MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

Master of Science in Engineering Management

Point of Contact: Yong Zhu, Ph.D.

The Master of Science in Engineering Management is a 30 credit-hour program that integrates 15 hours of mandatory engineering management courses with 15 hours of technical electives or graduate project. The program is committed to the successful development of the upward-bound technical talent in industry. Entering students enjoy a curricular breadth and flexibility unique to Wilkes University.

The program emphases include decision processes, systems modeling, uncertainty analysis and risk assessment. Graduates will learn to effectively address and communicate the growing complexities of organizational performance and decision processes as they prepare for leadership roles in technical staff and technology management such as project planning and execution, production flow, logistics, demand forecasting, and quality improvement. The program also prepares students for further academic endeavors that may lead to post-graduate or doctoral studies in Engineering Management, Industrial Engineering or other related disciplines.

Admission Requirements

An ABET-accredited baccalaureate Engineering degree is preferred but not required. Applicants with other four-year degree preparations (e.g. BS or BA) may meet entrance requirements once the necessary foundation content is satisfied. Entry standards include the following:

1. Experience:
   Post-baccalaureate industrial/professional work experience preferred.

2. Application:
   Submitted with payment of appropriate application fee. (International students: Refer to the International Students section of this bulletin for additional admission requirements).

3. Academic Preparation-Official Transcripts are Required:
   • Demonstrate satisfactory performance as an undergraduate as evidence with a complete set of official undergraduate transcripts to be submitted to the Graduate Admissions Office.
   • To be accepted on a regular basis, candidates for the degree must have obtained a cumulative GPA of at least 3.0. Prospective students with a GPA of less than 3.0 may be conditionally accepted into the program. To be reclassified to regular status, the conditionally accepted student must attain no less than a 3.0 for each of the first six credit hours of graduate coursework taken. Failure to maintain the minimum 3.0 in any course will result in dismissal of the conditionally accepted student.

Applicants not holding an ABET-accredited undergraduate or graduate engineering degree must demonstrate or accrue the following preparation prior to enrolling in EGM courses:

• Mathematics: 12 hours (calculus, differential equations and statistics, or approved equivalent)
• Engineering economy or equivalent; 3 hours
• Science (chemistry and/or physics): 12 hours of approved coursework
• Engineering: 12 hours of approved coursework
• Demonstrated ability with computer programming and/or numerical analysis techniques

4. Professional Recommendations:
   Applicants must submit two letters of professional recommendation.

Degree Requirements

The Masters of Science Degree in Engineering Management requires a minimum of thirty (30) credit hours consisting of fifteen (15) credits in CORE courses and fifteen (15) elective credit hours.

Typical Course Sequence

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Third Semester

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<td>[EGM-516] – Management Science</td>
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Technical Elective Courses

[EGM-525], [EGM-530], [EGM-534], [EGM-536], [EGM-538], [EGM-540], [EGM-544], [EGM-545] and other advisor approved electives.

Financial Aid

A limited number of assistantships are available for full-time students. Applicants should possess superior academic qualifications and provide good scores in the GRE.

EGM. ENGINEERING MANAGEMENT

EGM-510. PROJECT DECISION PROCESSES

Credits: 3

Projects are assessed with respect to uncertainty (revenues, expenses, product/process performance) and risk. Cash flows are evaluated to estimate present values and quantify risks associated with various decision alternatives. Topics include depreciation strategies, make/purchase/rent choices, break-even and benefit/cost assessments, and decision analysis with imperfect information. Required of all students. Three hours lecture per week.

EGM-515. QUALITY MANAGEMENT

Credits: 3

Applicable quality techniques are presented within the context of research, new product development, plant operations, product support, and risk reduction. Students will learn how to articulate objectives, identify desired outcomes and establish suitable metrics for performance management. Required of all students. Three hours lecture per week.
EGM-516. MANAGEMENT SCIENCE  
Credits: 3  
Students learn how to structure complex problems, analyze available options, obtain information from data, and how to formulate analytical models for making optimal decisions. Topics may include (but are not limited to) regression and correlation analysis, time series analysis, forecasting models, and quality and productivity management. Course activities may include case analyses, research, application of advanced techniques, or and/or utilization of various information technologies. Required of all students. Three lecture hours per week.

EGM-520. OPERATIONS ANALYSIS  
Credits: 3  
Students will assess production flows and space/equipment/resource utilization for purposes of reducing production bottlenecks while maintaining/increasing facility utilization. Various quantitative analysis and optimization methodologies will be covered for solving linear and nonlinear optimization problems. Simulation and graphical approaches will be utilized to assess solution performance. Required of all students. Three hours lecture per week.

EGM-521. QUANTITATIVE ANALYSIS  
Credits: 3  
Terms Offered: On Demand  
Discussion of various quantitative analysis and optimization methodologies. Analytical numerical approaches are used in solving linear and nonlinear optimization problems. Emphasizes the development of ability in analyzing problems, solving problems by using software, and post solution analysis.

Pre-Requisites  
Junior Standing

EGM-525. PROJECT ANALYSIS  
Credits: 3  
A study of critical issues in the management of engineering projects including proposal development, mobilization, scope change, completion and termination. Performance metrics are considered in planning and tracking project cost, schedule, and resource requirements with CPM/PERT algorithms. Case discussions and a term project are included in the course. Required of all students. Three hours lecture per week.

EGM-530. STOCHASTIC MODELS IN ENGINEERING MANAGEMENT  
Credits: 3  
A review of engineering analytical methods and their application in strategic decision environments. Required case studies will require techniques such as Monte Carlo simulation, risk assessment, and failure modeling as the suitability and application of several engineering analytical approaches to operational analysis of business/industry decision processes. Required of all students. Three hours lecture per week.

EGM-534. MATERIAL & INTELLECTUAL PROPERTY  
Credits: 3  
A study of the history, fundamental strategies and issues relating to generating and protecting intellectual and material property rights. Topics include the subjects of and the present legal processes to protect trademarks, copyrights, patents, trade secrets, software and other intellectual property rights. Three lecture hours per week.

EGM-536. PRODUCT DESIGN & DEVELOPMENT  
Credits: 3  
This course focuses on the integration of the design, manufacturing, the ability to coordinate multiple interdisciplinary tasks and marketing functions in the process of creating new products. The course is intended to provide students with the necessary set of tools and methods for new product design and development. Several design frameworks are discussed in order to achieve a common objective. This course will reinforce students specific knowledge from other courses through practice and reflection in an project-oriented setting. Three lecture hours per week.

EGM-538. AUTOMATION PRODUCTION AND SYSTEMS  
Credits: 3  
This course focuses on the use of a quantitative approach to simulate, analyze and optimize all engineering aspects of automated production systems. Several modeling frameworks are discussed, such as automata, State-charts, cutting-edge technologies and Petri nets. Solving automation problems is of critical importance to decrease the cost of production systems and increase the throughput and flexibility. This course aims to give the student a basic knowledge of the important results of current research on discrete event systems and how these results can be applied to production systems. Three lecture hours per week.

EGM-540. SIX SIGMA AND LEAN MANUFACTURING  
Credits: 3  
This course focuses on developing the knowledge and skills of a typical industry based Six Sigma Green Belt candidate. The course includes the descriptive statistics and project management skills necessary to Define, Measure, Analyze, Improve and Control processes. Lecture topics include Six Sigma problem-solving techniques, continuous improvement, mistake proofing, Lean Six Sigma, Lean manufacturing, determining the cost of quality and more. Three lecture hours per week.

EGM-544. EMERGING TECHNOLOGIES  
Credits: 3  
This course aims to develop students' skills in monitoring emerging new technologies, innovation forecast and technology assessment, with an introduction of data mining tools and exploration of emerging technologies. Students will study new developments in emerging technologies, how to track pertinent developments, and discover what is going on in the research world. The course focuses on developing the capability to be a technology manager and a critical well-informed consumer of such technology. Three lecture hours per week.

EGM-545. APPLIED ENGINEERING ANALYSIS  
Credits: 3  
This course is intended for all engineering students and it provides a strong background in mathematical modeling of various systems relevant to mechanical, electrical and management problems. Typical topics covered include (but are not limited to) linear algebra, matrix and vector mechanics, eigenvalue problems, ordinary differential equations, Fourier analysis, partial differential equations and optimization. Three lecture hours per week.
EGM-580. GRADUATE PROJECT CONTINUUM
Credits: 1-3
One - Three CreditsEGM students may elect a three-credit-hour industry-based project option. The student, working with industry, will select a project topic derived from an existing need/interest in industry under the guidance of a faculty project advisor selected by mutual agreement of the student and faculty member. When the project is completed and approved by the Project Advisor, bound copies of the approved report will be filed in the department office and in Farley Library for record. A grade will be awarded each semester the student is enrolled in [EGM-580]. At project completion, a completion grade will be awarded by converting one credit-hour of [EGM-580] to one credit-hour of [EGM-581] (Graduate Project Completion). [EGM-580] credit does not apply toward meeting degree requirements until a grade for [EGM-581] is recorded. Only two hours of credit for [EGM-580] may apply toward degree requirements (although the student may enroll in a total of more than two credit hours of continuum if project completion extends to additional semesters).

EGM-581. GRADUATE PROJECT COMPLETION
Credits: 1
One CreditRecorded with grade by converting one credit-hour of [EGM-580]. Occurs upon completion of the graduate project, receipt of Project Advisor approval, and submittal of approved copies to the department office and Farley Library for binding and record.

EGM-590. THESIS CONTINUUM
Credits: 1-6
One - Six CreditsStudents may elect the six-credit-hour thesis option under the guidance of a Thesis Advisor who chairs the Thesis Committee. The Committee is comprised of three members; at least two members (including the Advisor) must be Wilkes faculty members. When the thesis is complete and has been defended with Committee approval in an open forum, bound copies of the approved thesis will be filed in the department office and in Farley Library for record. A continuum grade will be awarded each semester the student is enrolled in Continuum. A completion grade will be awarded by converting one credit-hour of [EGM-590] Graduatethesis Continuum to one credit-hour of [EGM-591] Graduate Thesis Completion. [EGM-590] credit does not apply toward meeting degree completion until a grade for [EGM-591] is recorded. Only five hours of credit for [EGM-590] may apply toward Engineering Management degree requirements (although the student may enroll in a total of more than five hours of continuum if thesis completion extends to additional semesters).

EGM-591. GRADUATE PROJECT COMPLETION
Credits: 1
One CreditRecorded with grade by converting one credit-hour of [EGM-590]. Occurs after successful defense of the Graduate Thesis before a Thesis Committee in an open forum, and after approved copies have been submitted to the department office and Farley Library for binding and record.