

ENGINEERING MANAGEMENT (ENGM)

ENGM 505. Principles of Engineering Management. 3 Hours.

Functions of engineering managers: planning, organizing, leading, and controlling. Business fundamentals for engineering managers. Engineering leadership and engineering management. Project management methods: planning, scheduling, and controlling.

ENGM 510. Engineering Project Management. 3 Hours.

Explores methods for organizing, coordinating, and controlling resources to minimize risk and conflict, and to maintain budgets and schedules. Discuss the evaluation of competing alternatives, organization of a project, scheduling of tasks and resources, and the role of management. Project control methods such as the Project Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are introduced. A project case study is carried out throughout the semester to illustrate decisions and problems encountered in technical project management.

ENGM 515. Operations Research for Engineering Management. 3 Hours.

This course provides you with an understanding of how various business situations are modeled and optimized effectively using mathematical modeling and quantitative techniques. Examples of the techniques covered in this course are time-series analysis, regression, optimization (linear, nonlinear, and discrete), probabilistic modeling, decision analysis, and simulation. Application areas include forecasting, finance, operations, production, and logistics. You will learn through examples, cases, and the use of software.

ENGM 520. Energy, Environment, and Sustainability. 3 Hours.

This survey course provides an overview of energy issues in the context of global sustainability. Energy demands for transportation, residential, and commercial uses are presented, and strategies for demand reduction are discussed. Major potential sustainable energy sources will be presented, including solar, wind, hydroelectric, geothermal, biofuels, waves, and tides, along with coal, nuclear, and hydraulic fracturing technologies. Issues associated with carbon capture, energy storage, and the power grid will be discussed. While this course will address many technical and scientific aspects of energy, no prerequisite technical courses are required.

ENGM 521. Energy Law and Regulation. 3 Hours.

This course explores how state and federal energy policy have shaped the energy landscape and can support or hinder the transition to a low-carbon economy. It examines the various drivers for policy change, and it reviews the major U.S. and Texas policies and regulations shaping the energy landscape with a focus on electricity. Topics covered include the role and perspectives of the key actors in policy making, including utilities, regulatory agencies, and advocacy organizations, as well as frameworks for policy evaluation.

ENGM 522. Renewable Energy Economics. 3 Hours.

This course introduces students to renewable energy sources, systems, economics, and the environment. It covers fundamental characteristics of renewable resources like solar, wind, and geothermal. Technical generation systems for photovoltaics, wind, hydroelectric, and more will be analyzed. The economic and environmental impacts of these technologies will also be evaluated.

ENGM 529. Principles of Manufacturing Processes. 3 Hours.

The course covers theoretical and practical aspects of manufacturing processes, including material properties and behavior influenced by the manufacturing process. In-depth study of such manufacturing processes as casting, heat treatment, bulk forming, sheet metal forming, metal cutting, nontraditional machining, and process monitoring through measurement of manufacturing process variables.

ENGM 530. Production & Inventory Control. 3 Hours.

This course focuses on traditional and contemporary techniques in production and inventory control within operations management. Key topics include forecasting, inventory control under deterministic and stochastic demand, lot sizing, supply chain management, scheduling, Materials Requirements Planning (MRP), just-in-time (JIT) systems, pull control models, and aggregate planning. The course also examines the design, development, implementation, and management of production planning systems, including master production scheduling, capacity and inventory planning, and production activity control.

ENGM 531. Advanced Quality Control. 3 Hours.

Advanced methods applied to quality control and anomaly detection; classical treatments and recent developments in statistical process control; evaluation, design, and maintenance of quality control programs; focus on monitoring and root cause identification.

ENGM 535. Advanced Engineering Economics. 3 Hours.

The design and analysis of financial strategies in a technical environment. Emphasis is on the application of these strategies in the competitive industry. Core topics include review and application of basic engineering economy concepts, mathematical techniques and models, treatment of risk and uncertainties, cost of capital, demand and price elasticity as it applies to capital investment decisions, financial statements, financial ratio analysis, taxes and inflation, capital budgeting, and financial planning. Special topics include ethics and legal perspectives.

ENGM 545. Strategic Management for Engineers. 3 Hours.

This course integrates concepts from all functional areas of an enterprise to provide strategic direction and organizational leadership. It equips engineers with a management perspective that complements their technical expertise. Emphasis is placed on strategies that promote success and sustainability in competitive, profit-driven environments across economic cycles. Students develop a framework for understanding the interrelationships among accounting, finance, operations, engineering, and marketing. The course employs a combination of lectures, case study analyses, open discussions, guest speakers, and student presentations.

ENGM 571. Economics of Pulp and Paper Industry. 3 Hours.

This course serves as an introduction to a global perspective on economic issues that affect the pulp and paper industry. Issues covered are the main characteristics of the global pulp and paper industry, the world paper market, information on forest industry raw material resources and energy resources, the worldwide structure and various strategies of the industry, and the economic consequences of decisions taken in a pulp and paper mill.

ENGM 599. Capstone Project. 3 Hours.

Introduction and development of an engineering management research project. The application of engineering management theory and science to real-world projects is the focus of this course. The research project includes literature reviews, data collection, data analysis, and conclusions based on the findings. Upon completion of the project, the student must submit a report and present an oral defense. To be taken in the last semester of the degree plan.