



SCHOOL OF ENGINEERING AND COMPUTING

# MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

## Engineering Management Principles for Real-World Practice

Today's competitive, global, and technical environment needs qualified professionals to manage development in an increasingly complex world. If you're an engineer, scientist, or technologist interested in managing engineering and development, the Master of Science in Engineering Management program will prepare you for this role.

The program's four specializations (project/program management, systems engineering, technology management, or enterprise architecture) introduce you to a broad perspective of modern technology and high-quality, graduate-level instruction. By demonstrating proficiency in the custom-designed mix of management concepts and technical expertise taught in the program, you'll be in the forefront of the engineering management discipline.

Unlike a traditional MBA program, this one emphasizes management skills specifically

built on a student's technical background and experience. Leadership in this well-recognized profession is a highly sought skill in the competitive global technological marketplace.

**Program highlights:**

- Entire program can be completed online
- Demonstrate quantitative analytical and critical-thinking skills and techniques to manage projects and processes
- Take a multidisciplinary approach using the integration of engineering, management, quality, and risk analysis in projects and processes
- Apply global thinking and detailed business knowledge for engineering management solutions
- Establish yourself as an important member of a building team

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## MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

Academic Program Director: Shekar Viswanathan; (858) 309-3416; sviswana@nu.edu

Engineering Management leadership has become a highly sought skill in today's competitive global technological marketplace. The Master of Science in Engineering Management program is designed to bring the benefits of modern technology and high quality graduate level instruction to engineers/scientists/technologists interested in furthering their skills in engineering management with specialization in the following areas:

- Project Management to become effective future project managers.
- Systems Management to manage the life cycle of systems including definition, development, deployment and decommissioning.
- Technology Management to manage and lead technology in global marketplace.

These specializations offer practical business perspectives necessary for engineering management. Unlike traditional MBA programs, these programs emphasize management skills that are specifically built on the students' technical backgrounds and experience. The custom-designed mix of management concepts and technical expertise will help prepare professionals to direct major public and private organizations in the increasingly complicated managerial environment of today's competitive global, technical environment. In this program, engineering management principles are broadly based and draw from many different disciplines such as applied sciences, engineering, natural sciences, mathematics, economics, business, and social sciences.

### Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Demonstrate quantitative analytical and critical thinking skills and techniques to manage projects and processes (products and services).
- Examine a multidisciplinary approach involving the integration of engineering, management, quality, and risk analysis in projects, and processes (products and services).
- Identify, prioritize, and select relevant solutions in solving complex engineering problems and processes.
- Assess tools and techniques, resources, organizational systems, and decision making processes for the successful management of projects and processes (products and services).
- Apply global mindset and a detailed knowledge of business environments in engineering management solutions.
- Demonstrate organizational and team skills needed to manage projects and processes.
- Communicate effectively using graduate-level oral and writing skills.
- Demonstrate professional and ethical responsibility in engineering management.

### Degree Requirements

To receive a Master of Science in Engineering Management, students must complete at least 58.5 quarter units of required courses. A total of 13.5 quarter units of graduate credit may be granted for equivalent graduate work completed at another regionally accredited institution, as it applies to this degree, and provided the units were not used in earning another advanced degree. Students should refer to the section in the graduate admission requirements for specific information regarding application and matriculation.

### Program Prerequisites

(2 courses; 9 quarter units)

Candidates for the program must possess a bachelor's degree in engineering, engineering technology, or physical sciences or a closely related area from a regionally accredited university. Interested students from other disciplines may be admitted to the program but may be required to complete additional courses. Non-degree students will not be allowed to enter this program. For those who have a general non-science and non-engineering degree, admission would be based on relevant experience and the following program prerequisites:

MGT 309C Prin. of Mgmt. & Organizations  
CSC 220 Applied Probability & Stats.  
*Prerequisite: MTH 215*

OR

MNS 205 Intro to Quantitative Methods

### Core Requirements

(9 courses; 40.5 quarter units)

ENM 600 Engineering Mgmt. Concepts  
ENM 601 Project Management Principles  
ENM 602 Risk, Contracts, and Legal Iss.

PME 602 Skills Management  
ENM 604 Quality Management  
TMG 610 Global Trends in Technology  
ENM 607A Capstone Course I  
*Prerequisite: All core classes in program.*  
ENM 607B Capstone Course II  
*Prerequisite: ENM 607A*  
ENM 607C Capstone Course III  
*Prerequisite: ENM 607B*

All students must choose one area of specialization defined below

### Specialization in Project Management

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From small companies to giant global institutions, project managers are fueling much of the successful development of exciting technical enterprises. Talented and knowledgeable project managers command the best assignments, salaries, other compensation and bonuses. They are the future leaders and entrepreneurs. Good project managers are not born, but are nurtured from a combination of experience, time, talent, and training. Successful projects do not happen spontaneously; they require preparation, planning, and organization. This specialization is designed to provide systematic training to those would like to pursue an engineering project management career.

### Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Apply a multidisciplinary approach involving the integration of engineering, management, quality, and cultural analysis to the conduct of project management engineering.
- Evaluate the financial impact of projects on corporations and businesses and develop appropriate action plans through project management engineering.
- Integrate state-of-the-art technological advances to the practice of project management engineering.
- Achieve agreed upon scope, budget and schedule requirements using resources, organizational systems, and decision-making processes.

### Program Requirements

(4 courses; 18 quarter units)

ENM 603 Operation Management  
*Prerequisite: ENM 600*  
PME 601 Advanced Project Management  
*Prerequisite: ENM 600, ENM 601, ENM 602 and ENM 603*  
PME 603 Product Management  
*Prerequisite: ENM 600, ENM 601, ENM 602 and ENM 603*  
PME 604 Project Financing Management  
*Prerequisite: ENM 600, ENM 601, ENM 602 ENM 603*

### Specialization in Systems Engineering

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This specialization focuses on complex technology systems that have a far reaching effect on society and its people. These systems are comprised of three types of entities: a) complex products such as aircraft, ships, land vehicles, and military hardware; b) networks of information and infrastructure such as air traffic control, highways, and public works and environmental processes; and c) the organizations that design, build, and maintain these products, systems and related services, i.e., businesses (public and private, for-profit and non-profit), military command, and government agencies. The systems engineering program provides knowledge in the activities related to the life cycle of systems including definition, development, deployment, and decommission.

### Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Comprehend the fundamentals of systems and general systems theory.
- Design discrete and continuous systems utilizing appropriate systems theory, operational requirements, and component integration.
- Validate system performance with testing and evaluation methods.
- Maintain system operations at optimal conditions through the application of systems management fundamentals.

### Program Requirements

(4 courses; 18 quarter units)

SYE 600 Introduction to Systems Design  
SYE 601 Systems Analysis & Design Eval.  
*Prerequisite: SYE 600*

SYE 602    Advanced System Design

*Prerequisite: SYE 601*

SYE 603    System Dynamics

*Prerequisite: SYE 602*

### **Specialization in Technology Management**

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This specialization prepares individuals to manage and lead the technology in any organizations. Information technology has expanded the technological management responsibilities beyond desks, offices, labs, manufacturing sites, cities, and countries. Technology has become the essential force in any industry. Over the past decade the synergy of business, technology, and people have created the abundance of opportunities in all fields of technology management, especially information technology.

### **Program Learning Outcomes**

Upon successful completion of this program, students will be able to:

- Implement and manage technologies aligned with the business of an organization.
- Perform organizational systems analysis, design, planning, and integration of technology.
- Evaluate hardware, software, and systems applications that support technologies.
- Develop strategic technology management policies and procedures required by the organization.

### **Program Requirements**

(4 courses; 18 quarter units)

TMG 620    Principles of Technology Mgmt.

TMG 635    Mgmt. of Tech & Innovation

TMG 640    Managing Technology Change

TMG 625    Systems Analysis and Design