

# ENGINEERING AND TECHNOLOGY MANAGEMENT

## Master of Science in Engineering and Technology Management

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OSU's Master of Science in Engineering and Technology Management is a rigorous degree program designed specifically for experienced engineers and scientists who are interested in accelerating their management careers. Managing today's global organizations requires a complex set of knowledge and skills. Effective planning, selection, implementation and management of technology, and the teams involved, are essential to the success of any business in today's time-critical, global markets. MSETM students learn to apply proven evaluation concepts and implementation strategies to fast moving, technical management decisions that make the difference in both career and business success addressing the real needs identified by industry leaders. The MSETM curriculum permits you to build a strong degree that directly addresses your needs and prepares you for the future, combining academic coursework with the latest business practices. The degree consists of 32 credit hours.

Please see the ETM website, <https://etm.okstate.edu> (<https://etm.okstate.edu/>), for more information about the program.

### Program Educational Objectives

The OSU Engineering and Technology Management program exists to provide accessible, career-enhancing educational opportunities to practicing engineers, scientists and technical managers.

### Program Student Learning Outcomes

ETM graduates will be able to:

1. View the organization systemically.
2. Critically analyze a management problem.
3. Identify and act on strategic issues.
4. Articulate and defend their ideas in a professional manner.

### Admission Requirements

The guidelines for admission to the MSETM program are a bachelor's or higher degree, in engineering or the physical/mathematical sciences, with a 3.00 GPA, and professional employment in a related technical field since graduation with a bachelor's degree. Applicants not meeting these standards may be granted provisional admission based upon their overall academic and professional practice history and accomplishments. An applicant must submit the following documents:

1. OSU Application for Graduate Admission,
2. Official transcript of all academic work and degrees received,
3. Application fee (\$50 domestic, \$75 international),
4. MSETM program application,
5. A professional resume,
6. A statement of goals and objectives.

International applicants must also submit official results of the TOEFL with a minimum score of 89 IBT. Application instructions can be found online at <https://etm.okstate.edu> (<http://etm.okstate.edu/>).

Degree requirements can be found at <https://etm.okstate.edu> (<https://etm.okstate.edu/>).

## Courses

### ETM 4173 Cost Control and Analysis for Engineering and Technology Professionals

**Prerequisites:** IEM 3503 or IEM 3513 or permission of the department.

**Description:** Presents the fundamental concepts, methods, strategies and terminology necessary for engineers and engineering managers to interpret financial data properly. The information is designed to enable engineers and project managers to prepare, appraise, evaluate and approve financial plans to accomplish specific departmental and company objectives. May not be used for degree credit with ETM 5173.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

### ETM 5110 Seminar

**Prerequisites:** Admission to the master's program or consent of instructor.

**Description:** Guided study in a topic area selected to enhance a student's program. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Industrial Engr & Mgmt

### ETM 5111 Introduction to Strategy, Technology and Integration

**Prerequisites:** Admission to the MSETM program or consent of instructor.

**Description:** Introduces students to the discipline of engineering and technology management, emphasizing the importance of strategy, technology, and integration, where timing of products and services are keys to market success.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

### ETM 5133 Capstone to Strategy, Technology and Integration

**Prerequisites:** Enrolled in last semester of MSETM program or consent of advisor.

**Description:** Independent analysis of a business problem. Student prepares a proposal and report that makes substantive use of MSETM material, and is a notable and relevant contribution to the student's organization. Readings and discussions.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5143 Strategic Decision Analysis for Engineering and Technology Managers****Prerequisites:** Admission to MSETM program or consent of instructor.**Description:** Introduction to analytical concepts and procedures engineering and technology managers can use to strategically allocate resources to achieve business objectives. Strengths and weaknesses of alternative analytical procedures to evaluate alternative resource allocation decisions are outlined. Theoretical foundations, data requirements, application and strengths and weaknesses of cost-benefit analysis techniques when making strategic management decisions are evaluated.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5153 Foundations of Engineering Management****Prerequisites:** Admission to MSETM program or consent of instructor.**Description:** Principles and practices of the management of engineering and technology activities. Focus is on the tools and methods for solving problems in service and industrial systems.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5163 Business Innovation and Technology****Description:** Advanced study of innovation and technology in a business setting. Strategic development of internal and external innovation.

Planning, implementation, evaluation and control technology. No degree credit for those with credit in MGMT 5553 Management of Technology and Innovation.

**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5173 Cost Control and Analysis for Engineering and Technology Professionals****Prerequisites:** IEM 3503 or IEM 3513 or permission of the department.**Description:** Presents the fundamental concepts, methods, strategies and terminology necessary for engineers and engineering managers to interpret financial data properly. The information is designed to enable engineers and project managers to prepare, appraise, evaluate and approve financial plans to accomplish specific departmental and company objectives. May not be used for degree credit with ETM 4173.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5211 Enterprise Integration****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** Conceptualizing, designing and operating advanced manufacturing systems within an integrated enterprise-wide framework. Recent developments in computer and communication technologies and conceptual breakthroughs regarding the nature and behavior of integrated enterprises.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5221 Engineering Teaming****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** Management and group issues inherent in the application and implementation of high performing work teams. The team's roles in improving organizational performance, along with the best practice procedures and techniques that increase team effectiveness.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5231 Benchmarking****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** Benchmarking as an effective approach to study and adopt or adapt methodologies representing best specific practices from any industry; or identify and assess performance based on equivalent and common measures, usually from those in the same or similar industries, including competitors.**Credit hours:** 1**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5241 Strategic Project Management****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** Overview of traditional project management concepts and techniques (i.e., Gantt charts, PERT, CPT) along with several technical issues related to their effective use. Fundamental nature of the problems associated with several technical issues related to their effective use. Fundamental nature of the problems associated with effectively managing and coordination of multiple discrete projects within an overall systems integration initiative. A framework for addressing these problems.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt

**ETM 5253 Engineering Problem Solving and Decision-Making****Prerequisites:** Admission to the MSETM program or consent of instructor.**Description:** Processes and tools for problem solving and decision making in technical organizations. Focus on issues involving both quantitative and qualitative factors, where the quantitative factors are the result of an engineering analysis. Risk and systems analysis tools provide a fundamental background to understanding the context in which technical decisions are made. Concentration on general systems theory as developed by Ludwig von Bertalanffy. Course previously offered as ETM 5251.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5271 Technology Forecasting and Assessment****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** A framework and analytical tools for developing technological foresight. Technology monitoring, forecasting and assessment in the context of a family of emerging technologies.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5283 Strategic Planning****Prerequisites:** Admission to the MSETM program or consent of instructor.**Description:** Continuous and systematic process of thought about the future, resulting in a plan or specific course of action for communicating, coordinating and controlling activities. Strategic, long-range, tactical, operational, contingency and performance planning. Course previously offered as ETM 5282.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5291 Failure Mode and Effects Analysis in Design****Prerequisites:** Admission to the MS in ETM program or consent of instructor.**Description:** A design technique for reducing risk and improving reliability of a system, design or process. Potential failures in any of these studied methodically during design. The concepts, tools and techniques applicable to any product or process.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5311 Value Engineering****Prerequisites:** Admission to the ETM program or consent of instructor.**Description:** The application of Value Engineering (also known as Value Analysis, Value Methodology) to improve customer value for a project, process, or product during or after engineering design. The development of VE, its objectives, definitions and methodologies, the use of the VE system, and its range of application. VE's use for improving performance reducing life cycle cost.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5341 Leadership Strategies for Technical Professionals****Prerequisites:** Admission to the ETM program or consent of instructor.**Description:** Leadership strategies, principles, styles and dynamics that must be understood by technical professionals engaged in the creation of products, processes, and services in technology-based organizations.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5351 Planning Technical Projects****Prerequisites:** Admission to the MSETM program or consent of instructor.**Description:** Techniques and tools for project definition, staffing, scheduling, resource allocation, and time estimation. Behavioral and quantitative dimensions of project management. Performance measures of project progress and completion.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5361 Managing Virtual Project Teams****Prerequisites:** Admission to the MSETM program or consent of instructor.**Description:** The management and group issues inherent in the application and implementation of effective teamwork in virtual work-spaces. The appropriate use of virtual team issues and challenges associated with effective teamwork; virtual team structures, process, and technology facilitation skills; group dynamics; and team motivation.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt**ETM 5371 Ethics for Practicing Engineers****Prerequisites:** Admission to the MSETM program or consent of instructor.**Description:** A values-based approach to professional ethics and its application to the decision-making in a technology-intensive environment. Ethical concerns related to the expectations of stakeholders.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Industrial Engr & Mgmt

**ETM 5391 New Product Introduction and Commercialization**

**Prerequisites:** Admission to the MSETM program or consent of instructor.

**Description:** Elements of the new product introduction (NPI) process and its impact on business strategy and planning. Organizational resources required for NPI and tools for determining commercial viability.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5411 Engineering Economic Analysis**

**Prerequisites:** Admission to the MSETM program or consent of instructor.

**Description:** Quantitative evaluation of investment alternatives. Basis for comparison of alternatives, including present worth, annual worth, rate of return and payout period methods. Decision-making among capital constrained and unequal-life projects. Benefit-cost and cost effectiveness analysis.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5461 Intellectual Property Management**

**Prerequisites:** Admission to MS in ETM program or consent of instructor.

**Description:** Overview of intellectual property law and management of intellectual property. Exploration of ways to manage intellectual property from conception through production and licensing. Types of intellectual property and associated legal issues and management processes.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5471 Introduction to System Safety**

**Prerequisites:** Admission to the MSETM program or consent of instructor.

**Description:** System safety as a discipline in research, development and acquisition of systems, sub-systems and components. The history and methodologies of mishap prevention including the development of system safety management and engineering processes.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5481 Sustainable Enterprise Strategies**

**Prerequisites:** Admission to the MSETM program or consent of instructor.

**Description:** The principles of sustainability in the context of industrial enterprises. The implications of sustainability in design of products, industrial systems and infrastructure. The importance of life cycle cost analysis as a key engineering economy tool.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5491 ISO 9000**

**Prerequisites:** Admission to the MSETM program or departmental permission.

**Description:** A detailed look at the requirements of ISO 9001:2008 from a systems perspective. The relationship between ISO 9001, ISO 9000, ISO 9004 and industry-related standards. Implementation and improvement of quality management systems (both high quality and typical methods).

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5511 Capstone Preparation**

**Prerequisites:** Admission to the MSETM program and at least 17 hours earned toward MSETM degree or departmental permission.

**Description:** Introduction to the requirements for the ETM Capstone Project, including problem statements, strategic implications, management systems, and problem metrics. Emphasis is placed on persuasive technical communication.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5521 Quick Response Manufacturing**

**Prerequisites:** Admission to the MSETM program or departmental permission.

**Description:** Introduction to QRM, an enterprise-wide strategy for lead-time reduction. Discussion of the four core concepts of QRM - realizing the power of time, rethinking organizational structure, understanding and exploiting systems dynamics, and implementing a unified strategy enterprise-wide. Definitions of manufacturing critical-path time (MCT) map. Focused target market segment (FTMS), and material control strategy POLCA. Case studies and MPX software.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5531 Contract Law in Engineering and Technology**

**Prerequisites:** Graduate standing.

**Description:** This course will provide engineers and architects with a background in common law as it applies to contracts. Topics will include concepts such as offer, acceptance, consideration and breach; contracts under the Uniform Commercial Code; express and implied warranties; and employment contracts.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt

**ETM 5943 Lean Sigma Implementation**

**Prerequisites:** IEM 5113, admission to the MSETM program or departmental permission.

**Description:** Introduction to the implementation skills necessary to successfully apply lean manufacturing and six sigma concepts and manage continuous improvement within a small to mid-sized firm. Successfully combining leadership, organizational dynamics, and skills in meeting customer expectations. Planning, applying, and monitoring these learned skills.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Industrial Engr & Mgmt