**MÜHENDİSLİK YÖNETİMİ**

**İNGİLİZCE TEZLİ YÜKSEK LİSANS PROGRAMI**

**DERS İÇERİKLERİ**

### **EM 500 Research Methods and Scientific Ethics**

### Scientific research; stages of scientific research methods, setting a scientific hypothesis, collecting data, analyzing and reaching a conclusion; approaches for modeling and formulating a problem to reach a solution; ethics in scientific research; rules and steps in writing a thesis.

### **EM 501 Statistical Analysis for Engineers**

Revıew of probability, random varıables and distributions; random sampling and data description, point estimation of parameters and confidence intervals; hypothesis testing; analysis of variance and design of experiments; regression and response surface analysis.

### **EM 502 Operations Management**

Operation strategy, production processes and process design, production logistics, forecasting methods, inventory management, planning and quality management within the scope of operations management and their applications in real business life.

**EM 503 Engineering Project Management**

Project initiation, estimating, budgeting, developing work plans, scheduling, tracking work, resource allocation, project coordination, quality management, leadership, managing teams, conflict, negotiations, ethics, and professional responsibility.

### **EM 504 Advanced Statistical Quality Control**

### Understanding of variation, statistical process control, process improvements through statisticalanalysis, 7 QC tools, advanced forms of controlcharts (EWMA, CUSUM, Shewhart charts), Moving Range techniques, time series analyses, controlcharts for attribute data, capability studies, process mapping, visualisation techniques for effective decision making, statisticalanalyses in Exceland MINITAB, measurement system analysis, implementation of performance measurement and control.

### **EM 505 Human Machine Systems Design**

Development of safe, high performance human-machine systems. System/function/task analysis, function allocation, design, mockups and rapid prototyping, human factors test and evaluation. Critical examination of the human-factors and domain-specific literature, identifying human factors problems, and knowledge and methods to address those problems.

### **EM 506 Optimization Methods**

Concept of optimization, optimization algorithms, nonlinear programming, gradient reduction method, least squares method, Newton's method, random mutation, simulated annealing, evolutionary algorithms, genetic algorithms, particle swarms, bacterial search, ant colonies, artificial bee colony applications.

### **EM 507 Industrial Data Analytics**

Both theoretically and with industry practice, applying data analytics techniques in manufacturing and service institutions, data analytics course, principal component analysis, regression analysis, classification, clustering analysis, verification, and testing. Besides the theoretical discussion of these techniques, sector applications will be shown.

### **EM 508 Stochastic Models in Operations Research**

An introduction to techniques for modeling random processes used in operations research - Markov chains, continuous time Markov processes, Markovian queues, Martingales, Optimal Stopping/Optional Stopping Theorem, Brownian Motion, Option Pricing.

### **EM 509 Advanced System Simulation**

Queue models and basic performance measures; Random Number, Variable and Generation Methods; Monte Carlo Simulation; Discrete event simulation: Modeling and Programming; Statistical Analysis of Input and Output (simulated) Data; Validation and Verification, Variance Reduction Techniques; Comparison of Alternative Systems.

### **EM 510 Financial Management**

The role of financial managers, core concepts in corporate finance and financial terminology, the financial manager's role within a company, including financing decisions, investing decisions and risk/return tradeoffs, stock valuation, cash flow valuation and project evaluation criteria.

### **EM 511 Fuzzy Decision Making Methods**

Fuzzy sets and logic, Fuzzy set operations, Fuzzy inference and composition, Fuzzy relationship equations, Fuzzy rules, Mamdani, Tagaki-Sugeno and Tsukamoto fuzzy modeling, Fuzzy logic controller structures and design, Fuzzy logic control applications, Fuzzy multi-criteria decision making methods.

### **EM 512 Healthcare Systems Management**

Operations research to solve various healthcare management problems related to performance measurements, optimization of working times, minimization of costs, optimization of activity planning, case practices, using optimization and simulation tools.

### **EM 513 Cost Management**

Importance and Development of Cost Management, Strategic Cost Management, Current Cost Management Approaches, Activity Based Costing, Cost Management in Just-in-Time Production, Cost in Product Life Cycle, Target Costing, Logistics Costs, Inventory Costs and Management, Quality Costs, Standard Costs and Cost Control, Budgeting and Performance Management, Cost Management Information System.

### **EM 514 Lean Manufacturing and Six Sigma**

Historical Development of Lean Thinking, Lean Production Philosophy, Lean Production Principles, Lean Production Techniques, Lean Production Culture, Value, Wastes, Elimination of Wastes, Determining Problems, Continuous Improvement, Drawing System, Value Flow Mapping, Shortening Production Flow Times, Balancing Production, Production and Inventory Control, Cellular Production, 5S system, Performance Measurement.

### **EM 515 Information Systems Management**

Managing, analyzing, designing and implementing an information system, Strategic value, methodologies, quality, decision making, modeling, re-engineering, software, hardware, and ethical issues.

### **EM 516 Business Intelligence**

Introduction to Business Intelligence, Fundamentals of Business Intelligence, Types of Business Intelligence, Data Architecture, Introduction to Data Mining, Data Mining Techniques, Data Warehouse, Data Warehouse Types, Information Management, Business Intelligence Cycle, Business Intelligence User Model, Problems and Challenges in Business Intelligence, Business Intelligence Strategy and Roadmap, Business Intelligence Applications.

**EM 517 Quality Engineering Management**

Concept of quality, development of quality concept, global competition and new management paradigms Differences between total quality management and classical management Total quality management philosophy and principles Total quality management tools Total quality management applications Quality control circles Implementation of total quality management Leadership and importance of total quality management Total quality management success factors, criticism on total quality management, total quality management in Turkey, quality awards in quality practice.

**EM 518 Customer Relationship Management**

Importance of customer relationship management, CRM culture and restructuring, Integration of human resources and customer relationship management, New dimensions of customer relations, Customer acquisition and retention, Measurement of customer relations, Organizational culture and change, Customer oriented management approach.

### **EM 519 Quantitative Models in Supply Chain Management**

EconomEMs of scale in the supply chain, quantity and transportation discounts. Multi-stage inventory and production systems, risk pooling, decentralized and centralized modeling approaches, bullwhip effect. Supply chain coordination, strategic games in supply chains, and contracting. more complicated examples from industry. Decision-making and information management issues in supply chains with emphasis on integrating procurement, operations, and logistics; stages from raw materials to customer demand, with emphasis on quantitative models of supply chain.

**EM 520 Industry 4.0 Applications**

Introduction to Industry 4.0, Digitalization and Challenges for Industry 4, Comparison of Industry 4.0 Factory and Today's Factory, Trends of Industrial Big Data and Predictive Analytics, Industrial Internet of Things (IIoT), Smart Manufacturing, Smart Supply Chain Logistics,  Cyberphysical Systems, Robotic Automation and Collaborative Robots, Role of data, information, knowledge and collaboration in future organizations, Cloud Computing and Industry 4.0.

**EM 521 Communication Skills for Engineers**

Discovering how to handle difficult conversations and crisis communication, solve case studies and building teams, design and deliver strong and persuasive presentations.

**EM 522 Creativity, Innovation, and Design**

Contemporary views of creativity, innovation and design and their importance within organizations and business that are increasingly characterized by risk and uncertainty, managing the activities of creativity, innovation and design through the application of theory and the introduction of practices and processes to achieve sustainable competitive advantage, the innovation imperative, creative problem-solving approaches, design thinking, innovation process management, and innovation performance measurement.

**EM 523 Healthcare Quality Management**

Basic concepts in healthcare quality, Causes of errors in healthcare systems, Use of various statistical tools in healthcare quality management, Patient safety, cause and effects analysis, and root cause analysis of errors in healthcare systems, Effects of various healthcare policies on healthcare quality.

**EM 524 Risk Assessment and Management**

The concepts and general principles of risk analysis, assessment and management in engineering systems, the qualitative risk identification methods and the quantitative risk assessment methods and techniques. the risk management strategy and the process of managing risks, starting by the identification stage, and followed by the initial assessment and the response and mitigation stage.

**EM 525 Economic Analysis**

Project initiation and development, review of practical decision-making problems and relevant techniques, benefit/cost analysis, time value of money, Nominal and effective interest rate, calculation involving multiple interest formulae, internal rate of return, payback period method, comparisons of alternative investments, depreciation methods, income tax consideration, inflation, replacement analysis, sensitivity analysis, life-cycle costing, economic analysis of projects.

**EM 526 Safety Engineering Management**

Principles and theory of hazard, qualitative hazard assessment of equipment and technologies, knowledge on the influence of risk on the environment, more sophisticated hazard and risk assessment tools necessary for the elaboration of accident plans and the investigation of accidents.

**EM 527 Reliability and Maintenance Management**

The concept of reliability, estimating reliability and related characteristics of components. Mean time to failures and failure rate estimations, renewal process, and analysis of reliability of complex systems. Maintenance, availability, and maintenance management systems.

### **EM 528 Multi Criteria Decision Making**

Determination of alternatives, criteria, and weights for complex decisions. Analysis of multi criteria decision making methods such as AHP, TOPSIS, ELECRE, and PROMETHEE. Fuzzy multi criteria decision making approaches. Using goal programming in multi criteri decision making.

**EM 580 Selected Topics in Engineering**

Selected topics in the area of Engineering Management.

**EM 590 Graduate Seminar**

A series of lectures in Engineerin Management is given by faculty members or outside speakers.

**EM 595 M. S. Thesis**

**EM 596 Term Project**