DEPARTMENT OF INDUSTRIAL ENGINEERING
Industrial Engineering Master's Degree with Thesis Course Contents

COURSE CODE	COURSE NAME AND CONTENTS	T	P	C	ECTS
END206	**System Analysis and Design (Scientific Preparation Programme)**	3	0	3	5
Purpose and Content	Introduction of system concept, system terminology, system approach. Mathematical modeling of systems, system analysis, system analysis-system approach relationship. The basic stages of the system analysis study. Methods and tools used in system analysis (production function, isoquant curves, identical optimal points curve, etc.). Sensitivity analysis. Decision making techniques. Examples of system analysis applications.				
END207	**Operations Research I (Scientific Preparation Programme)**	3	0	3	6
Purpose and Content	1.Teach using different mathematical modeling techniques with Operations Research 2.Give information about LP Methods and training the students for the skill of implementing these methods. Definition, history and methodology of Operations Research, Construction of linear programming models and solving techniques, Duality theory, Sensitivity analysis, Integer Programming, Transportation, assignment and transshipment problems				
END208	**Operations Research II (Scientific Preparation Programme)**	3	0	3	5
Purpose and Content	1.Teach students to formulate problems and finding appropriate solutions or algorithms to solve them. 2.This course aims to give students a good foundation in Operations Research and introductory knowledge in modeling and solving the network and Decision Theory problems arising in diverse areas 3.Introducing stochastic processes and goal programming in Operations Research (OR) to the students of Industrial Engineering, and training the students for the skill of implementing the methods. Network Models, Decision Theory, Stochastic Processes and Markov Chains, Goal Programming, Non-Linear Programming				

END212	**Work Study (Scientific Preparation Programme)**	**3**	**0**	**3**	**5**
Purpose and Content	The aim of this course is to provide students with the ability to define and evaluate the business system. Definition of Work Study, Productivity, Human Factor in the Application of Work Study, Method Study, Arrangement of Material and Worker Movement at Work, Work Measurement, Job Sampling, Tools in Time Study, Job Selection and Measurement, Rating, Determination of Standard Time.				

END301	**System Simulation (Scientific Preparation Programme)**	**3**	**0**	**3**	**5**
Purpose and Content	This course aims at teaching the basic concepts and methods in developing simulation models of discreteevent dynamic and stochastic systems and enhancing all these concepts and methods by using the computer simulation modeling languages ARENA and ProModel. This course covers basic principles in developing discrete and continuous event simulation models and also emphasizes how to analyze and interpret the results of computer simulation experiments.				

END302	**Facility Planning (Scientific Preparation Programme)**	**3**	**0**	**3**	**5**
Purpose and Content	Facility Layout and Planning which is interested by many engineering branches and other disiplines aims to select facility location where activities are optimal performed in manufacturing and service area and to make decision for providing that optimal use of resources in accordance with requirements. Basic concepts and definitions. Facility design. Facility and environment. Facility and its contents. Facility design process. Opprotunity analysis and feasibility studies. facility location selection. Transportation techniques. MODI, VAM. Facility location quantitative measures. Facility layout. Systematic facility layout planning. Activity process diagrams. Flow-action relationship diagrams. Facility arrangement models and techniques.				

END305	**Production Planning and Control (Scientific Preparation Programme)**	**3**	**0**	**3**	**5**
Purpose and Content	1. to explain general structure of production systems and related planning and control techniques. 2.To teach students how to analyze a variety of production systems. 3.To teach students techniques of Material Management. Production Systems, concept and hierarchy of Production Planning, Demand Forcasting techniques, Material Management, Material Requirements Planning, Aggregate production planning, Master Production Scheduling, Capacity Planning				

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END309	**Cost Accounting (Scientific Preparation Programme)**	3	0	3	5
Purpose and Content	This course is aim to calculate costs of product and services, to convert the results to useful information by using various cost accounting and analysis techniques and to make comment information Calculation of the cost of the product produced in production facilities, classification of production costs, analysis of these costs with different methods. Cost allocation, basic cost calculation methods and cost accounting systems, inventory valuation. Activity-based, order- and phase-based cost accounting systems.				

END311	**Quality Engineering (Scientific Preparation Programme)**	3	0	3	5
Purpose and Content	Because quality is one of the most important indicators for companies to maintain their existence and to to maximize their market shares,it is aimed in this course to provide understanding of the importance of quality improvement and processes control in business life. Quality and quality-related terms, statistical measures related to quality, quality control diagrams and graphs, experimental design and analysis				

LUEE701	**Scientific Research Techniques and Scientific Ethics**	3	0	3	8
Purpose and Content	To express the process operation in a scientific research and to define the points to be considered in the preparation of a scientific report. Fundamental concepts and information about the science, the structure of scientific research, scientific methods and different ideas on these methods, data acquisition methods (quantitative and qualitative), registration, analysis, interpretation and reporting of datas.				

FBE701	**Enterpreneurship**	4	0	0	8
Purpose and Content	The concept of entrepreneurship, importance and historical development, The entrepreneur personality characteristics, Entrepreneurial culture, and benefits, Entrepreneurial processes, Entrepreneurship in Turkey, Basic business functions in enterprise, Foundation stages, Business idea, Business plan, Project preparation, Sections of the business plan, Business plan writing and presentation, Sample business plan. With the number of entrepreneurs on the basis of development of the country. The purpose of this course will be the people who graduate from college, and the courage to give the method needed to establish their own businesses. Instead of individual runs is necessary to provide an enterprise to teach the methods. Individuals building of the business idea is simple and easy to comprehend.				

ENM701	**Deterministic Models In Operations Research**	3	0	3	8
Purpose and Content	The aim is the implementation of deterministic models to decide which problems and to reach a solution. Introduction to linear programming, sensitivity analysis, duality problems, integer programming and solution techniques and applications programs developed for the solution of industrial problems.				

ENM702	**Sequencing and Scheduling**	3	0	3	8
Purpose and Content	The aim is the implementation of several sequencing and scheduling problems and solution methods to achieve different properties Model characteristics. The machine configurations. Processing characteristics and constraints. Performance criteria. General-purpose scheduling methods. Basic distribution rules. Mixed distribution rules. Branch-and-bound method. Local search methods. Single machine parallel machine, work-flow models. Single machine scheduling systems, sequence dependent setup time. Single machine earliness and tardiness penalty functions systems. Workshop makespan and total weighted tardiness scheduling heuristic for the bottleneck.				

ENM704	**Advanced Statistical Applications**	3	0	3	8
Purpose and Content	The aim is to understand the various theories of probability, and can be measured what kind of data analysis will be made and to gain the ability to interpret a variety of software with the conclusions reached. Statistical package for data analysis programs. Excel, Minitab and SPSS interfaces. Selection of an appropriate statistical analysis. Data entry. Data differentiation. create a table. create a chart. Z and T tests. One-and two-way analysis of variance. Factorial ANOVA. Analysis of covariance. Simple multiple regression and correlation analysis. The multivariate hypothesis testing. Multivariate analysis of variance (MANOVA). Multivariate linear regression analysis. Principal components analysis. Factor analysis. Cluster analysis. Discriminant analysis. Correlation analysis between sets. Correspondence analysis.				

ENM706	**Logistics Management**	3	0	3	8
Purpose and Content	The aim is the learning of logistics, logistics management, supply chain management, the importance of logistics enterprises, issues of how to design effective and efficient logistic systems Logistics and logistics management. Procurement, production and distribution logistics concepts. Supply chain management and its components. Relationship between supply chain and logistics. Supply chain integration. Logistics and transportation. Logistics network design. Inventory management. Distribution systems and distribution strategies. Logistics strategies, logistics planning, logistics approaches to solutions to the problems. Logistics outsourcing. The third and fourth party logistics. Logistics and supply chain management, information technology. Supply chain management and logistics case studies.				

ENM708	**Object-Oriented Programming For Engineers**	3	0	3	8
Purpose and Content	The aim is create algorithms for computer software applications encountered in engineering studies, series, file, class and understanding of pointers and the acquisition of programming skills. Introduction and general concepts of object-oriented programming method. Comparison of object-oriented programming languages with traditional programming languages. Software development process. Object-oriented programming features. Data hiding. Heredity. Polymorphism. Functions installation. Classes. Abstract Classes. Founder and destructive functions. The use of pointers. References. Operator Overloading. Exceptions. Visual Programming.				

ENM709	**Human Factor Engineering**	3	0	3	8
Purpose and Content	The aim is a more appropriate working environment for employees to increase productivity Human factors engineering, definition, scope and objectives. The importance of human engineering, industrial engineering and management. Evaluation of the study. Human error. Change in the supply of performance over time. Load / strain concepts. Shift work. Anthropometric examination of their place of work. Working conditions. Ergonomic workplace regulation. Factory audit ergonomic principles. Applied Human Engineering issues.				

ENM710	**Production and Inventory Management**	3	0	3	8
Purpose and Content	The aim is to ensure effective and up-to-date production and inventory management that will provide an advantage to the business in an intensely competitive environment. Facility and capacity planning in production; process management; supply chain management; inventory management; demand forecasting; automation systems; quality control systems; latest production techniques; artificial intelligence and multi-criteria decision-making techniques in production				

ENM711	**Advanced Information Systems**	3	0	3	8
Purpose and Content	The aim is the learning of information, information management, knowledge management models and how to establish these models Introduction to information systems. Data processing and management information systems. Data base management systems. System development tools. The development of information systems. Decision support systems. Office automation systems. Top management information systems. Artificial intelligence and expert systems				

ENM712	Ergonomics In Work Analysis	3	0	3	8
Purpose and Content	The aim is to increase the efficiency of operation in the field of ergonomics, on behalf of the necessary arrangements can be measured Ergonomics and ergonomics-related business disciplines. Business analysis ergonomics. Human physiology and anatomy. Energy requirements and working hours, rest breaks. Business physiology. Business psychology.				

ENM714	Information Management	3	0	3	8
Purpose and Content	Knowledge, understanding and purposeful definition of knowledge management and enterprise information model to learn how to be established Introduction to information systems. Organization, information systems, information systems, investigation and analysis of an organization s information technology policy. Information technology architecture: data communication and network communication. Internet, Intranet and web-based systems. Information processing needs. Enterprise Resource Management (ERM) in business information technology.				

ENM716	Data Mining For Engineers	3	0	3	8
Purpose and Content	Data mining; statistics, database technology, machine learning, artificial intelligence and visualization. In this course, it is aimed to introduce the basic applications, concepts and techniques related to data mining. Data Mining Concepts, Basic Requirements of Data Mining, Data Mining Models, Data Mining Methodology with IBM SPSS Modeler, WEKA Data Mining, Statistica Data Miner, Microsoft Data Mining Addins Excel, Rapidminer, Application with Weka and IBM SPSS Modeler Data Mining Programs				

ENM717	Hazard Evaluation Methods	3	0	3	8
Purpose and Content	The aim is the identify potentially hazardous situations in production systems and taken necessary precautions. Hazard evaluation input. Reliability. Hazard and Risk. Accident-producing system. Hazard assessment and prevention techniques. Risk assessment. Hazard prevention methods.				

ENM722	Lean Manufacturing	3	0	3	8
Purpose and Content	To teach students the classification of production systems, value stream mapping, lean manufacturing philosophy, lean manufacturing techniques such as 5S, SMED, TPM, JIT and KANBAN techniques of lean manufacturing techniques. Lean Production Philosophy, Differences in Approach Between Traditional Production and Lean Production, Concept of Waste in terms of Lean Production, 5s, Value Stream, Kanban, Kaizen				

ENM724	**Artificial Intelligence and Industrial Applications**	3	0	3	8
Purpose and Content	The aim is learning of general concepts of artificial intelligence and understanding various applications in industrial Artificial intelligence, basic concepts (search, problem solving, knowledge representation methods, planning, natural language processing), artificial intelligence technologies, expert systems, artificial neural networks, genetic algorithms, fuzzy propositional logic, artificial intelligence technologies, examples of industrial applications				

ENM726	**Process Management**	3	0	3	8
Purpose and Content	Gaining the knowledge necessary for the design, documentation and management of business processes in institutions The place, components, characteristics, hierarchy, definition, performance measurement, documentation and improvement of processes within organizational structures				

ENM728	**Management For Engineers**	3	0	3	8
Purpose and Content	Introducing the principles of teamwork in engineering and some mathematical models to assist in decision making; providing the necessary information for the student to make healthy decisions in accordance with the economic criteria and to carry out joint studies Leadership, Management Consulting Firms, Management Consulting Projects, Teamwork principles, performance evaluation, conflict and stress management				

ENM729	**Investment Planning**	3	0	3	8
Purpose and Content	To inform the student especially on economic and financial feasibility studies and to give feasibility study preparation techniques. Economic Definitions and Concepts, Place of Economics of Business, Investment Planning and Economic Systems, Production Factors and Major Production Activities, practice with incentives Tools in Turkey, Investment Planning and Project Concept, Preparation of Investment Project Economic Aspects, Preparation of Investment Projects Technical Direction, Investment Financial Preparation of Project Projects, Evaluation of Investment Projects, Cost Calculations, Profitability Analysis and Depreciation, Applied Feasibility Study				

ENM734	**Quality Control Applications**	3	0	3	8
Purpose and Content	This course aims to inform about the industrial quality concept and to teach Process Control and Acceptance Sampling techniques. Quality concept, Evolution of Quality Control, Basic statistics for quality, Probability distributions, Int to Statistical Process Control, Control Charts for Variables, Control Charts for Attributes, Process capability, Acceptance Sampling, Operating Characteristic Curve, AOQL and ATI values, Types of Sampling Plans, Standard Sampling Plans.				

ENM735	**Fuzzy Logic and Applications**	3	0	3	8
Purpose and Content	The aim of this course is to teach how Fuzzy Logic works and how it can be applied to engineering problems. Introduction to Fuzzy Logic, Fuzzy Set Theory, Fuzzy Set Operations, Fuzzy Set Properties, Membership Functions, Fuzzy Rules, Fuzzy Set Based Systems, Mamdani, Sugeno and Tsukamoto Fuzzy Inference Systems, Adaptive Network Based Fuzzy Inference System				

ENM736	**Design and Analysis of Experiments**	3	0	3	8
Purpose and Content	The aim is to design problem-based experiment and to perform statistical analysis and interpretation Single and multi-factor Variance Analysis, introduction to experimental planning, determine the number of experiments, full factorial designs, fractional factorial designs, Taguchi methods				

ENM737	**Sustainable Engineering**	3	0	3	8
Purpose and Content	The course covers the evolution of closed systems, where waste is the input to new processes rather than just the output of linear (open cycle) systems that process resources and capital. Sustainable engineering (SE) encompasses the responsible use of resources without compromising the ability of future generations to meet their own needs. With this course, it is aimed that the students will better understand the effects of the engineering applications on the environment and society. Industrial Ecology, Sustainability, Life Cycle Assessment, Circular Economy				

ENM797	**MSc Seminar**	2	0	0	6
Purpose and Content	To have comprehensive knowledge about the subject which will be presented, to gain the ability of presentation, to consider the comprehension about the subject of thesis. A comprehensive research and presentation about a subject assigned by student and supervisor.				

ENM7098D	**Course Specialized Field**	4	0	0	4
Purpose and Content	The aim of this course is to give students who are at the course stage the ability to follow, evaluate and discuss the literature on the subject. In addition, the development of students' knowledge and skills in terms of scientific ethics and scientific research methodology. Gathering information on current professional issues, Literature research, Science ethics, Scientific research methodology				

ENM7098T	**Thesis Specialized Field**	1	0	0	26
Purpose and Content	The aim of this course is to give students who are at the thesis stage the ability to follow, evaluate and discuss the literature on the subject. In addition, the development of students' knowledge and skills in terms of scientific ethics and scientific research methodology. Gathering information on current professional issues, Literature research, Science ethics, Scientific research methodology				

ENM799	**MSc Thesis Research**	1	0	0	26
Purpose and Content	To improve the ability of getting the scientific information, its evaluation and interpretation by conductive scientific research. MSc thesis work.				