical Engineering (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/electrical-engineering-ms)
- M.S. in Engineering Systems Management (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/engineering-systems-management-ms)
- M.S. in Industrial Engineering (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/industrial-engineering-ms)
- M.S. in Software Engineering (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/software-engineering-ms)

Certificate in Engineering

- Software Engineering Certificate (catalog.stmarytx.edu/graduate/science-engineering-technology/engineering/software-engineering-certificate)

EG 6000X. Maintaining Matriculation. 0 Semester Hours.

EG 6301. Statistical Data Analysis. 3 Semester Hours.
An applied approach to statistical inference in engineering and scientific work. Tests of hypothesis, regression analysis, analysis of variance and experimental design.

EG 6302. Engineering Management and Decision Systems. 3 Semester Hours.
Philosophy, theory, and practice of management; decision theory and social responsibility; management of research and development; the professional interrelationships of engineering to modern production organizations. Case studies in engineering management.

EG 6303. Lean Production. 3 Semester Hours.
Forecasting. Inventory planning and control. Aggregate planning. Deterministic and stochastic inventory models. Master scheduling. Just-in-time and lean. Theory of constraints. Sequencing and scheduling. Assembly line balancing.

EG 6304. Reliability & Maintainability. 3 Semester Hours.
Statistics of reliability. Reliability estimation and decision making. Reliability models. Redundancy. Experimentation and testing.

EG 6305. Economic Analysis for Managerial Decisions. 3 Semester Hours.
Criteria used for making decisions about proposed capital investments and the implementation of selected criteria in engineering design and investment decisions. Present worth, rate of return, payback period, cost-benefit analysis. Depreciation. Inflation. Taxes.

EG 6306. Software Project Planning and Management. 3 Semester Hours.
Planning and control of software project. Cost factors and cost estimation. Project scheduling, staffing, setting milestones. Role of project manager and organization of project team. Project management tools. Factors influencing productivity and success. Productivity metrics. Software project economics. Metrics for software quality, schedule, budget, and progress. Analysis of options and risks. Planning for change. Management of expectations. Release and configuration management. Software process standards and process implementation. Software contracts and intellectual property. Approaches to maintenance and long-term software development. Case studies of real industrial projects. CASE tools for project planning, cost estimation, and project management.

EG 6307. Sequencing and Scheduling. 3 Semester Hours.
Quantitative analysis of operational problems of production systems with a concentration on operations sequencing and scheduling in job shops, flow lines, and project work.

EG 6308. Random Variables and Stochastic Processes. 3 Semester Hours.
Introduction to the underlying theory of stochastic processes. Topics include: random sequences and convergence; autocorrelation, autocovariance, stationarity, ergodicity; stochastic calculus (continuity, differentiability, integrability); Poisson processes; white-noise processes; Gaussian process; random walk, Brownian motion, Wiener process; Markov chains; Markov processes; linear systems driven by random inputs.

EG 6309. Human Factors/Ergonomics. 3 Semester Hours.
Comprehensive and practical review of basic concepts in the integration of the human component into the design, development and evaluation of human-machine systems. (Same as PS 6309).

EG 6310. Nonlinear Optimization. 3 Semester Hours.
Formulation of nonlinear problems. Classical nonlinear optimization. Unconstrained and constrained optimization. Numerical search techniques. Genetic algorithms.

EG 6311. Wireless Communications. 3 Semester Hours.
This course addresses wireless communications in four parts. The first part addresses wireless sys tems with an overview of wireless channels, propagation characteristics, wireless system architecture and elements. The second part reviews wireless communications techniques, including modulation, diversity and combining, and multiple access. The third part introduces analysis and simulation methods and procedures for system performance evaluation. The fourth part presents various wireless communications systems and applications. Topics include: Introduction to Wireless Communications; The Cellular Concept; Wireless Channel Environment; Statistical Communications Theory; Path Loss Prediction; Received-Signal; Envelope and Phase Characteristics; Modulation Techniques; Diversity and Combining Technique; Multiple-Access Schemes; System Performance Evaluation; Wireless Systems and Applications.

EG 6312. Data Mining. 3 Semester Hours.
Recent advances in database technology along with the phenomenal growth of the Internet have resulted in an explosion of data collected, stored, and disseminated by various organizations. Because of its massive size, it is difficult for analysts to sift through the data even though it may contain useful information. Data mining holds great promise to address this problem by providing efficient techniques to uncover useful information hidden in the large data repositories. The key objectives of this course are two-fold: (1) to teach the fundamental concepts of data mining and (2) to provide extensive hands-on experience in applying the concepts to real-world applications. The core topics to be covered in this course include classification, clustering, association analysis, and anomaly/novelty detection. Students will develop and/or apply data mining techniques to applications such as network intrusion detection, Web traffic analysis, business/financial data analysis, text mining, bioinformatics, Earth Science, and other scientific and engineering areas.

EG 6327. Computer Aided Manufacturing (CAM) & Robotics. 3 Semester Hours.
Modem manufacturing systems including automation, computer integrated manufacturing, robotics, and programmable logic controllers. Computer implementation of CAM topics such as computational geometric modeling, dimensioning, and tolerancing. Experiments on programmable logic controllers, computer numerical control (CNC) programming, coordinate measuring machine (CMM) techniques, and computer aided design.

EG 6328. Software Engineering. 3 Semester Hours.
This course surveys the entire software engineering field. It presents the management and technical aspects of the software development process. Software architectures, paradigms, and life-cycles are briefly discussed and compared. It covers topics in software management, problem specification and analysis, system design techniques, documentation, system testing and performance evaluation, and system maintenance. The technical aspects include software requirement analysis, design methodologies, system implementation, and testing techniques. Software verification and validation, quality assurance, and configuration management are also introduced.

EG 6331. Computer Simulation. 3 Semester Hours.
The modeling of the operational aspects of manufacturing and service systems using discrete and continuous simulation techniques.

EG 6332. Operations Research I. 3 Semester Hours.
Linear programming, Big-M and two-phase methods, revised simplex, duality theory, sensitivity analysis, transportation and assignment methods. Goal programming.

EG 6333. Operations Research II. 3 Semester Hours.
Network flow programming, dynamic programming, Markov chains, queuing theory, Monte Carlo simulation. May be taken independently of EG6332, Operations Research I.

EG 6334. Software Quality Assurance. 3 Semester Hours.
Quality: How to assure it and verify it? Avoidance of errors and other quality problems. Inspections and formal technical reviews. Testing, verification, and validation techniques. Process assurance versus product assurance. Quality work product attributes. Software quality measurements and metrics. Quality process standards and formal approaches to SQA. Product and process assurance. Problem analysis and reporting. Statistical approach to quality control. Software configuration management: baselines, version control, change control, configuration audits, and SCM standards. CASE tools for SQA.

EG 6335. Wireless Security. 3 Semester Hours.
Designing and implementing security measures in wireless network environment. Wireless communications vulnerabilities and threats. Methods of creating a seamlessly secure and impenetrable wireless network. Design, configuration, implementation and full spectrum of wireless network security concepts. Fundamental wireless security concepts such as WEP and EAP, switching protocols, physical layer security, mobile and cellular network security.

EG 6338. Special Topics. 3 Semester Hours.
Course may be repeated for credit if topics vary.

EG 6340. Manufacturing Engineering. 3 Semester Hours.
An overview of modem manufacturing systems including computer aided manufacturing, computer integrated manufacturing, manufacturing resources planning, lean and just-in-time, and robotics. Economic and ergonomic aspects of product design. Experiments on computer integrated manufacturing and manufacturing processes are conducted.

EG 6341. Supply Chain Management. 3 Semester Hours.

EG 6345. Digital Control Systems. 3 Semester Hours.
Analysis and design of discrete-time linear systems, sampling and reconstruction, open-loop and closed-loop discrete-time systems, system time-response characteristics, stability analysis techniques, digital controller design, pole-assignment design and state estimation. Prerequisite: EG 6365.

EG 6350. Digital Signal Processing I. 3 Semester Hours.
Discrete time signals & systems, z-transform, discrete fourier transform, flow graph and matrix representation of digital filters, digital filter design techniques and computation of the discrete fourier transform (FFT).

EG 6354. Computer Systems Management. 3 Semester Hours.
This course examines a broad range of topics in the management of technology, information systems and organizational issues in exploiting new technology. The course explores concepts of applying computer information systems and communications technology to provide an effective frame work for managing competitiveness in an environment of rapid global change. Managing R&D, systems acquisition, decision-making, and links to other functional areas in the corporation are emphasized.

EG 6356. Computer Networking. 3 Semester Hours.
Foundamentals of computer networking and data communication in the context of the OSI and TCP/IP reference models. Layered protocols and the role of each layer of the combined OSI-TCI/IP reference models; namely the Application layer, the transport layer, network layer, the link layer, and local area networks. Current trend in computer networking, design principles behind computer networks, application of quantitative measures to gage the performance of computer networks, and major issues involved in designing high speed computer networks.

EG 6359. Optical Communications. 3 Semester Hours.
Study of wave propagation in single mode and multimode optical fibers, light emitting diodes and laser diodes, detectors, and communication networking. Students should have a reasonable background in Electromagnetic field theory and solid state devices.

EG 6360. Digital Signal Processing II. 3 Semester Hours.
Finite world length effects in digital filters, discrete orthogonal transforms such as Walsh-Hadamnd, Haar, slant and discrete cosine, power spectrum estimation and digital signal processing applications. Prerequisite: EG 6350.

EG 6362. Computer Vision and Pattern Recognition. 3 Semester Hours.
Digital image characterization, image transforms, image enhancement, image restoration, image encoding, image analysis, applications of digital image processing to robotics. Prerequisite: EG 6350.

EG 6365. Automatic Control Systems. 3 Semester Hours.
This course introduces students to the theory and practice of control systems engineering. The topics include basic concepts and mathematical foundations for analysis and design of continuous control systems, transfer function techniques and state- variable analysis, frequency and time do main design and analysis of control systems.

EG 6367. Communication Systems. 3 Semester Hours.
Introductory information theory, frequency response of linear systems, analog-to-digital conversion, time multiplexing of signals, Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), quantization noise, Amplitude Modulation (AM) and Frequency.

EG 6369. Cryptography Principles and Practices. 3 Semester Hours.
Basic concepts of cryptography, symmetric encryption schemes, review of finite fields, number theory, and elliptic curves, advanced cryptographic schemes, public-key cryptography, MAC, hash functions, and digital signature, key management and distribution, user authentication, and different applications.

EG 6370. Parallel Processing. 3 Semester Hours.
This course provides a practical introduction to parallel programming in C using MPI (Message Passing Interface), Pthreads, and OpenMP. The first part of the course surveys the various taxonomies and classifications of parallel computers along with a brief introduction to parallel architectures. This part includes a high level overview of various interconnection networks for parallel computers. The second part of this course focuses on demonstrating how to use Foster's parallel algorithm design methodology to develop MPI, OpenMP, and Pthreads programs to solve a series of progressively more complex programming problems. Throughout this course, particular attention will be given algorithm design and performance measurement of parallel programs.

EG 6372. Expert Systems. 3 Semester Hours.
Expert systems concepts and architecture. The knowledge base, the global database, and the inference engine. Backward and forward chaining. Uncertainty. Prerequisite: EG 6326 or consent of instructor.

EG 6374. Computer Architecture. 3 Semester Hours.
Measuring and reporting computer performance. Quantitative principles of computer design. Classification, design, and encoding of instruction sets. Role of compilers in instructions set design. Reduced Instruction Set Computers (RISC) versus Complex Instructions Set Computers (CISC). Pipelining and problems associated with pipeling (hazards). Instruction level parallelism. Static and dynamic branch prediction. Out of order instruction execution. Memory hierarchy; cache memory and virtual memory organizations. Reducing cache misses and cache hit time. Memory protection in virtual memory.

EG 6376. Neural Networks. 3 Semester Hours.
Neuron model and network architecture; Heb net; perception learning rule; ADALINE and MADAL1NE architectures and algorithms; back propagation algorithm; pattern classification; pattern association competitive neural networks. Prerequisite: Consent of instructor.

EG 6378. Microprocessors. 3 Semester Hours.
Overview of number systems, codes and digital devices. An introduction to microcomputers and microprocessors. Assembly language programming. A survey of a number of microprocessor families. Microcomputer structure, bus structure, bus protocols, and system expansion.

EG 6380. Microcomputer Interfacing. 3 Semester Hours.
Programming parallel ports and Input/Output. Interfacing a microcomputer to keyboards, to alphanumeric displays, and interfacing microcomputer parts to high-power devices. Review of operational amplifiers and circuits, sensors, and transducers. D/A converter operation and interfacing, A/D converter operations and interfacing. Prerequisite: EG 6378.

EG 6382. Computer Aided Design and Manufacturing (CAD/CAM). 3 Semester Hours.
Overview of basic concepts of CAD/CAM. Application of computers for the design and creation of a manufacturing database. Hardware and software considerations in CAD. Modem manufacturing systems including automation, computer integrated manufacturing, robotics, and programmable logic controllers. Computer implementation of CAM topics such as computational geometric modeling, dimensioning, and tolerancing. A term project is required. Experiments on programmable logic controllers, computational modeling, computer numerical control (CNC) programming, and coordinate measuring machine (CMM) techniques are conducted.

EG 6386. Engineering Problem Solving. 3 Semester Hours.
This course covers elementary applied mathematics, basic numerical methods, and problem solving methodology. MATLAB and its associated Toolboxes are used for computations. Topics include introduction to problem solving, introduction to MATLAB, scalar, and array computation, control flow, matrix computation, plotting capabilities, solution to systems of linear equations, interpolation and curve fitting, polynomial analysis, numerical integration and differentiation, ordinary differential equations, matrix decomposition and factorization.

EG 6388. Data Acquisition, Presentation, and Analysis. 3 Semester Hours.
Principles, methods, and applications of data acquisitions, presentation, and analysis. Topics covered include methods of analog-to-digital conversion, the Nyquist criteria and aliasing errors, signal processing, the use of analog and digital filters, system identification, frequency-spectral estimation, techniques for clear and concise presentation of data, and error analysis of computational results. Hands-on experiments and applications will be emphasized. Lab VIEW software and the associated hardware will be used. Oral and written presentations of application projects will be required of each student.

EG 6390. Digital Systems Design Using VHDL. 3 Semester Hours.
Brief review of combinational and sequential circuit design principles; VHDL basic language organization; structural modeling in VHDL; date flow modeling in VHDL; VHDL technology information; describing synchronous behavior in VHDL; algorithmic modeling in VHDL. Prerequisite: undergraduate logic design course.

EG 6392. Network Programming. 3 Semester Hours.
Introduction to networks; Client-server model and software design; concurrent processing in client-server software; program interface to protocols; socket interface; algorithms and issues in client-server software design; connectionless servers (UDP); connection-oriented servers (TCP); client-server concurrencies; application level gateways; remote procedure calls (RPC). Prerequisites: EG 6356 and working knowledge of C programming language.

EG 6396. Applied Cryptography. 3 Semester Hours.
Introduction to classical cryptography, encryption algorithms, stream cipher, block ciphers, DES, AES, pseudorandom bit generation. Public-key cryptography, Diffie-Hellman, ElGamal, RSA, Elliptic curves, digital signature schemes. Hash functions, message authentication codes, key management. Deployed cryptography, Kerberos, digital payment systems, cloud data security.

EG 6397. Fault Tolerant Computing. 3 Semester Hours.
This course covers the theory and practice of fault tolerant systems, focusing in particular on techniques for achieving high reliability in computational systems with software, hardware, and networking components. Approaches for testing, fault handling and assessing reliability will be examined. It discusses reliability measures, error detection and correcting codes, fault-tolerant networks, redundant disks (RAID), software fault-tolerance, case studies of fault-tolerant systems, and others.

EG 7155. Internship. 1 Semester Hour.
An experimental approach to advanced engineering topics through work in a company or organization. Industry/University cooperation is required. Topics vary depending on the needs of the sponsoring company or organization and the academic needs of the student. Students may start an internship projects anytime after enrolling in any Engineering program. A minimum of three credit hours is required. Prerequisite: Consent of the Graduate Program Director.

EG 7255. Internship. 2 Semester Hours.
An experimental approach to advanced engineering topics through work in a company or organization. Industry/University cooperation is required. Topics vary depending on the needs of the sponsoring company or organization and the academic needs of the student. Students may start an internship projects anytime after enrolling in any Engineering program. A minimum of three credit hours is required. Prerequisite: Consent of the Graduate Program Director.

EG 7303. Safety Engineering & Loss Assessment. 3 Semester Hours.
Systems safety; product safety; safety and health related workplace hazards; worker safety; loss prevention principles and regulations; loss assessment and control, theories of accident causation. Safety standards.

EG 7304. Requirements Engineering. 3 Semester Hours.
Domain engineering. Techniques for discovering and eliciting requirements. Languages and models for representing requirements. Analysis and validation techniques, including need, goal, and use case analysis. Requirements in the context of system engineering. Specifying and measuring external qualities: performance, reliability, availability, safety, security, etc. Specifying and analyzing requirements for various types of systems: embedded systems, consumer systems, web-based systems, business systems, systems for scientists and other engineers. Resolving feature interactions. Requirements documentation standards. Requirement traceability. Human factors. Requirements in the context of agile processes. Requirements management: Handling requirements changes. CASE tools for requirement engineering.

EG 7305. OO Analysis, and Design Methodologies. 3 Semester Hours.
Review of object oriented concepts: objects, classes, instances, inheritance, and entity relationship diagrams. Object-oriented analysis methodologies and their role in the software development process. Object-oriented modeling and prototyping using UML. Software reuse. Design patterns, frameworks, architectures. Component design. Measures of design attributes. Component and system interface design.

EG 7306. Total Quality Systems. 3 Semester Hours.
This course provides the student with (1) an awareness of the history and evolution of the Quality Management philosophy and its principles and methodologies, (2) a thorough knowledge of the quality design and planning process, (3) the ability to deploy basic and advanced quality methods and functions in various organizational settings, and (4) the skills to analyze and develop strategies using relevant case studies and ways to transition organizations to the quality.

EG 7307. Plant Layout and Facilities Design. 3 Semester Hours.
Principles and method of analysis and design of service, production, and manufacturing facilities. Location selection. Plant layout. Materials requirement and resource planning. Enterprise resource planning (ERP). Use of computers in facilities planning and control. A term project featuring the design of a production system is required.

EG 7308. Soft. Verification & Valid.. 3 Semester Hours.
Testing techniques and principles: defects versus failures, equivalence classes, boundary testing. Types of defects. Black-box versus structural testing. Testing categories: Unit testing, integration testing, profiling, test driven development. State-based testing, configuration testing, compatibility testing. Website testing. Alpha, beta, and acceptance testing. Coverage criteria. Test instrumentation and tools. Developing a test plan. Managing the test process. Problem reporting, tracking, and analysis. Testing metrics. Software safety. Debugging and fault isolation techniques. Defect analysis.

EG 7310. Software Maintenance, Evolution and Reengineering. 3 Semester Hours.
Introduction to software maintenance, defect management, corrective, adaptive and perfective maintenance. Evolution of legacy software systems. Program comprehension techniques, reverse engineering, restructuring, refactoring of software systems. Software re-engineering, data reverse engineering. Software reuse. Impact analysis, regression testing.

EG 7311. User Interface Design. 3 Semester Hours.
Psychological principles of human-computer interaction. Evaluation of user interfaces. Usability engineering. Task analysis, user-centered design, and prototyping. Conceptual models and metaphors. Software design rationale. Design of windows, menus, and commands. Voice and natural language I/O. Response time and feedback. Color, icons, and sound. Internationalization and localization. User interface architectures and APIs. Case studies and project.

EG 7312. Soft. Des & Architecture. 3 Semester Hours.
Modeling and design of flexible software at the architectural level. Basics of model-driven architecture. Architectural styles and patterns. Middleware and application frameworks. An in-depth look at software design. Survey of current middleware architectures. Design of distributed systems using middleware. Component based design. Measurement theory and appropriate use of metrics in design. Designing for qualities such as performance, safety, security, reusability, reliability, etc. Measuring internal qualities and complexity of software. Evaluation and evolution of designs.

EG 7313. Web Engineering. 3 Semester Hours.
Concepts, principles, techniques, and methods of Web engineering. Topics include requirement engineering for Web applications, modeling Web applications, Web application architectures, Web application design, technologies for Web applications, testing Web applications, operation and maintenance of Web applications, web project management, web application development process, usability of Web applications, performance of Web applications, and security of Web applications. Quality characteristic and attributes for websites.

EG 7314. Software Security. 3 Semester Hours.
Theory and practice of software security. Identification of potential threats and vulnerabilities early in the design cycle. Methodologies and tools for identifying and eliminating security vulnerabilities. Techniques to prove the absence of vulnerabilities and ways to avoid security holes in new software. Essential guidelines for building secure software: how to design software with security in mind from the ground up and to integrate analysis and risk management throughout the software life cycle.

EG 7351. Systems Engineering Concepts. 3 Semester Hours.
This course deals with systems analysis, engineering economics, and systems engineering and their impact on decision making.

EG 7352. Applications of Material Concepts. 3 Semester Hours.
This course focuses on emerging materials and material/component considerations including the subject of government military/private sector specification, testing, and preservation affecting large project management.

EG 7353. Project Management. 3 Semester Hours.
This course provides a management perspective on managing projects. It examines the basic nature of managing business, public, engineering and information systems projects, including the specific insights and techniques required. Issues such as the selection and management of the project team, project initiation, implementation and termination are addressed. This course is cross-listed with BA 7353. Students who have previously received credit for BA 7311 may not enroll in this course.

EG 7355. Internship. 3 Semester Hours.
An experimental approach to advanced engineering topics through work in a company or organization. Industry/University cooperation is required. Topics vary depending on the needs of the sponsoring company or organization and the academic needs of the student. Students may start an internship projects anytime after enrolling in any Engineering program. A minimum of three credit hours is required. Prerequisite: Consent of the Graduate Program Director.

EG 7356. Engr. Management Leadership and Ethics. 3 Semester Hours.
Historical and contemporary leadership theories and concepts. Fundamentals of organizational leadership. Foundational ethics. Engineering ethics. Ethical dimensions of leadership.

EG 7357. Systems Engineering Concepts. 3 Semester Hours.
Systems analysis, engineering economics, and systems engineering and their impact on decision making.

EG 8300. Engineering Systems Management. 3 Semester Hours.
This is a comprehensive course for the Engineering Systems Management graduate program. It incorporates case studies to permit integration of the functional areas studied in the program and engineering ethics. Class activities typically focus on practical applications of engineering systems management (systems of systems) concepts.

EG 8390. Thesis I. 3 Semester Hours.
The thesis is a culminating experience that provides a record of a student's achievement in the program. The thesis requires research leading to the discovery of new knowledge or enhancement of existing knowledge in the field of interest. A thesis in which the goal is to solve a practical problem may also be acceptable. The thesis features a complete documentation of the research study, including the theoretical background, description of the problem, the method used to investigate or solve the problem, presentation of results, interpretation of results, and explanation of the significance of the results. Six hours of thesis credit are required for graduation.

EG 8391. Thesis II. 3 Semester Hours.
Continuation of Thesis I.

EG 8396. Capstone Project. 3 Semester Hours.
A comprehensive project featuring basic or applied research. Concluding experience for the Master Program. Deliverables include a written report and an oral presentation before faculty and peers.