DEPARTMENT: ENVIRONMENTAL ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1201831	Anaerobic Biological Treatment	4	Fall/Spring	Prof. Dr. Dilek Erdirençelebi	Undergraduate	Introduction to biological treatment processes, ananerobic stoichiometry, microbiology, digestion characteristics, co-digestion, reactors, application to industrial wastewaters, energy recovery.
1201711	Biological Nutrient Removal	4	Fall/Spring	Prof. Dr. Dilek Erdirençelebi	Undergraduate	Aerobic processes, anoxic processes, phosphorus removal, microbiology, nitrogen and phosphorus removing systems, reactors, design and process operation.
1201911	Environmental Biotechnology	5	Fall/Spring	Prof. Dr. Dilek Erdirençelebi	Master's	Biological treatment processes, microbiology, aerobic processes, anaerobic processes, anoxic processes, treatability studies, modelling, reactor designing, process operations, review of pilot- and real-scale applications.
1201912	Sustainable Operation of Wastewater Treatment Plants (WWTP)	5	Fall/Spring	Prof. Dr. Dilek Erdirençelebi	Master's	Introduction, municipal WWTPs, processes, parameters, design characteristics, operational characteristics, industrial WWTPs, processes, reactor operations, sectors, processes and systems with valuable material recovery, waste recovery methods.
1201913	Sustainable Development	5	Fall/Spring	Assoc. Prof. Selim Doğan	Master's	SDG Knowledge, Intergovermental Processes, SDG Actions, Implementetion Progress, SD Goal 6: Water and Sanitation, SD Goal 11: Sustainable Cities and Communities, SD Goal 12: Climate Action, SD Goal 15: Life on Land, Rescue Plan for People and Planet
1201920	Drought Analysis and Monitoring	5	Fall/Spring	Assoc. Prof.Dr. Selim Doğan	Doctoral	The concept of drought and extreme events in hydrology, Meteorological, hydrological and agricultural droughts, Drought classifications, Drought parameters, Methods for drought analysis and monitoring, Drought Indices (SPI), Drought Indices (EDI), Drought Indices (PDSI, Z-Score, Percentiles, others.), Calculation of SPI, Calculation of EDI, Constructing drought time series, Temporal and spatial analysis of drought parameters, Drought monitoring, Drought management

1201540	Electrochemistry	4	Fall	Asst.Prof.Dr. Seçil Tutar Öksüz	Undergraduate	The aim of this course is to teach the basic principles of electrochemistry, the laws of electrochemistry, electrochemical equations, electrochemical cell types, and electrochemical applications (e.g. batteries and fuel cells).
1201631	Soil Pollution and Control	4	Spring	Asst.Prof.Dr. Seçil Tutar Öksüz	Undergraduate	The aim of this course is to introduce the causes of soil pollution from various aspects and to teach physical, chemical and biological techniques for the treatment of contaminated soils.
8228001017	Resource recovery from waste	5	Spring	Asst. Prof. Dr. Gamze Göktepeli	Master's	Waste types and their classification; Water recovery - "Black and gray water", "Biological treatment of wastewater", "Desalination", "Mining wastewater recovery technologies"; Energy recovery - "Thermochemical methods", "Biofuel production", "Microbial fuel cells"; Material recovery - "Volatile fatty acids", "Recycling of waste electronic and electrical equipment", "Important raw materials"; Application examples

DEPARTMENT: ELECTRICAL-ELECTRONICS ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1202501	Electrical Machinery I	5	Fall	Asst. Prof. Dr. Emre Hasan DURSUN	Undergraduate	To provide students with knowledge and skills on basic principles of electromagnetic field, basic principles of energy conversion, structure of transformers and direct current machines, steady-state equivalent circuit models, all properties and performance analysis.
1202603	Electrical Machinery II	6	Spring	Asst. Prof. Dr. Emre Hasan DURSUN	Undergraduate	Introducing all electrical and electromechanical features of induction motors, which make up approximately 90% of the motors used in industry, and especially synchronous machines used in electrical energy generation to students.
1202308	Computer Programming 2	3	Fall	Asst. Prof. Dr. Kemal ERDOĞAN	Undergraduate	Introduction to MATLAB, Arrays, Polynomials, Matrices, Graphs, Finding Equation of Curves, Integral Calculation, File Operations, Simulink, Introduction to Proteus, Analog Circuit Drawing, Digital Circuit Drawing, Printed Circuit Example Preparation

1202210	Computer Programming 1	5	Spring	Asst. Prof. Dr. Kemal ERDOĞAN	Undergraduate	General Introduction and Basic Concepts of Programming, Algorithm Design and Flow Diagrams, Introduction to C Functions and Variables, Operators, Comparison, Loops, Arrays, Matrices, Sorting, Search, Functions, Pointers, String, Mathematical Functions and Applications, File Operations
1202746	Introduction to Near Field Communication	3	Fall	Asst. Prof. Dr. Dilek UZER	Undergraduate	Introduction to Near Field Communication, Basics of Near Field Communication, History, Design Challenges of Near Field Communication (YAH), YAH Operating Modes, Coding, Modulation and Interference in YAH, Antenna Designs for YAH Devices and Applications, Near Field Magnetic Communication, RFID Introduction to, Fundamentals, Design Steps, Chip and Chipless RFID Structures, Smart Antenna Designs for RFID Systems, RFID Readers and Recorders, Security of RFID Systems, RFID Tags, Active and Passive RFID Structures, Security and Personality Rights in YAH, NDEF' Introduction to Arduino, Arduino and YAH, Embedded Systems, YAH, Internet of Things and YAH Applications, Wireless Power Transmission, Current YAH Applications, Current YAH Applications.
1202812	Antennas and Propagation	4	Spring	Asst. Prof. Dr. Dilek UZER	Undergraduate	Antenna Definition and Antenna Types, Radiation Generation, Current Distribution in Thin Wire Antenna, Basic Antenna Parameters, Radiation Pattern, Isotropic, Directional and Non-Directional Patterns, Radiation Power Density, Radiation Intensity, Directivity, Gain, Antenna Efficiency, Half-Power Beam Width, Beam Efficiency, Bandwidth, Polarization, Input Impedance, Radiation Resistance, Antenna Radiation Efficiency, Effective Length and Equivalent Areas, Maximum Directivity and Maximum Effective Area, Friis Transmission Equation and Radar Range Equation, Antenna Temperature, Radiation Integrals and Auxiliary Potential Functions, Electrical and Vector Potentials of Magnetic Current Sources, Electric and Magnetic Fields of Electric and Magnetic Current Sources, Solution of Inhomogeneous Vector Potential Wave Equation, Far Field Radiation, Duplicity and Reciprocity Theorems, Fundamental Antennas, Infinitely Small Dipole Radiation, Power Density, Radiation Resistance, Near Field, Far Field and Intermediate Zones, Small Dipole, Segmentation into Zones (Far Field Zone, Radiant Near Field n and Reactive Near Field Regions), Finite Length Dipole, Half-Wave Dipole, Vertical Antenna, Horizontal Wire in Free Space, Horizontal Wire Near Ground, Rhombic Antenna, Frame Antenna, Helical Antenna, Frequency Independent Antennas (Spiral Antenna and Log-Periodic Array) , Antenna Arrays, Two Point Source, N Element Array and Radiation

						Pattern Drawings, Pattern Multiplication, Typical Arrays (Yagi-Uda, Broadside, etc.), Array Scan (Phase Scan, Frequency Scan), Microwave Antennas, Horn Antennas, Parabolic Reflective , Slit Antennas, Lenses, Electromagnetic Wave Propagation, Reflection, Refraction, Diffraction, Interference. Propagation Paths of EM Waves, Ground Waves, Space Waves, Celestial Waves
8221031008	Feature extraction and Selection Methods	7,5	Fall	Prof.Dr. Seral ÖZŞEN	Graduate	Feature extraction with time and frequency domain signal processing and feature selection methods
8221001071	Time Series Analysis Applications in Biomadical Signal Processing	7,5	Spring	Prof.Dr. Seral ÖZŞEN	Graduate	ARMA, parametric and nonparametric time series methods, density estimation, nonlinear prediction
8221021008	Economic Operation of Electrical Energy Systems	7,5	Fall	Prof. Dr. Nurettin ÇETİNKAYA	Graduate	All kinds of work to be done in order to increase the efficiency and reduce the cost in electrical facilities.
8221001063	Computer Aided Antenna Design and Simulation	7,5	Spring	Asst. Prof. Dr. Dilek UZER	Graduate	An overview of simulation programs, necessary assignments, mathematical methods used in antenna and microwave design

DEPARTMENT: INDUSTRIAL ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
IE1203133	Introduction to Industrial Engineering	3	Fall	Assoc. Prof. Dr. Mehmet Emin BAYSAL	Undergraduate	Operations and productivity, operations strategy in global framework, the design of goods and services, locations strategies, layout strategies, human resource, work design and measurement, operations research, simulation, quality management, project management, engineering economy, descriptive statistics and data summary, forcasting and simple linear regression, ergonomics.

IE1203333	Operations Research-1	6	Fall	Asst. Prof. Dr. Alper DÖYEN	Undergraduate	Introduction to operations research, modeling by linear programming, linear programming problem examples, graphical solution method, simplex method, special cases in simplex method (alternative optimal, degeneration, unbounded solution space), big-M method, two-phase method, finding the dual of linear programming problems, weak duality, strong duality, complementary slackness, reading optimal dual solution from simplex table, sensitivity analyses (on graphical solution, on simplex table and on GAMS solution file), dual simplex method, transportation problems, transportation simplex method (MODI method), assignment problems, Hungarian method, introduction to integer programming, branch and bound method.
IE1203334	Probability Theory	4	Fall	Asst. Prof. Dr.Ece ÇETİN YAĞMUR	Undergraduate	Sample spaces, events, conditional probability, independence, Bayes' theorem, discrete random variables, probability distributions, probability mass functions, and cumulative distribution functions, mean and variance, binomial, geometric, negative binomial, hypergeometric, poisson distributions, continuous random variables and density functions, cumulative distribution, mean and variance, continuous uniform, normal, exponential, erlang, gamma, weibull, lognormal, beta distributions, joint probability distributions, marginal distributions, conditional distributions, independence, covariance and correlation, multinomial, bi-variate normal distributions.
IE1203335	Systems Analysis	3	Fall	Assoc. Prof. Dr. Ahmet SARUCAN	Undergraduate	System design and environment, information systems, lineer cycle problem solving, data gathering, data flow diagrams, data description, advanced modeling techniques, new system design, process design, database design, practical design methods alternative solution methods, strategic planning, detailed system design.
IE1203337	Engineering Economy	3	Fall	Asst. Prof. Dr. Gözde CAN ATASAGUN	Undergraduate	Economic analysis and evaluation for investment projects, subject and basic concepts of engineering economics, interest and time value of money, simple, compound, nominal, effective and real interest rate, cash flow series, single, uniform, gradient and irregular payment series, evaluation of investment projects alternatives, present worth, future worth, annual worth method, internal rate of return, benefit/cost ratio, payback period method, replacement analysis, the effect of inflation on cash flows, depreciation and its effect on investments, after-tax economic analysis, sensitivity and risk analysis.

IE1203433	Operations Research-2	6	Spring	Asst. Prof. Dr. Alper DÖYEN	Undergraduate	Modeling by integer programming (capital budgeting, fixed-charge, set covering, bin packing, traveling salesman, vehicle routing problems), modeling “either-or” and “if-then” constraints, linearization techniques for nonlinear functions (for maxmin or minmax type models, absolute value terms, and piecewise linear functions), GAMS modelling language, non-preemptive and preemptive goal programming, network models (minimum spanning tree, shortest path, maximum flow, minimum cost network flow problems) solving combinatorial optimization problems by branch and bound method, dynamic programming, game theory (saddle point and strictly determined games, games with mixed strategies and solving these games by linear programming), Markov chains.
IE1203434	Engineering Statistics	5	Spring	Asst. Prof. Dr.Ece ÇETİN YAĞMUR	Undergraduate	Introdution to statistics, measures of central tendency and variability, sampling distibution, statistical estimation, statistical hypothesis testing, Z and t tests, nonparametric tests, regression analysis, variance analysis, time series, indexes.
IE1203435	System Design	3	Spring	Assoc. Prof. Dr. Ahmet SARUCAN	Undergraduate	General systems theory and its history, system design and environment, typical information systems, problem-solving steps, problem definition, feasibility study, system analysis, system design, system implemantation, data collection, starting a project, information system development tools, data flow diagram and sample applications, pseudocode, decision trees, decision tables, description of data, advanced modeling techniques, process definitions, object-oriented methodology.
IE1203531	Production Planning and Control-1	3	Fall	Prof. Dr. Yakup KARA	Undergraduate	Production planning and control system, strategic planning and manufacturing strategies, learning curves, product design, product life cycle, demand forecasting (Causal Models, Time Series), aggregate production planning (Tableau Method, Linear Programming Models, Dynamic Programming Models), master production scheduling (MPS), materials requirements planning (MRP), lot sizing, capacity requirements planning (CRP), production activity control and purchasing.
IE1203532	Quality Control	3	Fall	Prof. Dr. Orhan ENGİN	Undergraduate	General quality concepts, quality philosophy and management strategies, cost of quality control, use of statistical methods for quality control and ımprovement, control charts for variables, control charts for attributes, cumulative sum and exponentially weighted moving average control charts, exponentially weighted moving average control charts, process monitoring and

						control techniques, acceptance sampling, single and multiple acceptance sampling, acceptance sampling plans.
IE1203534	System Thinking	2	Fall	Prof. Dr. S. Erhan KESEN	Undergraduate	Learning in and about complex sytems, system dynamics in action, the modeling process, structure and behavior of dynamic systems, causal loop diagrams, stocks and flows, dynamics of stocks and flows, closing the loop, dynamics of simple structures, S-shaped growth, epidemics, innovation diffusion, and growth of the new products, path dependence and positive feedback, delays, coflows and aging chains, modeling decision making,
IE1203538	Mathematical Modeling and Solving	4	Fall	Prof. Dr. İsmail KARAOĞLAN	Undergraduate	Introduction and basic concepts, importance of linarity in mathematical models, modeling sample problems related to linear programming, modeling sample problems related to integer programming, modeling sample problems related to mixed integer programming, expressing and understanding models with multi-index decision variables and parameters in closed form, solution and analysis of sample models using Microsoft Excel add-ins such as Excel Solver or Open Solver etc., solution and solution analysis of sample models using GAMS package program.
IE1203540	Project Management	4	Fall	Assoc. Prof. Dr. Mehmet Emin BAYSAL	Undergraduate	Introduction to project management and basic terminology, organization structures in projects, project selection and evaluation, project management knowledge areas/project management process groups, project initiation processes, planning processes, execution processes, monitoring and controlling processes, closing processes, post project evaluation and lessons learned, project presentations.
IE1203631	Production Planning and Control -2	3	Spring	Prof. Dr. Yakup KARA	Undergraduate	Machine loading, job sequencing and scheduling (flow shop scheduling algorithms, job shop scheduling algorithms), manufacturing/assembly line balancing (single-model assembly line balancing models, mixed-model assembly line balancing algorithms, U-line balancing algorithms), project planning and scheduling (CPM, PERT), inventory management - inventory control policies, inventory management - static and deterministic models, inventory management - discount models, inventory management - dynamic deterministic models, inventory management - stochastic models.

IE1203632	Plant Layout And Design	4	Spring	Prof. Dr. İsmail KARAOĞLAN	Undergraduate	Introduction to facility location selection, single facility site selection in continuous space, multi-plant site selection in discrete space, heuristic methods used in facility location selection, introduction to facility layout, tools and required data, mathematical models and other methods, computer aided heuristics.
IE1203633	Simulation	4	Spring	Prof. Dr. S. Erhan KESEN	Undergraduate	Introduction to simulation, simulation examples in a spreadsheet, general principles, simulation software, statistical models in simulation, queueing models, random-number generation, random-variate generation, ınput modeling, estimation of absolute performance, estimation of relative performance, developing simulation model using Siman/Arena.
IE1203634	Productivity Analysis	2	Spring	Assoc. Prof. Dr. Mehmet Emin BAYSAL	Undergraduate	Main productivity concepts, ratio analysis, regression analysis, productivity measurement using mathemathical models, green productivity, green productivity application steps, green productivity techniques, green productivity tools, sustainable productivity applications, green productivity applications in Turkey, case study presentations.
IE1203635	Lean Prıduction	3	Spring	Prof. Dr. Yakup KARA	Undergraduate	Introduction to production systems, competing with production, decision making in production systems, lean production, seven types of waste, value chain components, value chain mapping, lean production techniques, standards, 5S, visual management, kaizen, just-in-time production, flow, pull system, Heijunka, SMED, quality assurance network, quality at the source, Jidoka, Poka Yoke, problem solving techniques, PDCA, seven quality tools, process production capability, total productive maintenance, TPM losses,overall equipment effectiveness (OEE), TPM components.
IE1203637	Network Optimization	4	Spring	Asst. Prof. Dr. Alper DÖYEN	Undergraduate	Introduction and basic concepts, minimum spanning tree problem, shortest route problem, transportation problem - transportation table, transportation problem - initial solutions (north-west corner mothod, minimum cost method, Vogel approxiamation method), transportation problem - transportation simplex (MODI) Method, transshipment problem, maximum flow problem, minimum cost flow problem, assignment problem, Königsberg Bridges problem - Euler network, The Chinese Postman problem, solution of network models using package programs.

IE1203640	Analytical Decision Making in Management	4	Spring	Assoc. Prof. Dr. Ahmet SARUCAN	Undergraduate	Basic concepts in decision making, the classification of decision problems, decision making under risk, expected value, expected loss of opportunity, most likely event, target level methods, decision trees, decision making under uncertainty, decision making under certainty, multi-criteria decision making, simple additive weighting and weighted product methods, AHP method, TOPSIS method, weighting methods, application and discussion of decision problems to real life problems.
IE1203641	Enterprise Resource Planning	4	Spring	Prof. Dr. Yakup KARA	Undergraduate	History and terminology of ERP systems, components and features of ERP systems, ERP software market and selection process, implementation of ERP systems and critical success factors, human resources management using ERP Software, costumer relationships management using ERP software, materials management using ERP software, production planning and MRP using ERP software, production activity control using ERP software (orders, reports, etc.), quality management using ERP software, maintenance management using ERP software, integration of ERP and MES systems.
IE1203719	Scheduling	4	Fall	Prof. Dr. S. Erhan KESEN	Undergraduate	Single machine models, the total weighted completion time, maximum lateness, the number of tardy jobs, the total tardiness (dynamic programming), Parallel machine models: the makespan with and without preemptions, the total completion time with and without preemptions, due date related objectives, flow shop models: unlimited and limited intermediate storage, job shop models: disjunctive programming and branch&bound, the shifting bottleneck heuristic and the makespan, open shop models: the makespan with and without preemptions.
IE1203720	Heuristic/Metaheuristic Methods	4	Fall	Prof. Dr. İsmail KARAOĞLAN	Undergraduate	Optimization concept, heuristic methods, constructive heuristics for the traveling salesman problem and vehicle routing problem, neighborhood search mechanisms (i,e. swap, insert, swap range), evaluation steps for neighborhood search mechanisms, hill climbing method, introduction to meta-heuristic methods, simulated annealing, tabu search, ant colony optimization, variable neighborhood search algorithm, genetic algorithm, memetic algorithm.

IE1203803	Management Information Systems	3	Spring	Assoc. Prof. Dr. Ahmet SARUCAN	Undergraduate	System and system concepts, decision making in management, information systems, computer-based information systems, decision support systems, office automated systems, artificial intelligence and expert systems, executive management support systems, data processing systems, management information systems, information system development tools, database design and management, relational database design, sources of data and data management, database models, system development lifecycle, prototyping, application software packages, end user development, communication and network systems, network topologies, communication network types.
IE1203810	Quality Assurance Systems	4	Spring	Prof. Dr. Orhan ENGİN	Undergraduate	ISO management systems, introduction of ISO 14001 environmental management system, analysis of ISO 14001 environmental management system standard, introduction to ISO 14001 environmental management system, introduction to ISO 9001 quality management system, ISO 9001 quality management system user manual and terms, context of organization, leadershi,, policy, quality policy, planning, support, operation, performance evaluation, continuous improvement.
IE1203816	Inventory/Warehouse Management	4	Spring	Prof. Dr. S. Erhan KESEN	Undergraduate	Deterministic single-item models with static demand, multiple items and constraints, quantity discounts: all-units discounts, quantity discounts: incremental discounts, stochastic single-period models, periodic review models: multiperiod models with no fixed ordering cost, periodic review models: multiperiod models with a fixed ordering cost, continuous review models: a heuristic treatment of the fixed reorder quantity policy with lost sales.

DEPARTMENT: GEOMATICS ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1205840	Physical Geodesy	4	Spring	Prof. Dr. R. Alpay ABBAK	Undergraduate	1. Introduction and basic concepts 2. Potential Theory: Newton's law of gravitation, Gravitational potential and its characteristics 3. Potential Theory: Definition of Spherical Harmonics and Global Geopotential Models (GGM) 4. Earth Gravity Field: Centrifugal force and potential, Gravity force and potential, Gravity Measurements 5. Earth Gravity Field: Equipotential surface 6. Normal Gravity Field: Nivo ellipsoid 7. Disturbing Gravity Field: Geoid Height (undulation), Height Anomaly, Vertical Deflection, Gravity Disturbance, Gravity Anomaly 8. Height Systems: Scientific and Practical Heights 9. Midterm Exam 10. Geoid determination methods 11. Types of Geoids 12. Geoid determination: Numerical application 13. PROJECT: Local geoid determination by GNSS levelling 14. PROJECT: Local geoid determination by GNSS levelling 15. Presentation of project report

1205435	Mathematical Geodesy	2	Spring	Prof. Dr. Muzaffer Kahveci	Undergraduate	1. Subject and scope of mathematical geodesy 2. Projection of a surface onto another surface and deformations in projections 3. Isometric parameters in conformal (angle-preserving) projections, isometric latitude, and solved problems. 4. Transforming geodetic (ellipsoidal, geographic) coordinates into Gauss plane coordinates (Xg, Yg) and solved problems. 5. Transforming from Gauss plane coordinates into geodetic (ellipsoidal, geographic) coordinates and solved problems. 6. Differential scale in Gauss-Krüger projection 7. The first Fundamental Geodetic Problem in a Gauss-Krüger projection plane coordinate system. 8. The Second Fundamental Geodetic Problem in a Gauss-Krüger projection plane coordinate system. 9. Midterm exam 10. Reduction formulas in the Gauss-Krüger projection system and solutions to fundamental problems using reduction formulas 11. Relationship between UTM and Gauss-Krüger projection plane coordinate systems 12. Coordinate transformation between adjacent zones in the Gauss-Krüger projection system 13-15. Problem-solving assignment covering all calculations taught within the scope of the course

1205745	Differential GNSS (DGNSS) and RTK CORS Networks	2	Spring	Prof. Dr. Muzaffer Kahveci	Undergraduate	1 Introduction, aim of the lecture and its contents 2 What is GNSS and DGNSS? General definitions, similarities and differences 3 Satellite Based Systems (WAAS, EGNOS, MSAS vb.) 4 Ground based systems (GBAS) 5 Real Time Kinematic (RTK) 6 Real Time Net-RTK 7 Proprietary DGNSS and RTK protocols 8 International standard DGNSS and RTK protocols 9 RTK correction computation and transfer methods (VRS) 10 Mid exam 11 RTK correction computation and transfer methods (FKP) 12 RTK correction computation and transfer methods (MAC) 13 RTK CORS Networks 14 CORS Examples in the World 15 CORS-TR (TUSAGA-Aktif)
8223031013	Modern Approximations in Geoid Determination	5	Spring	Prof. Dr. R. Alpay ABBAK	Master's	1. Introduction and basic concepts 2. Astro-geodetic method 3. Gravimetric method 4. Geometric method 5. Hybrid method 6. KTH approximation 7. Additive corrections 8. Stokes-Helmert approximation 9. Terrain correction 10. Hotine approximation 11. PROJECT: regional geoid determination 12. PROJECT: regional geoid determination 13. PROJECT: regional geoid determination 14. PROJECT: regional geoid determination 15. Presentation of project report

8123031012	Modern Approximations in Gravity Field Modelling	5	Spring	Prof. Dr. R. Alpay ABBAK	Doctoral	1. Introduction and basic concepts 2. Gravity field modelling and its importance in geodesy 3. Normal gravity field computation 4. Disturbing potential field computation 5. Satellite geodesy and its importance in gravity field 6. CHAMP satellite mission 7. GRACE satellite mission 8. GOCE satellite mission 9. GRACE-FO satellite mission 10. Other low orbit satellites 11. PROJECT: Earth gravity field modelling by satellites 12. PROJECT: Earth gravity field modelling by satellites 13. PROJECT: Earth gravity field modelling by satellites 14. PROJECT: Earth gravity field modelling by satellites 15. Presentation of project report

DEPARTMENT: CIVIL ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
-	Water Resources	4	Spring	Assoc. Prof. Dr. Alpaslan YARAR	Undergraduate	This course aims to provide students with the necessary knowledge regarding the dimensioning and operation of structures built for the development, conservation, and management of water resources, from the perspective of sustainable engineering.
-	Advanced Hydrology	5	Spring	Assoc. Prof. Dr. Alpaslan YARAR	Master's	The proportion of precipitation that can become runoff, and the impact of the resulting hydrograph on water resource facilities, will be discussed. Furthermore, the theory of the unit hydrograph and its applications will be explained.

-	Cement And Concrete Technology	3	Spring	Assoc. Prof. Dr. Oğuzhan ÖZTÜRK	Undergraduate	Cement and Concrete Technology course thoroughly examines the physical, chemical, and mechanical properties of cement, aggregates, water, and admixtures, which are the core components of concrete. Within the scope of the course, cement production processes, the behavior of fresh and hardened concrete, concrete mix design methods, and environmental factors affecting concrete durability are covered both theoretically and practically. Students gain the skills to manufacture, test, and manage quality control processes for high-performance, economical, and sustainable concrete types required in modern construction projects.
-	Cement And Concrete Technology	5	Spring	Assoc. Prof. Dr. Oğuzhan ÖZTÜRK	Master's	Cement and Concrete Technology course thoroughly examines the physical, chemical, and mechanical properties of cement, aggregates, water, and admixtures, which are the core components of concrete. Within the scope of the course, cement production processes, the behavior of fresh and hardened concrete, concrete mix design methods, and environmental factors affecting concrete durability are covered both theoretically and practically. Students gain the skills to manufacture, test, and manage quality control processes for high-performance, economical, and sustainable concrete types required in modern construction projects.
-	Engineerıng Hydrology	3	Spring	Prof. Dr. Nermin ŞARLAK	Undergraduate	Definition of Hydrology and Hydrologic Cycle; Rainfall and runoff; Streamflow; Hydrograph analysis; Statistical methods in hydrology.
-	Numerical And Experimental Modeling Of Hydraulic Structures	5	Spring	Asst. Prof. Dr. Ali YILDIZ	Master's	To introduce experimental and numerical modeling methods used to understand the behavior of hydraulic structures and conduct design and performance analyses; to teach the theoretical foundations, application areas, and limitations of these methods; and to ensure that students gain competence in using these methods in scientific research and engineering design processes.

-	Fluid Mechanics	5	Spring	Asst. Prof. Dr. Ali İhsan MARTI	Undergraduate	Basic Concepts, Physical properties of fluids, Behavior under stress,Viscosity, Surface tension, Capillarity, Hydrostatics,Variation of pressure with depth, Manometers, Pascal's principle,Hydrostatic buoyancy, Fluid kinematics, Lagrangian perspective, Eulerian perspective,Streamlines, Types of flow,Flow pipes, Basic equations of one-dim. flows,Continuity equation, Bernoulli's equation,Impulse-momentum equation,Two-dimensional flows.
-	Hydraulics	4	Spring	Asst. Prof. Dr. Ali İhsan MARTI	Undergraduate	Introduction to Hydraulics, Pipe Hydraulics, Boundary Layer, Types of Pipe Flows, Laminar and Turbulent Flows, Continuous-Local Head Losses, Moody Diagram, Pump Aided Reservoir Systems, Wetted Perimeter, Hydraulic Radius, Uniform Flow Formulas, Three-Reservoir Systems, Water Pipelines,Water Networks, Hardy Cross Method, Open Channel Flow, Energy Loss in Open Channel, Chezy, Manning Formulas,The Most Economic X-section, Non-uniform flows, Specific Energy-Depth Relationship, Sub- and Super Critical Flows, Discharge-Depth Relations, Cross-section Change Channel Control Structures, Hydraulic Jump.

DEPARTMENT: GEOLOGICAL ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1207535	Environmental Geology	5	Fall	Prof. Dr. Kerim KOÇAK	Undergraduate	The Philosophy and Fundamental Principles of Environmental Geology, The Earth and Influencing Processes, Minerals and Rocks, Earthquakes and the Environment, Energy and the Environment, Water Pollution, Waste Disposal, Landslides and Their Impact on the Environment, Site Selection and Decision-Making in Urban Planning, Air Pollution
1207514	Igneous Petography	5	Fall	Prof. Dr. Kerim KOÇAK	Undergraduate	Introduction, magmas, petrography of igneous rocks, volcanic and hypabyssal rocks, abundance and distribution of magmatic rocks, the chemical and mineralogıcal properties of igneous rocks, textures of igneous rocks, glassification of igneous rocks, steic of ıgneous crystallization, magmatic differentiation, igneous alteration, granites and granitic rocks,

1207415	Optical Mineralogy	3	Spring	Prof. Dr. Kerim KOÇAK	Undergraduate	Introduction , properties of light , interference , optic retardation, light and polarized light, uniaxial and biaxial indicatrix, optic activity, polarised light microscopy, accessory plates, orthoscopic studies (form, shape, colour, pleochroism, the Becke lines, relief, cleavage, measurement of length and surface in minerals, isotropy, anisotropy, extinction angles, elengation), conoscopic studies, optical orientation, relatıonship of optical properties to crystal, andesites and related rocks, basalts and related rocks, trachyte-syenite and related rocks, dacite-rhyolite and related rocks, ultramafic rocks, kimberlites, carbonatites, chemistry.
1207612	Petrography of Metamorphic Rocks	4	Spring	Prof. Dr. Kerim KOÇAK	Undergraduate	Metamorphic processes, texture, structure, nomenclature of rocks, mineral phase and zone, metamorphic facies, metamorphic rocks, types of metamorphism, metamorphic grades, anatexis and migmatites

DEPARTMENT: MINING ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1209804	Mining Machinery	4	-	Prof. Dr. Niyazi BİLİM	Undergraduate	Participants should have information about the equipment used in mining operations, have knowledge about the purpose of using these equipments and how they are used, have knowledge about the right selection of the equipment to be put into operation, correctly determine the equipment required for the operation and choose from the suppliers in the market according to these needs. By determining the most suitable brand and model, they have a preliminary experience in the selection of equipment that will both meet the needs of the enterprise in an optimum way and be suitable in terms of cost. and as a result, it is aimed to raise awareness about the advantages it will bring to the business.

1209502	Haulage & Drainage In Mining	4	-	Prof. Dr. Bilgehan KEKEÇ	Undergraduate	Classification of haulage systems. Chain conveyor system and calculations. Belt conveyor systems and calculations. Rail haulage systems and calculations, rope haulage systems an calculations. The importance of drenage, drenage facilities, pumps, pump combinations.
1209304	Strength of Material	4	-	Prof. Dr. Mehmet Kemal GÖKAY	Undergraduate	Strength of material are given through force, strengh and strain relations by solving examples in classroom.
1209501	Rock Mechanics-2	4	-	-	Undergraduate	Mechanics of rocks are explaining in this lecture. It is the second course in rock mechanics and add extra information-knowledge obtained in Rock Mech.-1 lecture given earlier. Rock mass behavior around dams, galleries, tunnels and at constructions' foundations are lectured in this course.
1209710	Geophyical Measurements In Mining	5	-	Prof. Dr. Mehmet Kemal GÖKAY	Undergraduate	Understanding opportunities of geophysical measurements in mining industry.
1209719	Automation In Mining	5	-	Dr. Emre KARAKAYA	Undergraduate	This course covers the execution of production, excavation, and monitoring processes in mining operations through automated control systems, robotic technologies, sensors, and digital systems.
1209704	Flotation	4	-	Assoc. Prof. Dr. Hasan Ali TANER	Undergraduate	This course aims to provide the students with general knowledge related to the theory and practice of enrichment of ores with flotation method.
1209431	Mineral Deposits	5	-	Assoc. Prof. Dr. Hasan Ali TANER	Undergraduate	In this course, students are provided with an overview of the fundamental principles of mineral deposits, the environments and conditions of their formation, examples of such deposits, and the mineral potential of our country.
1209717	Mineral Processing Grinding Equipment	4	-	Assoc. Prof. Dr. Hasan Ali TANER	Undergraduate	The objective of this course is to explain the fracture behavior of particles during size reduction, define the principles of grinding, and introduce the types of mills used in grinding processes.
1209813	Mineral Processing in Recycling	4	-	Assoc. Prof. Dr. Hasan Ali TANER	Undergraduate	The classification of waste in recycling, the use of ore preparation and beneficiation technologies in recycling applications, and the environmental impacts of waste are explained.

8227011007	Quantitative decision making methods in mining	5	-	Prof. Dr. Mehmet Kemal GÖKAY	Graduate	It encompasses the application of mathematical modeling, optimization, multi-criteria decision-making, and risk analysis methods to the solution of engineering problems encountered in mining operations.
8227011011	Fracture mechanics in rock and solid materials	5	-	Prof. Dr. Mehmet Kemal GÖKAY	Graduate	It encompasses the study of crack formation, propagation, and fracture behavior in rocks within the framework of mechanical principles, as well as the application of this knowledge in rock engineering practices.
8127011051	Underground depositories and their design works	5	-	Prof. Dr. Mehmet Kemal GÖKAY	Graduate	It encompasses the design, stability analysis, and safe operation of underground storage facilities and underground cavities, in accordance with geological, geotechnical, hydrogeological, and engineering criteria.
8227001009	Micronized Grinding	5	-	Assoc. Prof. Dr. Hasan Ali TANER	Graduate	Information about the mills used in ore preparation plants, mills used for micronized grinding of liberated minerals in fine particle size
8227001011	Rare Earth Elements and Enrichment	5	-	Assoc. Prof. Dr. Hasan Ali TANER	Graduate	Learning about deposits containing rare earth elements (REEs) and methods for their beneficiation, and being able to contribute to the resolution of challenges encountered in the beneficiation of REEs.
8227001008	Response Surface Methods in Mineral Processing	5	-	Assoc. Prof. Dr. Hasan Ali TANER	Graduate	Ability to design and perform laboratory experiments, learning and applying Response Surface Methods, ability to create multi-factor and multi-level experimental designs

DEPARTMENT: MECHANICAL ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1210185	[ME] Computer Aided Technical Drawing II	5	Fall (Semester 1)	Asst. Prof. Dr. Osman Öztürk	Undergraduate	1. GEOMETRY FOR MODELING AND DESIGN 2. MODELING AND DESIGN 3. ORTHOGRAPHIC PROJECTION 4. 2D DRAWING REPRESENTATION 5. SECTION VIEWS 6. AUXILIARY VIEWS 7. MODELING FOR MANUFACTURE AND ASSEMBLY 8. DIMENSIONING 9. TOLERANCING 10. THREADS, FASTENERS, AND SPRINGS 11. WORKING DRAWINGS 12. DRAWING CONTROL AND DATA MANAGEMENT 13. GEARS AND CAMS 14. WELDING REPRESENTATION
1210280	[ME] Computer Aided Technical Drawing II	5	Spring (Semester 2)	Asst. Prof. Dr. Osman Öztürk	Undergraduate	1. GEOMETRY FOR MODELING AND DESIGN 2. MODELING AND DESIGN 3. ORTHOGRAPHIC PROJECTION 4. 2D DRAWING REPRESENTATION 5. SECTION VIEWS 6. AUXILIARY VIEWS 7. MODELING FOR MANUFACTURE AND ASSEMBLY 8. DIMENSIONING 9. TOLERANCING 10. THREADS, FASTENERS, AND SPRINGS 11. WORKING DRAWINGS 12. DRAWING CONTROL AND DATA MANAGEMENT 13. GEARS AND CAMS 14. WELDING REPRESENTATION

1210381	[ME] Material Science I	6	Fall (Semester 3)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Introduction to material properties 2. Atomic structure and bonds 3. Crystal structure 4. Crystal structure 5. Solidification and crystal structure defects 6. Solidification and crystal structure defects 7. Strengthing mechanisms 8. Strengthing mechanisms 9. Deformation hardening dislocation interactions 10. Diffusion 11. Tensile Test 12. Destructive testing methods 13. Destructive testing methods 14. Destructive testing methods 15. Destructive testing methods
1210382	[ME] Material Science II	6	Fall (Semester 3)	Prof. Dr. Muhammet Hüseyin Çetin	Undergraduate	1. Phase diagrams 2. Phase diagrams 3. Production and heat treatment of steel 4. Fe-C phase diagram 5. Annealing, recrystallization, aging 6. Tempering steel 7. Hardening and its measurement. 8. The effect of alloying elements 9. Classification of steels 10. Cast iron 11. Aluminium alloys 12. Copper, Brass, Bronze 13. Corrosion 14. Corrosion and its prevention 15. Corrosion and its prevention

1210383	[ME] Strength of Materials I	5	Fall (Semester 3)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Calculation and application of strain using Mohr's circle 2. Calculation and application of stress using Mohr's circle 3. Derivation of stress transformation equations 4. Stress on inclined planes 5. Stresses in beams under unsymmetrical loading 6. Stress analysis of eccentrically loaded beams 7. Midterm examination 8. Determining stresses and the position of the neutral axis in beams under axial and bending loads 9. Bending moment diagrams 10. Calculation of bending and shear stresses in beams 11. Calculation of the centroid and second moment of area for beams with a specified cross-section 12. Shear-force and bending-moment diagrams for beams 13. Torsional shear stress and deformation; power transmission through rotating shafts 14. Calculation of strain and deformation in axially loaded members 15. Stress analysis of members under tensile and compressive stresses

1210384	[ME] Strenght of Materials II	5	Fall (Semester 3)	-	Undergraduate	1. Calculation of beam deflection by the double integration method 2. Application of the elastic-curve equation to statically indeterminate problems 3. Calculation of beam deflection using the singularity method 4. Calculation of beam deflection by superposition; solution of statically indeterminate problems 5. Application of Euler's column formula; stress and deformation calculations and sizing 6. Buckling design of timber and aluminum columns 7. Calculation of bending, torsional and shear stresses and deformations under a concentrated load using work and energy methods 8. Calculation of tensile and compressive stresses and deformations under a concentrated load using work and energy methods 9. Midterm examination 10. Application of strain energy to a general state of stress 11. Stress and strain calculations for impact loading under single and multiple loads using work and energy principles 12. Stress and strain calculations for impact loading under single and multiple loads using work and energy principles 13. Castigliano's theorem; calculation of displacements in truss systems 14. Determination of reaction forces in statically indeterminate beams using Castigliano's theorem 15. Castigliano's theorem; determination of beam deflection

1210386	[ME] Manufacturing Technologies	6	Fall (Semester 3)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Mechanical properties of materials 2. Tolerances 3. Casting 4. Casting 5. Powder metallurgy 6. Plastic deformation 7. Plastic deformation 8. Midterm examination 9. Sheet-metal processing techniques 10. Sheet-metal processing techniques 11. Machining and machine tools 12. Machining and machine tools 13. Welding 14. Welding 15. End-of-term evaluation and general review
1210389	[ME] Dynamics	5	Fall (Semester 3)	Prof. Dr. Ömer Sinan Şahin	Undergraduate	1. Basic concepts, Newton's laws and units 2. Law of gravitation, scalars and vectors, vector operations 3. Rectilinear motion 4. Curvilinear motion in a plane 5. Curvilinear motion in a plane 6. Relative motion in translating coordinate systems 7. Motion of interconnected particles 8. Midterm examination 9. Force, mass and acceleration 10. Force, mass and acceleration 11. Work and energy 12. Work and energy 13. Impulse and momentum 14. Impulse and momentum 15. Final examination

1210471	[ME] Strenght of Materials I	5	Spring (Semester 4)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Stress analysis of members under tensile and compressive stress 2. Calculation of strain and deformation in axially loaded members 3. Torsional shear stress and deformation; power transmission in rotating shafts 4. Torsional shear stress and deformation; power transmission in rotating shafts 5. Calculation of centroid and moment of inertia for beams with a given cross-section 6. Calculation of bending and shear stresses in beams 7. Bending moment diagrams 8. Determination of stresses in beams under combined axial and bending loads; locating the neutral axis 9. MIDTERM EXAM 10. Stress calculation in beams under eccentric loading 11. Stresses in beams under unsymmetric loading 12. Stresses on inclined planes 13. Derivation of the stress transformation equations 14. Stress calculations using Mohr's circle and applications 15. Strain calculations using Mohr's circle and applications

1210472	[ME] Technical English	3	Spring (Semester 4)	Asst. Prof. Dr. Ömer İncebay	Undergraduate	1. Introduction to Technical English 2. Basic concepts of fluid mechanics 3. Open-closed system, first law of thermodynamics, concepts related to conservation of mass and energy 4. Exergy analysis of the second law of thermodynamics 5. Basic concepts of heat transfer 6. Applications of nanotechnology in mechanical engineering 7. Applications of artificial intelligence techniques in mechanical engineering 8. Engineering & Engineers 9. Midterm examination 10. Engineering Design Past, Present & Future 11. Personality Types and Profiles 12. Journaling & Project Kick-Off 13. The Engineering Design Process 14. Team Evolution & Development Skills 15. Needs Assessment & Performance Metrics

1210473	[ME] Manufacturing Technologies	6	Spring (Semester 4)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Mechanical properties of materials 2. Tolerances 3. Casting 4. Casting 5. Powder metallurgy 6. Plastic deformation 7. Plastic deformation 8. Midterm examination 9. Sheet-metal processing techniques 10. Sheet-metal processing techniques 11. Machining and machine tools 12. Machining and machine tools 13. Welding 14. Welding 15. End-of-term evaluation and general review
1210474	[ME] Material Science I	6	Spring (Semester 4)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Introduction to material properties 2. Atomic structure and bonds 3. Crystal structure 4. Crystal structure 5. Solidification and crystal structure defects 6. Solidification and crystal structure defects 7. Strengthing mechanisms 8. Strengthing mechanisms 9. Deformation hardening dislocation interactions 10. Diffusion 11. Tensile Test 12. Destructive testing methods 13. Destructive testing methods 14. Destructive testing methods 15. Destructive testing methods

1210480	[ME] Materials Science II	6	Spring (Semester 4)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Phase diagrams 2. Phase diagrams 3. Steel production and heat treatment 4. Iron-carbon (Fe-C) equilibrium diagram 5. Annealing, recrystallization and ageing 6. Quenching of steel 7. Hardenability and its measurement 8. Effects of alloying elements 9. Classification of steels 10. Cast irons 11. Aluminum alloys 12. Copper, brass and bronze 13. Corrosion 14. Corrosion and its prevention 15. Corrosion and its prevention
1210486	[ME] Electronics II	5	Spring (Semester 4)	Prof. Dr. Murat Ceylan	Undergraduate	1. Function of the transistor under AC operating conditions in electronic circuits 2. Four-terminal operation of transistors and transistor parameters 3. Determination of parameters for different transistor models 4. Low-, mid-, and high-frequency equivalent circuits of transistor amplifiers 5. AC analysis of transistor amplifiers 6. AC analysis of transistor amplifiers 7. Low-, mid-, and high-frequency equivalent circuits of FET amplifiers 8. Midterm examination 9. AC analysis of FET amplifiers 10. Integrated circuits and operational amplifiers 11. Operational-amplifier equivalent circuit and analysis of op-amp circuits 12. Applications of operational amplifiers 13. Applications of operational amplifiers 14. 555-timer oscillator circuits 15. Voltage regulators

1210581	[ME] Dynamics of Machinery	4	Fall (Semester 5)	Asst. Prof. Dr. Abdullah Çakan	Undergraduate	1. Introduction and Basic Concepts 2. Static Force Analysis of Mechanisms 3. Static Force Analysis of Mechanisms 4. Static Force Analysis of Mechanisms 5. Dynamic Force Analysis of Mechanisms 6. Dynamic Force Analysis of Mechanisms 7. Dynamic Force Analysis of Mechanisms 8. Dynamic Force Analysis of Mechanisms 9. Mechanical Vibrations of Single-Degree-of-Freedom Systems 10. Mechanical Vibrations of Single-Degree-of-Freedom Systems 11. Mechanical Vibrations of Single-Degree-of-Freedom Systems 12. Dynamics and Balancing of Rigid Rotors 13. Whirling of Shafts 14. Balancing of Mechanisms 15. Balancing of Internal Combustion Engines

1210582	[ME] Machine Elements I	5	Fall (Semester 5)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Introduction to machine elements and explanation of the course content through general concepts. 2. Stress, normal stress, shear stress, simple and combined stress states, changes in forces and stresses over time, strength limits and failure. 3. Load and stress analysis, effects of deflection and how stiffness requirements are met. 4. Comparison of stresses calculated under combined loading with yield stress. 5. Basic criteria for identifying failures under static loading. 6. Basic criteria for identifying failures under variable (fatigue) loading. 7. Overview of shafts, axles, bolted joints, welded joints and springs as machine elements. 8. Stress-based distinction between shafts and axles and their different areas of application. 9. Strength and sizing calculations for shafts and axles. 10. Bolted joints and details of their different applications. 11. Calculation of tightening torque and construction of the preload triangle for bolted joints. 12. Basic distinctions among welded joints and the advantages and disadvantages of welded connections. 13. Strength and sizing calculations for welded joints. 14. Springs used as elastic connecting elements and their fundamental properties. 15. Strength and application-related calculations for springs used for energy storage.

1210583	[ME] Fluid Mechanics I	6	Fall (Semester 5)	Asst. Prof. Dr. Ömer İncebay	Undergraduate	1. Introduction and basic concepts 2. Properties of fluids 3. Pressure and fluid statics 4. Pressure and fluid statics 5. Fluid kinematics 6. Mass conservation, Bernoulli and energy equations 7. Momentum analysis of flow systems 8. Momentum analysis of flow systems 9. Midterm examination 10. Dimensional analysis and modeling 11. Pipe flow 12. Pipe flow 13. Pipe flow and differential flow analysis 14. Differential flow analysis 15. Differential flow analysis
1210584	[ME] Thermal Environmental Engineering	9	Fall (Semester 5)	Asst. Prof. Dr. Şükrü Ulaş Atmaca	Undergraduate	1. Introduction, definitions, units 2. Ideal-gas relations for moist air 3. Ideal-gas relations for moist air (continued) 4. Ideal-gas relations for moist air (continued) 5. Ideal-gas relations for moist air (continued) 6. Problems involving ideal-gas relations for moist air 7. Midterm examination 8. Psychrometric processes 9. Psychrometric processes (continued) 10. Problems involving psychrometric processes 11. Heat exchangers - I 12. Heat exchangers - II 13. Thermal radiation - I 14. Thermal radiation - II 15. Applications involving thermal radiation

1210586	[ME] Control Systems	9	Fall (Semester 5)	Asst. Prof. Dr. Muhammed Arif Şen	Undergraduate	1. General information and concepts 2. Block diagrams of control systems and block-diagram reduction 3. Transfer functions of control systems 4. Mathematical modeling of control systems 5. State-space models of control systems 6. Transient response of systems 7. Steady-state response and steady-state error of systems 8. Stability of linear feedback control systems 9. Basic control techniques (PID) 10. Root-locus method 11. Frequency-response methods 12. Control-system analysis in state space (controllability and observability) 13. Control-system design in state space (pole placement, state observers, LQR, LQG) 14. Industrial control systems: operation and structure
1210587	[ME] Heat Transfer	5	Fall (Semester 5)	Asst. Prof. Dr. Şükrü Ulaş Atmaca	Undergraduate	1. Definitions and units 2. One-dimensional steady-state heat conduction 3. One-dimensional steady-state heat conduction 4. Fins and extended surfaces 5. Steady-state two- and three-dimensional conduction 6. Transient heat conduction 7. Transient heat conduction 8. Midterm examination 9. Forced convection 10. Forced convection 11. Natural convection 12. Heat exchangers 13. Heat exchangers 14. Heat transfer by radiation 15. Heat transfer by radiation

1210588	[ME] Fluid Mechanics II	6	Fall (Semester 5)	Assoc. Prof. Dr. Muharrem Hilmi Aksoy	Undergraduate	1. Introduction to Fluid Mechanics II 2. Applications of the Navier–Stokes equations 3. Approximate solutions of the Navier–Stokes equations 4. Creeping flow and inviscid flow 5. Irrotational (potential) flow and boundary layers 6. Compressible flow 7. Stagnation properties, speed of sound and Mach number, one-dimensional isentropic flow 8. Midterm examination 9. Shock waves and expansion waves; isentropic nozzle flow; Rayleigh flow (heat transfer with negligible friction); Fanno flow (adiabatic flow with friction) 10. Open-channel flow 11. Froude number and wave speed; specific energy and the energy equation; uniform flow and optimal hydraulic cross sections 12. Gradually and rapidly varied flow; hydraulic jump; control and measurement of flow in channels 13. Turbomachinery 14. Pumps 15. Turbines

1210679	[ME] Fluid Mechanics I	6	Spring (Semester 6)	Asst. Prof. Dr. Ömer İncebay	Undergraduate	1. Introduction and basic concepts 2. Properties of fluids 3. Pressure and fluid statics 4. Pressure and fluid statics 5. Fluid kinematics 6. Mass conservation, Bernoulli and energy equations 7. Momentum analysis of flow systems 8. Momentum analysis of flow systems 9. Midterm examination 10. Dimensional analysis and modeling 11. Pipe flow 12. Pipe flow 13. Pipe flow and differential flow analysis 14. Differential flow analysis 15. Differential flow analysis
1210681	[ME] Thermal Environmental Engineering	9	Spring (Semester 6)	Asst. Prof. Dr. Şükrü Ulaş Atmaca	Undergraduate	1. Introduction, definitions, units 2. Ideal-gas relations for moist air 3. Ideal-gas relations for moist air (continued) 4. Ideal-gas relations for moist air (continued) 5. Ideal-gas relations for moist air (continued) 6. Problems involving ideal-gas relations for moist air 7. Midterm examination 8. Psychrometric processes 9. Psychrometric processes (continued) 10. Problems involving psychrometric processes 11. Heat exchangers - I 12. Heat exchangers - II 13. Thermal radiation - I 14. Thermal radiation - II 15. Applications involving thermal radiation

1210683	[ME] Fluid Mechanics II	6	Spring (Semester 6)	Assoc. Prof. Dr. Muharrem Hilmi Aksoy	Undergraduate	1. Introduction to Fluid Mechanics II 2. Applications of the Navier–Stokes equations 3. Approximate solutions of the Navier–Stokes equations 4. Creeping flow and inviscid flow 5. Irrotational (potential) flow and boundary layers 6. Compressible flow 7. Stagnation properties, speed of sound and Mach number, one-dimensional isentropic flow 8. Midterm examination 9. Shock waves and expansion waves; isentropic nozzle flow; Rayleigh flow (heat transfer with negligible friction); Fanno flow (adiabatic flow with friction) 10. Open-channel flow 11. Froude number and wave speed; specific energy and the energy equation; uniform flow and optimal hydraulic cross sections 12. Gradually and rapidly varied flow; hydraulic jump; control and measurement of flow in channels 13. Turbomachinery 14. Pumps 15. Turbines

1210716	[ME] Thermal System Design	5	Fall (Semester 7)	Assoc. Prof. Dr. İlker Göktepeli	Undergraduate	1. Introduction to thermal-system design 2. Thermodynamics, modeling, and design analysis 3. Laws of thermodynamics 4. Entropy and entropy generation 5. Heat transfer, modeling, and design analysis 6. Modes of heat transfer 7. Heat conduction 8. Heat convection 9. Forced convection 10. Natural convection 11. Thermal radiation 12. Applications involving heat and fluid flow 13. Heat exchangers 14. Refrigeration machines and heat pumps
1210760	[ME] Mechanical Engineering Practice I	5	Fall (Semester 7)	Prof. Dr. Hüseyin Selçuk Halkacı	Undergraduate	1. Oral presentation techniques 2. Project progress report 2 3. Completion of the final report 4. Final project presentations 5. Course introduction, objectives and expectations › Ertuğrul, Engineering Economics and Project Management (Introduction) 6. Project concept and problem definition › Ulrich & Eppinger, Chapter 1 (Product development process) 7. Literature review methods 8. Preparing a project proposal 9. Engineering design process 10. Project planning and Gantt charts 11. Experimentation, measurement and analysis 12. Project progress report 1 13. Use of CAD/CAE tools 14. Data collection and interpretation 15. Technical report writing

1210771	[ME] Mechanical Engineering Practice II	10	Fall (Semester 7)	Prof. Dr. Hüseyin Selçuk Halkacı	Undergraduate	1. Oral presentation techniques 2. Project progress report 2 3. Completion of the final report 4. Final project presentations 5. Course introduction, objectives and expectations › Ertuğrul, Engineering Economics and Project Management (Introduction) 6. Project concept and problem definition › Ulrich & Eppinger, Chapter 1 (Product development process) 7. Literature review methods 8. Preparing a project proposal 9. Engineering design process 10. Project planning and Gantt charts 11. Experimentation, measurement and analysis 12. Project progress report 1 13. Use of CAD/CAE tools 14. Data collection and interpretation 15. Technical report writing
1210784	[ME] Engineering Design	6	Fall (Semester 7)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Introduction 2. The design process and morphology. 3. Problem solving and decision making. 4. Modeling and simulation. 5. Use of computers in engineering design (CAD). 6. Project engineering, planning, and management. 7. Design optimization. 8. Midterm exam 9. Economic decision making, cost and reliability 10. Human and ecological factors in design. 11. Homework - Team Project 12. Homework - Team Project 13. Homework - Team Project 14. Homework - Team Project 15. Homework - Team Project

1210788	[ME] Mechanical Behavior of Materials	6	Fall (Semester 7)	Asst. Prof. Dr. Okan Demir	Undergraduate	1. Stress state at a point; strain energy 2. Failure criteria 3. Elastic and plastic deformation 4. Lattice defects (imperfections) in materials 5. Plastic deformation mechanisms 6. Strengthening methods for materials 7. Strengthening methods for materials 8. Midterm examination 9. Effects of temperature and strain rate on the stress-strain curve 10. Fracture and fracture modes of materials 11. Fracture and fracture modes of materials 12. Creep and creep curves 13. Creep mechanisms 14. Fatigue and fatigue mechanisms 15. Mechanical behavior of polymeric materials
1210791	[ME] Introduction to Finite Element Methods	5	Fall (Semester 7)	Prof. Dr. Ömer Sinan Şahin	Undergraduate	1. Introduction to the finite element method 2. Formulation of the finite element method 3. Formulation of the finite element method 4. Mesh structure 5. Definition of boundary conditions 6. Solution of mechanical problems 7. Solution of mechanical problems 8. Solution of mechanical problems 9. Solution of eigenvalue problems 10. Solution of modal problems 11. Solution of modal problems 12. Harmonic problems 13. Thermal problems 14. Optimization problems 15. Optimization problems

1210798	[ME] Occupational Health and Safety I	2	Fall (Semester 7)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Occupational health and safety (OHS) concepts and their development 2-3. Overview of OHS and safety culture 4-5. OHS committees 6-7. OHS management systems 8. Adult education and communication in OHS 9. Ergonomics 11-12. Ethics in working life 13. Psychological harassment and mobbing in OHS 14. Working in confined spaces in OHS 15. OHS risk factors
1210809	[ME] Mechanical Engineering Practice II	13	Spring (Semester 8)	Prof. Dr. Hüseyin Selçuk Halkacı	Undergraduate	1. Oral presentation techniques 2. Project progress report 2 3. Completion of the final report 4. Final project presentations 5. Course introduction, objectives and expectations › Ertuğrul, Engineering Economics and Project Management (Introduction) 6. Project concept and problem definition › Ulrich & Eppinger, Chapter 1 (Product development process) 7. Literature review methods 8. Preparing a project proposal 9. Engineering design process 10. Project planning and Gantt charts 11. Experimentation, measurement and analysis 12. Project progress report 1 13. Use of CAD/CAE tools 14. Data collection and interpretation 15. Technical report writing

1210823	[ME] Air Conditioning System Design	5	Spring (Semester 8)	Asst. Prof. Dr. Şükrü Ulaş Atmaca	Undergraduate	1. Introduction to psychrometrics, fundamental concepts 2. Properties and definitions of moist air 3. Adiabatic saturation temperature and adiabatic saturation device 4. Properties of moist air at saturation 5. Moist air tables 6. Psychrometric chart 7. Applications using the psychrometric chart 8. Psychrometric processes 9. Psychrometric process applications 10. Definition of thermal comfort and influencing factors 11. Cooling load calculations 12. Cooling load applications 13. Determination of sensible heat ratio and supply air flow rate 14. Basic summer air conditioning process 15. Basic winter air conditioning process
1210824	[ME] Renewable Energy Systems	5	Spring (Semester 8)	Assoc. Prof. Dr. Muharrem Hilmi Aksoy	Undergraduate	1. Introduction and definitions 2. Hydropower 3. Hydropower 4. Wind energy 5. Wind energy 6. Economic analysis of renewable-energy systems 7. Solar energy—electricity generation 8. Solar thermal energy 9. Biomass energy 10. Biomass energy 11. Geothermal energy 12. Hydrogen energy 13. Fuel cells 14. Recent developments in the renewable-energy sector 15. Recent developments in the renewable-energy sector

1210856	[ME] Occupational Health and Safety II	2	Spring (Semester 8)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Safety when working with hand tools 2-3. Safety principles for ventilation and air conditioning 4-5-6. Safety in the design, manufacture and use of work equipment 7-8-9-10. Safety of pressure vessels 11. Safety of construction machinery and motor vehicles 12-13-14. Safety in maintenance and repair work 15. Safety in welding operations
1210857	[ME] Occupational Health and Safety I	2	Spring (Semester 8)	Asst. Prof. Dr. Yusuf Yılmaz	Undergraduate	1. Occupational health and safety (OHS) concepts and their development 2-3. Overview of OHS and safety culture 4-5. OHS committees 6-7. OHS management systems 8. Adult education and communication in OHS 9. Ergonomics 11-12. Ethics in working life 13. Psychological harassment and mobbing in OHS 14. Working in confined spaces in OHS 15. OHS risk factors
1210888	[ME] Introduction to Finite Element Methods	5	Spring (Semester 8)	Prof. Dr. Ömer Sinan Şahin	Undergraduate	1. Introduction to the finite element method 2. Formulation of the finite element method 3. Formulation of the finite element method 4. Mesh structure 5. Definition of boundary conditions 6. Solution of mechanical problems 7. Solution of mechanical problems 8. Solution of mechanical problems 9. Solution of eigenvalue problems 10. Solution of modal problems 11. Solution of modal problems 12. Harmonic problems 13. Thermal problems 14. Optimization problems 15. Optimization problems

1210889	[ME] Mechanical Engineering Practice I	5	Spring (Semester 8)	Prof. Dr. Hüseyin Selçuk Halkacı	Undergraduate	1. Oral presentation techniques 2. Project progress report 2 3. Completion of the final report 4. Final project presentations 5. Course introduction, objectives and expectations › Ertuğrul, Engineering Economics and Project Management (Introduction) 6. Project concept and problem definition › Ulrich & Eppinger, Chapter 1 (Product development process) 7. Literature review methods 8. Preparing a project proposal 9. Engineering design process 10. Project planning and Gantt charts 11. Experimentation, measurement and analysis 12. Project progress report 1 13. Use of CAD/CAE tools 14. Data collection and interpretation 15. Technical report writing

DEPARTMENT: METALLURGICAL AND MATERIALS ENGINEERING

CODE	COURSE	ECTS	SEMESTER	PROFESSOR	LEVEL OF EDUCATION	COURSE CONTENT
1219746	Failure of Materials	4	Fall	Prof. Dr. Mustafa Serdar KARAKAŞ	Undergraduate	The aim of this course is to teach students about failure mechanism of materials
1219544	Mechanical Metallurgy	3	Fall	Assoc. Prof. Dr. Mehmet YILDIRIM	Undergraduate	Basic concepts related to mechanical properties of materials, and standard test method for determining the mechanical properties of materials teach.

1219245	Materials Science 1	6	Spring	Prof. Dr. Özlem ALTINTAŞ YILDIRIM	Undergraduate	Explain the importance of material science in terms of engineering applications. Teach the basic structure of engineering materials
1219340	Materials Science 2	6	Fall	Prof. Dr. Özlem ALTINTAŞ YILDIRIM	Undergraduate	Explain the importance of material science in terms of engineering applications. Teach the basic structure of engineering materials
1219551	Kinetics of Materials	4	Fall	Prof. Dr. Özlem ALTINTAŞ YILDIRIM	Undergraduate	The objective of this course is to unify phenomenological and atomistic kinetic processes in materials
1219443	Phase Equilibria	5	Fall	Prof. Dr. Volkan KALEM	Undergraduate	Explain the importance of material science in terms of engineering applications. Teach the basic structure of engineering materials
1219743	Dev. of Reading & Writing Skills	4	Fall	Prof. Dr. Hasan AKYILDIZ	Undergraduate	The aim of this course is to provide students a better understanding of the knowledge, science, philosophy of science, methods of the scientific research.
1219442	Fundamentals of Nanotechnology	4	Spring	Assoc. Prof. Dr. İlyas ŞAVKLIYILDIZ	Undergraduate	Teaching of the new era materials, nano concept and introduction future nano scale devices, robot and systems are aimed
1219550	Cristallography	4	Fall	Assoc. Prof. Dr. İlyas ŞAVKLIYILDIZ	Undergraduate	To learn theorics and applications of crystallography for engineering application