Master of Engineering Management (MEM)

Course requirements
Engineering Management Curriculum

Overview

Complete the required courses from the following list:

• T55-502 Strategic Management of Technology
• T55-521 Human Performance in Engineering
• T55-522A Principles of Strategic Planning
• T55-534A Principles of Operations Management
• T55-535 Productivity & Quality Control
• T81-535A Economics of Technology
• T81-5503 Developing Leadership for Professionals

*These courses are required to earn a Graduate Certificate in Project Management.

In addition to the core courses, students will choose electives focusing on Analysis or Project Management:

Electives

Select five of the following courses:

• T40-511 Systems Engineering & Analysis
• T40-542 Operations Analysis
• T55-523A Project Planning and Administration*
• T60-502 Financial Principles of the Company
• T81-503D Applying Innovations Within Organizations*
• T81-5507 Strategies of Projects, Programs, and Portfolios
• T81-5504 Foundations of Project Management*
• T81-5505 Project Management Standards*
• T81-509B Managing Teams & Projects*
Complete all of the following courses:

**Strategic Management of Technology**

**Total Units: 3.0**
Analytical methods for strategic management are reviewed. Technology strategy is linked to the strategic plan for the organization, and methods to accomplish this linkage are developed. Factors that characterize and encourage innovation are discussed. A process for managing and integrating new technology into the strategic process is developed. Throughout the course, cases are used to analyze and demonstrate the several elements of strategic management of technology. Prerequisite: graduate standing.

**Productivity & Quality Control**

**Total Units 3.0**
This course provides a comprehensive coverage of quality and productivity improvement concepts for operations management. Students face realities that confront managers involved with the concurrent optimization goals of customer satisfaction and profit improvement. Theoretical and business applications are presented to provide a sound understanding of the basic principles of quality and productivity management in both a manufacturing and services business environment. The student will study contemporary management principles such as total quality planning using the Malcolm Baldrige assessment, product reliability concepts, statistical process control, outsourcing management, customer requirements evaluation, total cost of quality assessment, productivity performance measurement and control, and others.

**Human Performance in Engineering**

**Total Units 3.0**
This course highlights the management of engineers, scientists, and technology-based organizations; facilitated by an understanding of individual, group, and organizational behavior to enhance organizational performance. Topics include: leadership, goals, motivation and performance, management of change, conflict and effectiveness, organizational development and work design.

**Economics of Technology**

**Total Units 3.0**
This course is designed to familiarize the student with microeconomic principles and managerial economics. Where possible, the course utilizes examples from technology environments, and information systems. The focus is on incentives and decision-making by individuals and firms and the aggregation of these decision-making agents into industries and markets. Business decision-making in the face of changing technology will be emphasized. The principles presented will be relevant both for managing a business as well as evaluating sound public policy.

**Principles of Strategic Planning**

**Total Units 3.0**
The process of management is interwoven with strategic planning, which is developed in detail. The engineering and technology functions are linked to business policy. The strategic management process is introduced. Fundamental analytical tools for strategic decisions are addressed. Analysis of selected cases applies the conceptual framework.

**Developing Leadership for Professionals**

**Total Units: 3.0**
Provides knowledge about a variety of leadership approaches and how they may be effective in technological situations. The course concentrates on developing skills to actually lead in various situations. These include decision-making, problem solving, coaching, evaluating performance, selling ideas, and gaining commitment. Combines classroom, actual experiences, and reality-based feedback to hone skills resulting in a higher ability to lead.

**Principles of Operations Management**

**Total Units 3.0**
Examination of quantitative and managerial approaches for the planning, scheduling, and control of production and inventories in manufacturing companies. Review various models for demand forecasting, capacity planning, lot-sizing, scheduling, and shop-floor controls in various types of manufacturing environments. Analysis of techniques such as MRP II, JIT, and Kanban in production scheduling and control.
Electives:
Select five of the following courses:

Systems Engineering and Analysis
Total Units: 3.0
This course covers the theory and practice of systems engineering. Students will learn the fundamentals of systems thinking, the systems engineering model, and key system engineering practices supporting the product life cycle: requirements development, trade studies, functional analysis and architecture, design synthesis, program planning, and program monitor and control. Additionally this course will cover specialty engineering integration and students will gain a strong foundation in theory coupled with practical exercises that enhance the strong foundation in theory coupled with practical exercises that enhance the students' understanding of the system engineering discipline.

Operations Analysis
Total Units: 3.0
Introduction to effectiveness analysis of systems and system of systems to include engagement analysis, mission analysis, campaign analysis, System of Systems Optimization, network centric operations and communications analysis. Introduction to survivability, vulnerability, lethality, etc. Learn to optimize overall system performance to meet the needs of present and future organizations and operators. Apply OR techniques to perform mission, usability and cost effectiveness analysis to predict system performance and operational utility. Evaluate alternatives through trade studies to balance system performance and cost while meeting customer requirements. Learn to evaluate alternatives through trade studies to balance system performance and cost while meeting customer requirements. Fundamentals of Operations Research or Instructor approval are prerequisites.

Project Planning and Administration
Total Units: 3.0
This course focuses on a holistic approach to project management, covering planning, scheduling, organizing, and controlling projects. The course includes major topics of strategy, priorities, risks, project tools, and organizations. Mastery of these key tools and concepts could give students a significant competitive advantage in the marketplace, as projects are used as a major tool to achieve organizational strategic goals. Sec. 02: Accelerated Weekend Students Only; every other Friday and Saturday.

Financial Principles of the Company
Total Units: 3.0
The course is designed to a) provide incoming program enrollees with little or no finance and accounting experience or background with a solid basic understanding of financial accounting concepts with an emphasis on the managerial applications of financial data, b) prepare those incoming students for the more advanced, discipline specific courses offered later in the program and, c) give those students a grounding in financial concepts that the student can utilize as they advance to higher and more responsible leadership positions post-graduation. The course is divided into three phases. The first consists of introducing and stressing basic financial concepts, rules, and principles. The second phase consists of leveraging that basic skill set to perform and evaluate analysis in the organization. The last phase will be case study driven and will challenge the student to take the lessons of the first two phases, combine that information with already existing experience and background, and develop a business correction plan for an ailing organization.

Applying Innovations Within Organizations
Total Units: 3.0
This course focuses on how innovations, such as new technologies, find their way into organizations through managerial approaches. Topics will include assimilation and diffusion of technology, effects of technology on organizations and organizations on technology, and how organizations may be analyzed to assess the role of innovations. Emphasis will be placed on how to understand the organization's social system and what can be done to prepare it for an innovation. Disruptive technologies, organizational culture, and how organizations change will also be covered. Prereq: appropriate background.
Strategies of Projects, Programs & Portfolios

**Total Units: 3.0**

This course addresses the strategic alignment and prioritization of multiple and complex projects with an organization's business objectives and directions. Major areas covered include: Stakeholder value, return on investment, balancing the tradeoff between project priorities and operational imperative business benefit; establish and implement program governance of multiple projects to ensure consistent alignment with organizational strategy; balancing and coordination of project resources across multiple projects; coordination of schedules among multiple projects using traditional and advanced methods; current trends and practices in Program and Project Portfolio Management.

Prereq: T81-5504

Foundations of Project Management

**Total Units: 3.0**

A practical orientation for using what is known about organizations and how to apply this knowledge to managing projects. Review of the project management paradigm, the basic ingredients of a project, critical stakeholders and roles, and the normal project life cycle will be provided. An introduction to the project management mastery model is covered along with explanations for ways to integrate current and future knowledge into the model. How project approaches should differ by how to segment the problem space - monolithic, incremental, or evolutionary.

Project Management Standards

**Total Units: 3.0**

A standard view of knowledge and processes common to all projects is presented. The course focuses on the review of the ten knowledge areas and five process groups from the Project Management Institute’s Body of Knowledge (PMBOK). These knowledge areas and processes are expanded with additional insights common to all projects. The course includes student teams managing a simulated project to gain experience in applying the knowledge areas and processes. While this course introduces the concepts essential for a project management certificate from the Project Management Institute, the knowledge areas and processes are foundational for any project management professional.

Managing Teams & Projects

**Total Units: 3.0**

Establishing a personal leadership style, assessing people, and recognizing/establishing authority on a project will be covered. Handling project meetings and dealing with key stakeholder communication will be given emphasis. Teamwork will be highlighted through discussion of various kinds of teams, team structure, and team formation. The virtual team style will also be reviewed.

If you have questions, contact us at:
Washington University
School of Engineering & Applied Science
Lopata Hall, CB 1220, 1 Brookings Drive, St. Louis, MO, 63130
Phone: (314) 935-5455, Fax: (314) 935-5449
engineeringgradadmissions@wustl.edu