

M.S. with a Major in Manufacturing Systems Management

Candidates must satisfy a total of 30 credit hours (CH) with a minimum G.P.A. of 3.000 on a 4.000 scale.

All students must complete 30 credit hours (TCH) from the required 10-course curriculum which follows.

ME 7301 Entrepreneurship and Business Development in Manufacturing

A perspective of entrepreneurial thought that provides the necessary tools for starting a manufacturing venture. Management is the process of creating value from existing resources; in contrast, entrepreneurship is the area of creating the ideas and identifying and assembling the resources to create value. Students address this art for new ventures inside existing corporations and de novo startups in the manufacturing realm, learn what personality characteristics are important and effective in each of these settings and where they fit, learn the risks and rewards of each approach, and acquire the tools required to develop a business plan. Course content enables students to answer the most frequently asked questions about entrepreneurship. Examples, exercises, and cases will be drawn from a manufacturing environment.

ME 7303 Organizational Leadership

This is a course in personnel and organizational leadership. Students learn the scientific structure of organizations and methods used to improve the productivity and quality of life of people working in the organization. Also, introduces industrial-organizational (I/O) psychology as applied to the manufacturing organization. This course will focus on understanding individual behavior and experiences in industrial and organizational settings. Students are introduced to industrial psychology as it addresses the human resource functions of analyzing jobs, and appraising, selecting, placing, and training people. The organizational psychology portion of the course addresses the psychology of work, including employee attitudes, behavior, emotions, health, motivation, and well-being, as well as the social aspects of the workplace.

ME 7351 Computer Integrated Manufacturing Systems

This course covers the basic concepts and use of computer integrated manufacturing. Topics include integration approaches for manufacturing, process planning and simulation, the production process in relation to automated control systems, process design for shop for control of multiple interacting processes, distributed network process control, real-time aspects, interface protocols and languages of production processes, computational and data processing methods for planning, design, production, and shipping, and methods of optimizing output quality, price, and productivity. Economic justification and the use of artificial intelligence for planning and process control will be examined.

ME 7352 Manufacturing Methods and Systems

This course is intended as an overview for the M.S. degree in manufacturing systems management. Highly successful manufacturing methods and systems will be examined. Topics include the evolution of manufacturing technology in the United States, mass manufacturing, integrated manufacturing, distribution and manufacturing automation, just-in-time systems, continuous improvement, Kaizen, poka-yoke and total quality management. Modern Japanese manufacturing techniques will be examined in-depth. The underlying concepts and strategic benefits of flexibility, agility, time-based competition, and global manufacturing operation will be covered. The course will be presented from the perspective of the manufacturing manager.

ME 7353 Manufacturing Management

This course will explore new organizational structures, paradigms and leadership styles. Problem-solving within the business context: manufacturing strategies for optimizing production processes across the enterprise. Measuring and reporting business performance; investment decision making under conditions of risk and uncertainty; intellectual property strategies, products liability and the legal environment; contemporary practices, including self-directed work forces, competitive assessment, total productive maintenance, managerial and activity-based costing.

ME 7354 Lean Manufacturing and Six Sigma

The focus of this course is an overall total quality management perspective for the design of quality management systems. Metrics for cycle time and defects, base-lining and benchmarking, and House of Quality approaches are examined. Also covered is the basic concept of managing product quality from inception to deployment. Topics include acquiring and stabilizing new production processes, data collection and analysis for improvement and decision making. Purchasing, process control, reliability are covered in detail. Taguchi and poka-yoke and other practices are examined as tools for implementing TQM.

ME 7365 Strategies for Manufacturing Firms

This course examines the development and implementation of strategies for product design and manufacturing that best supports the overall strategy of the firm. Topics include positioning the product and production system in the industry, location and capacity decision, implementing manufacturing technologies, facilities planning, vertical integration, logistics planning, and organizational culture. Case studies of manufacturing firms are used extensively. *Prerequisite:* Graduate student standing.

ME 7366 Global Manufacturing

This course examines goals and strategies for manufacturing operations in the multinational environment. Topics include decision making for decentralizing and setting up foreign manufacturing operations, marketing, sales and distribution strategies, R&D support, location and capacity decisions, implementing new manufacturing technologies, facilities planning and modernizations, vertical integration, outsourcing strategies, logistics planning and organizational cultures. Case studies of manufacturing firms are used. *Prerequisite:* Graduate student standing.

ME 7369 Innovation Management

This course provides a foundation of modern theory and practice of product innovation in three parts. First, the course will review the macro-theory of disruptive innovation: technological, organizational, and market-driven. Second, how to implement and augment fast innovation capability within an organization. Third, the project-level innovation/invention will be covered with such methods as quality function deployment, morphological analysis, and theory of inventive problem-solving. Students will practice methods through the case study method and explore and develop disruptive innovation in a class project.

ME 7382 Finance and the Manufacturing Enterprise

This course contains an overview of strategic management decision processes relevant to engineering, manufacturing, and service industries. The targeted student is the current or future professional engineer-manager, engineer-owner and/or engineer-entrepreneur who combines engineering/manufacturing technology with business execution. Emphasis will be placed on how engineering and manufacturing managerial functions interact with the finance industry, markets and institutions. *Prerequisite:* Graduate student standing.