MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

Master of Science in Engineering Management

Point of Contact: Prahlad Marthy, Ph.D.

The Master of Science in Engineering Management is a 36 credit-hour program that integrates 9 credit hours of required MBA program content with 27 hours of graduate engineering and elective content. 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 because of leadership development strengths in the Sidhu School of Business.

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 evidenced 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

1. 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-six (36) credit hours consisting of twenty-seven (27) credits in CORE courses and nine (9) elective credit hours.

Required Courses

EGM 510, EGM 515, EGM 516, EGM 520, EGM 525, EGM 530, MBA 501, MBA 505 and MBA 552.

Elective Options: Students have three options for distributing the remaining 9 hours of graduate elective credit:

2. Industry project option: 3 hrs project (EGM 580 & 581) plus 6 hrs approved elective coursework (EGM/EE/CSE/MBA).
3. 9 hours approved coursework distributed as follows: EGM/EE - 3 hrs; EGM/EE/CSE/MBA - 6 hrs.

EGM. ENGINEERING MANAGEMENT

EGM-510. ENGINEERING 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 PROCESSES FOR DESIGN AND PRODUCTION
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 AND RESOURCE
ALLOCATION
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-525. PROJECT ANALYSIS AND RESOURCE
ALLOCATION
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. LEAN SIX SIGMA & 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 Credits Students 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 Graduate Thesis 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 Credit Recorded 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.