**ENDÜSTRİ MÜHENDİSLİĞİ ANA BİLİM DALI**

Dersin

Kodu Dersin Adı Kredi Saati

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INE-501 Linear Optimization 3 0 3

INE-503 Quality Control 3 0 3

INE-508 Non-Linear Programming 3 0 3

INE-510 Decision Models 3 0 3

INE-511 Inventory Control Models 3 0 3

INE-512 Production Management 3 0 3

INE-513 Supply Chain Management 3 0 3

INE-515 Applied Statistics 3 0 3

INE-516 Simulation 3 0 3

INE-520 Facility Planning 3 0 3

INE-521 Integrated Product Design 3 0 3

INE-522 Special Topic 2 3 0 3

INE-523 Special Topic 1 3 0 3

INE-534 Heuristic Optimization 3 0 3

INE-568 Enginering Application of Stochastic Models 3 0 3

**DERS İÇERİKLERİ**

**INE-501 Linear Optimization Methods 3 0 3**

Mathematical Development of Simplex Algorithm. Formulations of Various Problems as Linear Programming  Problems.  Duality Theory and Economic Interpretations. The Revised Simplex, the Dual Simplex and the Primal-Dual Simplex Methods. Special Forma of Linear Programming Problems and Their Solution Methods. Sensitivity and Post-Optimality Analysis

**INE-503 Quality Control 3 0 3**

Introduction to quality control, total quality management-principles and practices, TQM tools and technics, fundamental of statistics, control charts for variables, additional SPC technics for variables, fundamentals of probability, control charts for attributes, acceptance sampling systems, reliability, management and planning tools

**INE-508 Nonlinear Programming 3 0 3**

Concept of Convexity for  Functions and Sets. Kuhn-Tucker Conditions and Lagrangean Duality. Quadratic Programming. Steepest Descent, Newton-type, Quasi Newton and Gradient Methods for Unconstrained Optimization.  Penalty and Barrier Methods for Constrained Optimization

**INE-510 Decision Models 3 0 3**

Introduction to decision making-framing the decisions; multiple attribute decision making techniques (discrete and continuous alternative space); multiple objective mathematical programming; modeling uncertainty and preferences; interactive methods; analytical hierarchy process; influence diagrams; game-theory based methods; strategic decision problems from real-life cases.

 **INE-511 Inventory Control Models 3 0 3**

 Study of Inventory Systems. Inventory Costs. EOQ Model. Deterministic and Stochastic Models with Fixed or Variable Reorder Intervals and Lead Times. Multi-Echolon Models. Heuritic Solutions to Some Inventory Models.

**INE-512 Production Management 3 0 3**

Basic essentials of production management, production systems, new product develeopment process, statistical method for forcasting, technology management, plant location and facilities planning, manaegment of logistics, capacity planning, maintenance management and preventive maintenance, production and inentory control, work design, motion and time study, productivity, wage and salary administration.

**INE-513 Supply Chain Management 3 0 3**

This course gives and understanding of the basic concepts, techniques and algorithms for planning and coordinating the supply chain systems. Moreover, it serves an opportunity to practice the tools taught in operations research and production planning courses.

**INE-515 Applied Statistics 3 0 3**

An overview of efficient methods of data collection and analysis in various fields of engineering and technology applications; exposition of experimental design concepts and statistical modeling tools of data analysis; role of experimental design in engineering studies; fundamental statistical concepts; comparison of more than two treatments (ANOVA analysis); factorial designs; regression and correlation analysis; response surface methodology; Taguchi's contribution to experimental design; hands-on experimental tests on engineering applications.

**INE-516 System Simulation 3 0 3**

This course highlights the importance of economic principles in engineering applications, especially in project evaluation procedures. Basics of economic evaluation of engineering decisions such as time value of money, inflation, depreciation and income taxes and related techniques are given

**INE-520 Facility Planning 3 0 3**

In this course, an overview of all the functions that are involved in successfully designing and operating a manufacturing facility. The topics covered are choosing manufacturing processes, developing production systems and associated plant layout, designing material-handling and storage systems, selecting the essential labor resources, considering the cost factors that go into the design and operation of a plant, basic location/allocation analysis, which determines the most economic location for a plant or plants in a country (or machines within a plant).

**INE-521** **Integrated Product Design 3 0 3**

An overview of product and process development methodology enabling simultaneous cost reduction, increased customer satisfaction, increased quality and reduced cycle time; major phases of product and process development; competitive manufacturing strategies; concurrent engineering; design for manufacturing; quality function deployment; value engineering; product architecture; process engineering; information modeling with a special attention to the changing nature of new product introduction in high technology companies; case studies in the above topics.

**INE-522 Special Topics** **3 0 3**

Contingency Logistic Network Design: Basic of contingency logistics networks, reliability modeling in contingency logistic networks, optimization in contingency logistic networks, stock allocation in contingency logistic network.

**INE-534 Heuristic Methods 3 0 3**

Heuristic methods are artificial intelligence search methods that can be used to find the optimal decisions for designing or managing a wide range of systems. This course covers applications and developments of heuristic search methods for solving complex optmization problems, detailing various local search strategies including genetic algorithms, simulated annealing, and taboo search. Algorithms will be used to find values of discrete and/or continuous variables that optimize system performance. Students can select application projects from a range of application areas. The advantages and disadvantages of heuristic search methods for both serial and parallel computation are discussed in comparison to other optimization algorithms.

**INE-568 Engineering Application Of Stochastic Models 3 0 3**

A Review of Probability Theory. Basic Foundations of Stochastic Processes. Bernoulli Processes. Poisson Process. Markov Chains and Markov Processes With Applications in Queuing Models. Renewal Processes and Their Applications in Reliability. Replacement and Inventory Problems