

COURSE CONTENTS

MATH-101 PRECALCULUS (Compulsory, 2+0)

Functions and their inverses, operations with functions and graphing techniques, polynomial functions, rational functions, exponential and logarithmic functions, trigonometric functions, trigonometric identities and trigonometric equations, systems of equations, inequalities and solving techniques.

MATH-141 BASIC CALCULUS I (Compulsory,3+2)

Functions and Their Graphs, Limits and Limit Rules, Continuity, Derivatives, Applications of Derivatives, The Intermediate Value Theorem, The Mean Value Theorem, Concavity and Curve Sketching, L'Hospital's Rule, The Definite Integral, Fundamental Theorem of Calculus, Indefinite Integrals and the Substitution Method, Area Between Curves.

PHYS-101 GENERAL PHYSICS I (Compulsory, 4+0)

Scientific notation, length, time, mass, unit systems, accuracy and significance, dimensional analysis. Motion along a straight line. Motion in two and three dimensions. Force and Motion. Newton's Laws and their applications. Kinetic Energy, work, power, potential energy and energy conservation. Systems of particles. Linear momentum. Collisions and the center of mass. Rotation and Rotational kinetic energy, angular momentum and its conservation, Torque, work and energy in angular momentum. Equilibrium and elasticity. Gravitation. Newton's law of gravitation, gravitational potential energy, planets and satellites.

PHYS-111 GENERAL PHYSICS LAB I (Compulsory, 0+2)

Students will conduct a number of experiments in the Laboratory class covering the topics of PHYS 101 General Physics I.

CHEM-121 GENERAL CHEMISTRY I (Compulsory,3+0)

Matter-its properties and measurement. Atoms and atomic theory. Chemical compounds. Chemical reactions. Introduction to reactions in aqueous solutions. Gases. Thermochemistry. Electrons in atoms. The periodic table and some atomic properties. Chemical bonding. Liquids, solids and intermolecular forces. Solutions and their physical properties.

CHEM-141 GENERAL CHEMISTRY LAB. I (Compulsory,0+2)

Experiments are related to the topics covered by CHEM 121 Course.

ENG-101 DEVELOPMENT OF READING AND WRITING SKILLS I (Compulsory, 3+0)

The course covers academic reading and writing skills, technical writing, citation and summarizing techniques, problem-solving writing, and oral presentation skills. It also introduces the APA citation system, academic integrity, and grading strategies. Students will engage in a variety of assignments, including formal email writing, structured academic discussions, and presentations.

OHS-101 OCCUPATIONAL HEALTH AND SAFETY I (Compulsory, 1+0)

This course introduces the fundamental concepts of occupational health and safety in engineering, design, and laboratory practices. It covers occupational accidents, occupational diseases, risk assessment methods, and relevant legal regulations. It also aims to develop students' awareness of safety culture and preventive approaches in workplaces.

ENV-101 INTRODUCTION TO ENVIRONMENTAL ENGINEERING (Compulsory, 2+0)

EnvE undergraduate program; Definitions: environment, media, ecosystem, contamination; History of environmental engineering, global, national current, emerging issues; Environmental resources, Sources of pollution; Environmental management, Principles of control; Fields of study: Potable water, domestic wastewater, industrial wastewater, air, indoor air, soil, solid wastes, noise, electromagnetic, radioactive pollution; Social aspects: Actors and roles; Professional engineering and environmental ethics.

MATH -142 BASIC CALCULUS II (Compulsory, 3+2)

Application of Integrals, Techniques of Integration and Improper Integrals, Sequences and Series, Partial Derivatives, An Introduction to Double Integrals.

ENV-112 TECHNICAL DRAWING (Compulsory, 2+2)

General CAD terminology and CAD user interface and drawing editor. Technical drawing concepts: Orthographic drawing, isometric and oblique projections and sectioning, basic dimensioning techniques, plotting and printing techniques. Introduction to model space and paper space concepts. Civil engineering applications.

CHEM-122 GENERAL CHEMISTRY II (3+0) Chemical kinetics. Principles of chemical equilibrium. Acids and bases. Solubility and complex ion equilibria. Entropy and free energy. Electrochemistry. Nuclear chemistry. Main group elements I: metals, main group elements II: nonmetals. Complex ion and coordination compounds. Transition metals.

CHEM-142 GENERAL CHEMISTRY LAB. II (0+2) 1 2 ECTS

Experiments are related to the topics covered by CHEM 122 Course.

ENG-102 DEVELOPMENT OF READING AND WRITING SKILLS II (3+0) 3 AKTS 3

This is a course which aims to equip students with the skills to analyze essays and articles, to write an organized essay and article, to make presentations, to take notes while listening and reading skills, which will help them in their academic studies.

ENV-104 COMPUTER PROGRAMMING (Compulsory, 2+2)

Introduction to Excel; cell operations and basic functions; data visualization and chart creation; engineering calculations; data analysis tools; introduction to VBA; macro recording and editing; variables and data types; decision structures; loops; user-defined functions; user interface creation; Excel-VBA integration; applied problem solving.

OHS-102 OCCUPATIONAL HEALTH AND SAFETY II (Compulsory, 1+0)

This course covers physical, chemical, biological, and ergonomic risk factors in industrial environments, along with the control measures for these risks. It also includes emergency management and workplace safety practices.

GCC-101 CAREER PLANNING AND DEVELOPMENT Career (Compulsory, 2+0)

CV preparation and cover letter and letter of intent (statement of purpose) writing are instructed. Students get aware of competency-based interviews. Contemporary career planning applications such as LinkedIn are mentioned. Tools and platforms to prepare a CV and Assessment Track Systems are mentioned in this stage. 21st-century competencies are mostly composed of soft skills; therefore, not only soft skills but also demanded competencies in career development are introduced. The ways used to gain these skills and to enhance them are guided.

Proper communication skills, such as business communication and effective body usage, are necessary for being a professional. Students would realize that life extension leads to life-long learning as well as lateral careers for all of us. Therefore, life-long learning ability is enhanced frequently in the course. IZTECH facilities' leading contribution to students' career development is enhanced through the semester in the course content.

MATH-255 DIFFERENTIAL EQUATIONS (Compulsory, 4+0)

First order equations and various applications. Higher order linear differential equations. Power series solutions: ordinary and regular singular points. The Laplace transform: solution of initial value problems. Systems of linear differential equations: solutions by operator method, by Laplace transform.

CHEM-221 ORGANIC CHEMISTRY (Compulsory, 4+0)

Carbon compounds & chemical bonds, alkenes, cycloalkanes, conformational analysis, stereo chemistry, nucleophilic substitution, alkenes, alcohols, ethers, radical reactions, aromatic compounds.

ENV-201 ENVIRONMENTAL CHEMISTRY (Compulsory, 3+0)

Fundamental concepts, units and parameters of environmental chemistry; acid/base reactions; titrations and buffers; organic pollution and related parameters; gas/liquid equilibrium reactions; metal chemistry in aqueous solutions.

ENV-203 ENVIRONMENTAL CHEMISTRY LABORATORY (Compulsory, 0+2)

Laboratory safety; solution preparation; turbidity; solids; pH, dissolved oxygen, conductivity measurements; acidity; alkalinity; hardness; BOD; COD; UV; oil-grease analysis; adsorption; ion exchange.

ENV-215 ENVIRONMENTAL MICROBIOLOGY (Compulsory, 2+2)

Foundation of environmental microbiology with a focus on environmental engineering applications, types of microorganisms, microbial metabolism, pathogens in environment and their effects on humans, indicator organisms, role of microbes in treatment of water and wastewater treatment as well as hazardous pollutants, microbiology of sewage sludge and organic solid waste treatment.

ENV-217 FLUID MECHANICS (Compulsory, 3+0)

Dimensions, units, and physical properties of fluids. Hydrostatics, forces on plane and curved surfaces, buoyancy, hydrostatics in moving and rotating containers. Lagrangian and Eulerian descriptions of fluid flow, System and control volume approach, Reynolds transport theorem, principles of conservation of mass, momentum and energy, Bernoulli equation. Dimensional analysis, Buckingham pi theorem, similitude, and modeling.

HIST-201- PRINCIPLES OF ATATURK I (Compulsory, 2+0)

The modernization of the Ottoman Empire during the nineteenth and early twentieth centuries, the spread of nationalism, and the revolutionary changes in Ottoman institutions and society that led to the Empire's demise, the transitional period from the Empire to the national state and the foundation of the Turkish Republic following the national struggle led by Mustafa Kemal Atatürk.

TURK-201 – TURKISH LANGUAGE I (Compulsory, 2+0)

Definition of language, the place and importance of language as a social institution in the life of a nation, the position of Turkish among world languages, word exchange between languages, vocabulary, basic phonetic and lexical characteristics, and the evaluation of the current situation of Turkish.

ENV-224 PRINCIPLES OF ENVIRONMENTAL ENGINEERING PROCESSES (Compulsory, 3+0)

Introduction to environmental engineering calculations; analysis of pollution control processes: chemical and biochemical kinetics, mass balances, reactor analysis, energy balances, mass-transport processes with particular emphasis on examples of environmental pollution control processes.

ENV-218 HYDRAULICS (Compulsory, 3+0)

Flow in pipes, laminar and turbulent flows. Local and continuous energy losses. Hydraulic calculations in pipe flow. Flow in open channels. Uniform and non-uniform flows. Water surface profiles. Local changes in water surface. Channel control structures and flowrate measurement. Model theory.

ENV-222 HYDROLOGY (Compulsory, 3+0)

Water cycle elements, rainfall data and its analysis, catchment area properties relevant to runoff, runoff analysis, stream flow analysis, hydrographs, hydrological statistics, flood discharge and routing, fundamentals of groundwater flow, well yields.

ENV-216 STATISTICS (Compulsory, 2+2)

Role of statistics in engineering, Probability, Discrete random variables, Continuous random variables, Correlation, Random sampling and data description, Point estimates, Confidence interval, Sampling distributions, Hypothesis testing: single sample, Hypothesis testing: two samples, Simple linear regression.

HIST-202 – PRINCIPLES OF ATATURK I II (Compulsory, 2+0)

The foundation of Turkish Republic, Principles of Atatürk and major events and changes that have taken place in politic, society, economy, and culture as a results of revolution for reorganization of state and society.

TURK-202 – TURKISH LANGUAGE II (Compulsory, 2+0)

The course aims to enable students to distinguish between written and oral expression types, effectively utilize oral and written communication methods, and develop habits of scientific, critical, interpretive, inquisitive, and creative thinking. It encompasses education focused on expression, definition, discussion, and narration in Turkish speaking and writing.

ENV-311 UNIT OPERATIONS AND PROCESSES OF WATER TREATMENT (Compulsory, 3+2)

Mechanical and chemical unit operations of water treatment: screening, grit removal, sedimentation, aeration, coagulation, flocculation, membrane separation, disinfection, ion exchange and softening.

ENV-315 WATER SUPPLY (Compulsory, 3+0)

Flow in pipes. Population forecasts for residential areas. Water demand calculation. Components of water distribution systems. Hydraulic calculations of water distribution systems. Design of water distribution systems. EPA-NET software.

ENV-313 THERMODYNAMICS (Compulsory, 3+0)

Fundamentals of Thermodynamic-Basic Concepts (Properties Extensive/Intensive, Dependent/Independent, Equilibrium, P-V-T properties of pure substances, property tables, The Ideal Gas Law); First Law of Thermodynamics (Heat & work, Reversible & irreversible processes, closed system and open system, Internal energy, Enthalpy, Heat capacity, Latent heat, Enthalpy of reactions, Thermodynamic cycles); Entropy & Second Law of Thermodynamics (Directionality & spontaneity of processes, Reversibility/Irreversibility, closed system and open system, The Rankine cycle, Refrigeration cycle); Equations of State (Intermolecular forces, Ideal gas equation of state, Principle of corresponding states, Generalized compressibility charts); Thermodynamic Property Relationships.

ENV-300 SUMMER PRACTICE I (Compulsory, 0+0)

The internship requires four weeks (20 working days) of participation. This participation must take place at a company where environmental engineering plant and laboratory applications are carried out. Laboratory applications may be related to water/wastewater treatment, air pollution control, or solid waste management.

ENV-317 ATMOSPHERIC CHEMISTRY AND AIR POLLUTION (Compulsory, 3+0)

The Atmosphere, Pollutants, Sources and scales of air pollution, Effects on humans, environment, and structures, Atmospheric Motion, Atmospheric chemistry and photochemical smog, Air quality standards, Ambient air sampling and measurement, Emission and standards, Source sampling and measurement, Emission inventory.

ENV-319 FUNDAMENTALS OF BIOLOGICAL PROCESSES (Compulsory, 3+0)

Foundation of microbial kinetics pertaining to wastewater treatment with a particular focus on those that describe batch, fed-batch, and continuous growth under aerobic and anaerobic conditions as well as constant stirred tank and plug flow reactors, activated sludge, nitrification and denitrification systems.

ENV-321 WATER QUALITY (Compulsory, 3+0)

Properties of water, hydrological cycle, dissolved solids, particulate matter, color, hardness, dissolved oxygen, pH, redox potential, nitrogen and phosphorus.

ENV-312 UNIT OPERATIONS AND PROCESSES OF WASTEWATER TREATMENT (Compulsory, 3+2)

Biological and chemical unit operations of wastewater treatment: screening, grit removal, sedimentation, flotation, aeration. Processes utilized for secondary and tertiary treatment of wastewater: attached or suspended growth based aerobic/anaerobic biological systems. Advanced wastewater treatments systems. Sludge digestion processes.

ENV-314 TRANSPORT PROCESSES (Compulsory, 3+0)

Mass transport processes in the environment, mass conservation. Momentum transport, momentum conservation. Heat Transfer. Mass Transfer and transformation processes. Diffusive, convective and dispersive transport, boundary layer mass transfer, interphase mass transfer. Development of governing equations for transport, transfer and transformation processes.

ENV-316 SEWERAGE (Compulsory, 3+0)

Open channel flow. Population forecasts. Determination of wastewater and stormwater flowrates. Components of sewerage systems. Hydraulic computations of sewerage and stormwater networks. Design of sewerage and stormwater drainage systems.

ENV-318 SLUDGE TREATMENT (Compulsory, 3+0)

Sludge characteristics, thickening, stabilization, conditioning, dewatering and disposal methods.

ENV-320 AIR POLLUTION CONTROL (Compulsory, 3+0)

The Atmosphere, Pollutants, Sources and scales of air pollution, effects on humans, environment, and structures, atmospheric motion, Atmospheric chemistry and photochemical smog, Air quality standards, Ambient air sampling and measurement, Emission and standards, Source sampling and measurement, Emission inventory.

ENV-411 ENVIRONMENTAL ENGINEERING DESIGN I (Restricted Elective, 2+4)

Explanation of the given problem and open discussion, Recap on literature review, Engineering ethics, Directives, Sustainability, Engineering economics, Life cycle assessment theory and application tools, Discussion of treatment approaches/technologies/processes.

ENV-413 SOLID WASTE ENGINEERING (Compulsory, 3+0)

This course comprises the fundamentals of solid waste management, description and classification of solid wastes, collection and transfer of solid waste, recycling, landfilling, incineration, pyrolysis, composting and operation of disposal facilities.

ENV-415 ENVIRONMENTAL MODELING (Compulsory, 3+0)

Introduction, Environmental modeling concept, Classification of models, Fundamentals of mathematical modeling, Mass balance, Transport mechanisms of pollutants, Contamination of pollutants, Calibration and verification, Numerical techniques used in environmental modeling, Modeling in engineering systems, Modeling in natural systems, Environmental engineering applications.

MAN-211 Corporate Communication and Management Skills for Engineers (Compulsory, 3+0)

Recruitment process, organizational structure and culture, developing communication and management skills, customer relations management and ethical issues in a global world and growing economies.

ENV-400 SUMMER PRACTICE II (Compulsory, 0+0)

Internship requires an attendance of 4 weeks (20 working days) to an institution where environmental engineering project applications are performed.

ENV-412 ENVIRONMENTAL ENGINEERING DESIGN II (Restricted Elective, 2+4)

Summary presentations of work done in ENV412, Selection of location and preliminary calculations regarding pollution, Physical footprint of proposed solution and its 3-D placement on map, selected modules, technical specifications, costs and acquisition schedule, Risk management, Design of treatment train to scale, Capital and operating costs, Life cycle assessment of proposal.

ENV-414 ENVIRONMENTAL ENGINEERING STUDY (Restricted Elective, 0+4)

Introduction of the projects and selection, Literature search, Initiation of experiments in the laboratory/ Theoretical studying-modelling works, Experiments- Analyses/Modelling design, Experiments- Analyses/Modelling, Submission of preliminary report to the lecturer - discussion of the report, Experiments- Analysis-Interpretation-Discussion, Experiments- Analysis-Interpretation-Discussion, Experiments- Analysis-Interpretation-Discussion, Gathering of all data –Discussion- Interpretation, Submission of first draft report to the lecturer-Refinements, Preparation of final report-Last experiments and preparations.

ENV-212 ENVIRONMENTAL ECONOMICS (Restricted Elective, 3+0)

Introduction to economics. The analysis of markets. Decision making and efficiency. Externalities and public goods. Pigouvian and Coasian solutions. Cost benefit analysis. Valuation studies. Air and water quality. Economics of climate change. Climate change policies. Sustainable development.

ENV-220 NUMERICAL METHODS IN ENVIRONMENTAL ENGINEERING (Restricted Elective, 3+0)

Numerical errors, roots of equations, curve fitting, matrix methods, integration and solution of numerical differential equations.

CE-203 ENGINEERING GEOLOGY (Restricted Elective, 2+2)

This course explores the fundamentals of geology applied to civil engineering problems. Topics include rock and mineral types, soil properties, rock mechanics, geologic structures, active tectonics and earthquake hazards, slope stability and landslides, groundwater, dams and tunnel and effect of geological factor on environmental and engineering structure. Team projects include classic engineering geology case studies and site assessment field investigations. Instruction is conducted through lecture and field trips.

CE-204 ENGINEERING SURVEYING (Restricted Elective, 2+2)

Basic surveying concepts, error and uncertainty, vertical and horizontal controls, distances, angles, conventional control surveys, control positions, survey instruments (simple/tacheometry), mapping techniques (triangulation/orthogonal), height measurements, area-volume calculations, satellite positioning, earthworks setting out, underground/tunnel surveying, marine surveying, photogrammetry, application software: NETCAD.

CE-221 ENGINEERING MECHANICS I: STATICS (Restricted Elective, 2+2)

Introduction to rigid body mechanics. Concepts of moment, couple, resultant. Equations of equilibrium, free-body diagram. Structural analysis of trusses and beams. Shear force and bending moment diagrams of beams. Moment and centroid of area. Moments of inertia, principal directions.

CE-222 ENGINEERING MECHANICS II: DYNAMICS (Restricted Elective, 3+0)

Nodal mass kinematics. Nodal mass motion. Work and energy. Impulse and momentum. Rigid body kinematics. Two and three dimensional motion of rigid bodies. Energy and momentum principles of rigid bodies. Mechanical vibrations.

ENG-301/302 TECHNICAL WRITING AND COMMUNICATION (Restricted Elective, 3+0)

Course introduction, academic integrity, technical writing characteristics, differences between academic and technical writing, abstract and explanatory writing, engineering ethics, citation, case studies, resume and job application letter writing, job interviews, presentations.

ENV-350 MATERIALS MACHINES AND EQUIPMENTS IN ENVIRONMENTAL ENGINEERING (Elective, 3+0)

Materials: Steel, stainless steel, ductile iron, HDPE, GRP, PVC, Polymers, membranes, liners, Coatings, composites, Machinery: Pumps, aerators, compressors, engines, turbines, Centrifuge, flotation, belt dryers, Equipment: Heat exchangers, boilers, coolers, Grates, grinders, mixers, Fans, mechanical aerators, Gauges, valves, Washers, air boilers.

CE-361 SOIL MECHANICS I (Restricted Elective, 3+2)

Soil formation and identification. Physical and mechanical properties of granular and cohesive soils. The nature and flow of water in soils, stress distribution, analysis of deformation and strength of soils. Site investigation techniques. Laboratory testing and evaluation of soil composition and properties.

CENG-398 APPLIED GENERATIVE AI FOR THE WORKPLACE (Elective 3+0)

Generative AI (GenAI) is transforming the way businesses operate accelerating content creation, automating knowledge work, personalizing customer experiences, and driving product and service innovation. This module introduces students to the business potential of GenAI through a managerial lens, examining strategy, digital transformation, governance, and ethical implications. Students will gain hands-on experience with leading GenAI tools and apply them to practical business scenarios such as customer service, marketing content creation, recruitment, innovation ideation, and automated workflows. Weekly case studies and guided exercises will ground theoretical concepts in real-world practice. By the end, students will be equipped to critically assess and responsibly apply GenAI to create value in a rapidly evolving business landscape.

CENG-399 CONCEPTS OF ARTIFICIAL INTELLIGENCE (Elective 3+0)

This course provides an introductory and interdisciplinary overview of Artificial Intelligence with a particular focus on the foundations of machine learning. It explores the evolution, principles, and applications of intelligent systems that learn from data to make decisions and predictions. The course examines data representation, supervised and unsupervised learning approaches, and model evaluation techniques. It introduces essential algorithms for classification, regression, and clustering, as well as the basic logic of neural networks and deep learning. Students also explore applications of AI in areas such as natural language processing, computer vision, and data-driven problem solving across engineering, science, and management disciplines. Ethical and societal considerations, including bias, fairness, and data privacy, are integrated throughout.

ENV-405 SOLIDS AND BIOSOLIDS TREATMENT AND DISPOSAL (Elective, 3+0)

Introduction, review and regulatory issues, sludge sources and quantities, solids processing flow diagrams, sludge thickening, sludge pumping, sludge stabilization, Storage of sewage sludge and biosolids, Sludge dewatering, sludge conditioning, incineration, combustion/thermal reduction, composting, ultimate disposal, land application, Ocean disposal technology and assessment, Beneficial utilization of biosolids.

ENV-406 MARINE POLLUTION (Elective, 3+0)

Types of marine pollution: eutrophication/hypoxia, anoxia in bottom water, harmful algal blooms, micropollutants and metals, microplastics. Basic principles on marine pollution prevention. Hazards of pollution to human life and marine environment. National and International rules on marine pollution prevention.

ENV-407 INDUSTRIAL AIR POLLUTION CONTROL (Elective, 3+0)

Air pollution meteorology; classification of air pollutants; sources of air pollution; sampling and analysis; elements of atmosphere; dispersion; concepts of control, principles and design of control measures; selection criteria for equipment, gaseous pollutant control by adsorption, absorption, condensation, combustion; pollution control for specific major industries.

ENV-408 PERSISTENT ORGANIC POLLUTANTS (Elective, 3+0)

Persistent, Bioaccumulative and Toxic chemicals, fate assessment of POPs, environmental partitioning and their transfer to biota and plant uptake, POPs in soils and groundwaters, atmosphere, in food chains, chiral environmental pollutants, modeling studies, POPs regulations; Stockholm Convention, LRTAP Convention and global monitoring programs

ENV-410 ENVIRONMENTAL IMPACT OF ENERGY SYSTEMS (Elective, 3+0)

The future of today's energy sources, Sustainable energy, Renewable energy, Landfill gas and related energy sources, Emissions trading schemes, Nuclear power, Wind energy, Wave energy, Biomass, Radiative energy transfer, Solar power, Hydroelectric power, Geothermal power, New types of energy, Atmospheric chemistry, Climate change, Atmospheric model design, application, and testing.

ENV-440 INDUSTRIAL WASTEWATER TREATMENT (Elective, 3+0)

Characteristics of wastewater from different types of industries, pollution loads and treatment alternatives

ENV-442 ENVIRONMENTAL LEGISLATION (Elective, 3+0)

Importance of environmental legislation and application; History of environmental legislation; Water legislation; Air legislation; Soil legislation; Related legislations; Human rights and sanitation; Legal instruments for the management of aquatic ecosystems; Gaps in environmental legislation; Applications.

ENV-444 HAZARDOUS WASTE MANAGEMENT (Elective, 3+0)

This course covers the study of sources, generation rates, and characteristics of hazardous wastes. Their regulation, handling, treatment, and disposal methods are also discussed. The course emphasizes on engineering process design, analysis and evaluation of different hazardous waste treatment technologies (such as activated carbon, solidification/stabilization, soil washing, etc.). Students taking this course will have the opportunity to study issues, processes, and problems involved in current hazardous waste management systems.

ENV-445 ADVANCED WASTEWATER TREATMENT (Elective, 3+0)

An introduction to advanced wastewater treatment, Biological nutrient removal, Anaerobic Processes, Membrane bioreactors, Wetland construction, Advanced oxidation Processes, Disinfection Processes, Adsorption, Ion Exchange, Water Reclamation and Reuse, Handling Solids and Biosolids

ENV-450 GEOGRAPHIC INFORMATION SYSTEMS FOR ENVIRONMENTAL ENGINEERS (Elective, 2+2)

GIS system platforms. Spatial data and data types. Data visualization. GIS databases. Environmental data creation, analysis and processing. Geostatistics. Applications of GIS in different disciplines of environmental engineering.

ENV-451 CURRENT TOPICS IN ENVIRONMENTAL ENGINEERING (Elective, 3+0)

This course is an introductory, interdisciplinary survey of environmental issues. The specific topics it explores include: Environmental Pollution, Renewable Energy and Sustainable Development, Carbon Footprint, Water Resources and Climate Change, Water Footprint and Rainwater Harvesting, Green Buildings and Green Cities, Micropollutants, Microplastic Pollution, Life Cycle Assessment, Biotechnology and Bioremediation, Nanotechnology and Nanobiotechnology in Environmental Engineering. Hot topics related to current environmental issues will be also covered by giving assignments to the students.

ENV-452 RIVER BASIN MANAGEMENT (Elective, 3+0)

The fundamentals of river basin management. Environmental baseline and database creation. Pressures, impacts and risks on quantity and quality of water resources. Environmental monitoring of surface and subsurface waters in river basins. Determination of environmental goals. Determining mitigation measures to reach good environmental status in surface and subsurface waters. Legal framework. Analysis of sample basin plans.

ENV-453 SOLID WASTE RECYCLING TECHNOLOGIES (Elective, 3+0)

This course comprises the unit operations for the separation (sorting) and processing of waste materials (size reduction, size separation, density separation, magnetic and electric field separation, compaction), fundamentals of thermal processing, thermal conversion technologies (combustion, pyrolysis, gasification, energy recovery systems), biological and chemical conversion technologies (aerobic composting, anaerobic digestion, acid hydrolysis, methanol production from methane), recycling of materials found in municipal solid waste (aluminum cans, paper and cardboard, plastics, glass, ferrous metals etc.)

ENV-454 ANAEROBIC TREATMENT (Elective, 3+0)

Introduction, primitive processes, high speed digesters, contact processing, anaerobic filters, UASB design, operation of anaerobic systems.

ENV-455 MEMBRANE DESALINATION TECHNOLOGY (Selective, 3+0)

Microfiltration, ultrafiltration, nanofiltration and reverse osmosis membranes, implementation of seawater and brackish water membrane technology, concentrate management techniques, overall system design approaches, operation and maintenance, capital and life cycle costs of membrane desalination.

ENV-456 WATER REUSE (Elective, 3+0)

Areas where treated wastewater can be used, treatment techniques, legal regulations, water quality criteria

ENV-457 TREATMENT PLANT PROJECT IMPLEMENTATION (Elective, 3+0)

Water conveyance and distribution systems, water and wastewater treatment facilities, environmental systems analysis, emerging technologies, industry practices and applications, water/energy nexus, desalination, materials and equipment specifications, environmental project management with real-life project examples from North America, Europe and Middle East.

ENV-458 ENERGY, SUSTAINABILITY AND THE ENVIRONMENT (Elective, 3+0)

It covers the production of energy from various sources and the environmental effects of consumption of this energy. Other aspects studied are energy, energy efficiency, consumption patterns and sustainability. The course also includes a term paper for student groups to prepare and present in class.

ENV-459 AUTOMATED PROCESS CONTROL STRATEGIES (Elective, 3+0)

General control concepts, need for automatic control, introduction to unit process control concepts, lift stations, flow splitting, preliminary treatment, primary treatment, attached growth and suspended growth biological treatment, physical-chemical treatment, stabilization, thickening and dewatering, disinfection.

ENV-460 ENVIRONMENTAL NANOTECHNOLOGY & APPLICATIONS (3+0)

Classification, synthesis, and characterization of nanomaterials. Environmental behavior and fate of engineered nanomaterials in air, water, and soil. Applications of nanotechnology in wastewater treatment, air purification, and soil remediation. Nano-enabled fertilizers and sustainable agriculture. Nanotoxicology, bioavailability, and ecological risk assessment. Safe-by-design nanomaterials and environmental regulations.

ENV-461 PRIME MOVERS (Elective, 3+0)

General descriptions, unit selections, control systems, operational and maintenance aspects of electric motors, engines, blowers, compressors, generators, pumps, and turbine engines in relation to energy considerations and system coordination.

ENV-491 SUPPLEMENTARY CURRICULUM COURSE (Elective, 3+0)

Students attend online courses, certificate programs, physically received certificate programs, national or international summer schools, offered on digital platforms in a number determined by the departments during each semester or throughout their undergraduate education and can apply for a credited Education Plan Supporting Field Course by documenting that they have registered and successfully completed the courses they have taken within the specified time intervals. During the whole undergraduate education, a maximum of 1 course can be taken with credit in this status.

ENV-498 COOPERATIVE EDUCATION COURSE (Elective, 3+0)

It is the work of gaining practical skills based on the information they receive during their education by enabling them to participate in the activities in the workplaces related to Environmental Engineering.

ENV-499 SUMMER PRACTICE II (Compulsory, 0+0)

Internship requires an attendance of 4 weeks (20 working days) to an institution where environmental engineering is practiced through project activities.

HISTG20X PRINCIPLES OF ATATÜRK I (Compulsory, 2+0)**HISTB20X PRINCIPLES OF ATATÜRK II (Compulsory, 2+0)****TURKG20X TURKISH LANGUAGE I (Compulsory, 2+0)****TURKB20X TURKISH LANGUAGE II (Compulsory, 2+0)**

