IZTECH COURSES

Course Title	Program	Brief Info	Relevant SDGs
AR121 Introduction to Architecture	Architecture/B.Sc.	The course aims to provide students with foundational knowledge about the roots of architecture; the scope of architecture in theory and practice; an overview of architecture in the context of historical developments, related disciplines; introduction to the basic vocabulary of architecture which includes natural & manmade environment, building, architectural space, structure, construction, trends & styles, etc.; fundamentals of architectural design concerning form, shape, color, texture, etc., and exploration of architecture as an embodiment of ideas & various design approaches.	
AR182 Introduction to Building Materials and Physics	Architecture/B.Sc.	Course provides the students the main and essential knowledge about building materials required for understanding relationship between design and materials. Introduction to building envelope, life safety, building costs, and sustainable design concepts is provided. It gives the basic tools required for the selection and a proper use of materials in the building construction field. It includes the types of building materials,	

		mechanical, physical and chemical characteristics of materials, standards of materials, their simple use and application techniques based on the latest technical developments. It starts with common traditional building materials: stone and brick as unit materials, then timber and steel as materials used in skeleton systems, composite materials such as concrete, polymers, plastics, etc.	
AR202 Architectural Design II	Architecture/B.Sc.	The course is designed to introduce the concepts of rural environment and natural environment. Explaining the concepts, terms and methods for understanding a place in the rural and natural context. To realize necessary studio practices for providing the analysis of an architectural program including public, semi-public and private spaces. To inquiry the effects of natural or rural environment to architectural design. To introduce different techniques for presenting the project.	
AR302 Architectural Design IV: Unit 1	Architecture/B.Sc.	The course introduces the concepts of housing and accommodation. The project involves a design of a housing settlement in urban context. The theme of the project, location of the project, and the workflow of the studio will be determined by the studio instructors for	

		each section. The project requires students to develop an understanding on the relationship between urban culture and housing practices. The functional program typically includes a variety of accommodation units and secondary components. The studio introduces students with various graphic strategies to represent design work.	
AR302 Architectural Design IV: Unit 2	Architecture/B.Sc.	The course introduces the concepts of housing and accommodation. The project involves a design of a housing settlement in an urban setting or a registered context. The theme of the project, location of the project, and the workflow of the studio will be determined by the studio instructors for each section. The project requires students to develop an understanding on the relationship between urban culture and housing practices. The functional program typically includes a variety of accommodation units and secondary components. The studio introduces students with various graphic strategies to represent design work. This unit particularly focuses on developing frameworks, strategies, and implementations of sustainable building design and/or computational methods in architecture.	

AR 382 Ecological Studies in Architecture	Architecture/B.Sc.	The course introduces the theoretical framework of ecological approach and its reflection to architecture; The concepts of green and sustainable architecture; Historical evolution of ecological design in architecture; The examples of different approaches in ecological point of view from Turkey and the other countries.	
AR 483 Design principles of energy efficient building	Architecture/B.Sc.	This course illustrates the principles design of energy efficient building in four major contexts; Global context, site context, building context, and renewable energy context. In addition, it illustrates the design tools and design methods of energy efficient building. Case studies of existing energy efficient building will be covered and some other applications.	
AR 486 Design Principles of Passive Heating and Cooling Systems of Buildings	Architecture/B.Sc.	This course introduces (1) Definitions of sustainable energy sources and their potentials, (2) Methods of calculation of energy need and energy losses of a selected small scaled residential building, (3) Energy options of gain with the passive systems, (4) Design guidelines for heating a building by passive systems, (5) Characteristics and scaled drawings of passive heating building elements and components.	

CHE211 Introduction to Polymer Science	Chemical Engineering/B.Sc.	The course aims to provide students with foundational knowledge about the structure, properties, and behavior of polymers. The learning objectives would generally cover key concepts, from the basics of polymer chemistry to their applications in various industries.	
CHE219 Environmental Chemistry	Chemical Engineering/B.Sc.	The course focuses on the chemical processes that occur in the environment and their impact on human health and ecosystems. The learning objectives are designed to help students understand the chemical principles underlying environmental issues and how human activities influence environmental systems.	
CHE420 Engineering Economics and Design	Chemical Engineering/B.Sc.	The course is designed to equip students with the knowledge and skills needed to make economically sound decisions in engineering design and project management. The course integrates economic theory with practical engineering design principles, focusing on how to evaluate the financial feasibility of engineering projects and optimize designs based on both technical and economic considerations.	

CHE424 Conversion of Biomass to Chemicals and Fuels	Chemical Engineering/B.Sc.	The course focuses on the processes, technologies, and scientific principles involved in converting renewable biomass resources (such as plant material, agricultural waste, or algae) into valuable chemicals and fuels. The course aims to provide students with both the theoretical and practical understanding of biomass conversion technologies, including biochemical, thermochemical, and catalytic processes.	
CP 242 Urban Sociology	City and Regional Planning/B.Sc.	The course begins with an exploration of the roots of urban sociology in its connections with the rise of sociology as a discipline and examines the key concepts, issues and classical theories of sociology. Then it focuses on the essential theoretical and phenomenal issues and problems of urban sociology. By taking a departure from the socio-spatial problematique, it elaborates on urbanization, industrialization, globalization and urban restructuring, uneven development and spatial differentiation, urban poverty, housing question, urban life and urban culture and urban policy.	

CP 301 & CP 302 Planning Design I & Planning Design II	City and Regional Planning/B.Sc.	Application of spatial strategic planning principles for the development of a sub-region. Understanding the structure and spatial organization requirements of the settlements in the sub-region. Development of sectoral policies in relation with planning principles and design standards. An emphasis on the development of urban structure plan and action area plans in accordance with the Turkish planning practice. Action area plans may include projects on issues as Public housing, Industrial & Technological Sites, New urban development, Transportation, Urban renewal, Conservation, City entrance, Health, Tourism and Recreation.	
CP 335 Environmental Issues and Planning	City and Regional Planning/B.Sc.	The course explores the fundamental concepts of ecology the interactions between natural environment and urbanization and the environmental problems created by the current trends in urban processes. Then it elaborates on the policy options and planning tools for creating sustainable urban environments and solving the environmental problems such as urban and industrial pollution chemical toxins, water scarcity, degradation in ecosystems, etc. The course also covers the methods for analysing and evaluating the adverse	

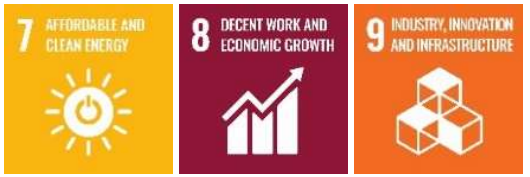
		impacts of current trends of industrialization and urbanization on the natural environment.	
CP 362 Urban Infrastructure Systems	City and Regional Planning/B.Sc.	Elements of urban infrastructure, systems of water, sewage and solid waste. Establishing the infrastructure demands of a region, city or site and methods for serving these demands. Integration of planning infrastructure systems to city planning process. Students are instructed to prepare a paper analysing the infrastructure problems of a particular site and the alternatives for solving them.	
CP 401 Urban Design	Architecture/B.Sc.	The course introduces the application of urban design theory, methods and techniques to specific large scale development and redevelopment endeavors with metropolitan areas. Strategies for change in large areas of cities to be developed over time, involving different actors. Developing designs into a natural, man-made, historical and cultural outlook; enabling desirable activity patterns; conceptualizing built form; providing infrastructure and services systems. This course involves a teamwork of architecture and planning students; requires individual designs on design and planning guidelines.	

CP 403 Sustainable Urban Conservation Planning and its Design Principles I	City and Regional Planning/B.Sc.	The course introduces the basics of the approaches and tools that define the contexts of sustainable urban conservation planning and its designing principles. Underlining these basics with exemplary cases from abroad and Turkey, the course focuses on urban conservation planning along with the design principles. This course provides city planners with knowledge at the basic level regarding the principles of sustainability and its relation with the planning of cultural heritage sites. It demonstrates the interplay between sustainable design principles in the conservation areas from urban patches to the whole city.	
CP 413 Urban Regeneration: Theory and Practice	City and Regional Planning/B.Sc.	The course introduces three major issues. (I) The main causes and the proponents of the process of the urban degradation and its wider implication on the social, physical, economic, cultural and ecological qualities of the cities. (II) The complex understanding and instruments organized to improve and to mitigate low quality-low standard of living condition and poor infrastructures of the depressed areas in order to and preserve healthy living and environmental conditions. (III) The ways and solutions to provide the improvements of the continuities lost in the cities, their improvements,	

		conservation and regeneration and transferring them to the future generation.	
CP 438 Urban Politics	City and Regional Planning/B.Sc.	The course intends to construct a critical and relational perspective to problematize the production of urban space as a political issue with capital accumulation, class conflict, hegemony and ideology. Throughout the course, different cases of urban development practices, including EU, North and South American countries, Asian and African countries, will be presented and these cases will be discussed with reference to the concepts like capital accumulation, class conflict, hegemony struggle and state power. Different cases from different countries of the world will be discussed through comparing them with Turkish case to explain how the urban growth and planning, collective consumption and struggles for the right to the city large scale projects and urban social movements take place in the metropolitan cities of Turkey. The roles, strategies and political positions of the state capital and the different agents of civil society in these processes will be elucidated.	

CP 431 Ecological Planning	City and Regional Planning/B.Sc.	The course introduces the role of natural systems in urban planning. Climate, geology, land forms, soil, vegetation and animal populations as the basis of agricultural and industrial technology. Environmental problems in the context of social, economic, and political trends. Competing demands on air, water and land. Technological and legal aspects of environmental issues.	
CP 442 Rural Planning	City and Regional Planning/B.Sc.	The use of rural space and the management of natural resources in developing country context, as in case of Turkey, is of utmost importance because of the rapid change occurring in rural areas. Decay in rural areas has already a widely known phenomenon however it has exacerbated by the winds of globalization. Rural areas are declining in population, causing land to be abandoned. Individuals become isolated without adequate social services. Residents often face poverty and social conflict as well as environmental degradation, soil erosion and water degradation. The poverty and inequality has risen. The course provides an integrated perspective on rural planning in developing country context. Attention is drawn to the relationship between strategic planning and local economic	

		development, ant the ways in which coordinated development planning and management of natural resources can underpin sustainable rural livelihood.	
ENV101 Introduction to Environmental Engineering	Environmental Engineering/B.Sc.	Provides an overview of environmental engineering, focusing on fundamental concepts and their applications in environmental protection. Describe natural environmental systems, including water, air, and soil, and how human activities impact these systems. Study the sources of water pollution and the principles of water quality management, including parameters like dissolved oxygen, pH, and nutrient levels. Study the methods used to monitor environmental quality, such as sampling and analysis of water, air, and soil.	
ENV201 Environmental Chemistry	Environmental Engineering/B.Sc.	Focuses on chemical processes in the environment and their impacts on health and ecosystems, helping students understand how human activities influence natural systems.	

ENV212 Environmental Economics	Environmental Engineering/B.Sc.	This course provides students with an understanding of economic principles as they apply to environmental issues. It covers topics such as the economic analysis of environmental policies, cost-benefit analysis, and the economics of natural resource use and pollution control.	
ENV214 Occupational Health and Safety	Environmental Engineering/B.Sc.	Covers principles of occupational health and safety, including risk management and safety regulations in engineering environments.	
ENV218 Hydraulics	Environmental Engineering/B.Sc.	Examines the behavior of fluids, focusing on applications in water resource management and environmental engineering.	
ENV222 Hydrology	Environmental Engineering/B.Sc.	Introduces students to the science of water movement, focusing on its applications in managing water resources.	
ENV311 Unit Operations and Processes of Water Treatment	Environmental Engineering/B.Sc.	Covers treatment processes for water and wastewater, including physical, chemical, and biological techniques. Study the principles behind physical, chemical, and biological processes used in water treatment. Understand the principles and applications of physical treatment processes, including screening, sedimentation, filtration, and flotation.	

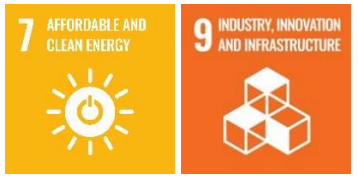
		Study chemical processes used in water treatment, including coagulation, flocculation, disinfection, and oxidation.	
ENV312 Unit Operations and Processes of Wastewater Treatment	Environmental Engineering/B.Sc.	Focuses on the unit operations involved in treating wastewater, covering techniques for sustainable waste management.	
ENV315 Water Supply	Environmental Engineering/B.Sc.	Covers the engineering principles of water supply systems, including sources, treatment, and distribution. Familiarize with water quality parameters, such as turbidity, pH, dissolved oxygen, and contaminants.	
ENV316 Sewerage	Environmental Engineering/B.Sc.	Focuses on the design and management of sewerage systems for effective waste disposal and public health.	
ENV317 Atmospheric Chemistry and Air Pollution	Environmental Engineering/B.Sc.	Focuses on atmospheric composition, chemical reactions, pollution sources and controls, chemical processes occurring in the atmosphere and their role in air pollution and climate change. Identify primary air pollutants (e.g., carbon monoxide, sulfur dioxide, nitrogen oxides) and secondary pollutants (e.g.,	

		ozone, particulate matter). Analyze the sources, composition, and behavior of aerosols and particulate matter in the atmosphere. Study the effects of aerosols on human health, visibility, and climate, including their role in cloud formation and radiation balance.	
ENV320 Air Pollution Control	Environmental Engineering/B.Sc.	Examines methods to control and reduce air pollution, including regulatory approaches. Focuses on understanding the causes, impacts, and methods to control and mitigate air pollution. Learn about methods for monitoring air pollutants, including sampling techniques, sensor technologies, and remote sensing. Analyze technologies used to control emissions from stationary and mobile sources, including scrubbers, electrostatic precipitators, catalytic converters, and carbon capture.	
ENV 300 & 400 Summer Practice I & II	Environmental Engineering/B.Sc.	Practical experience in environmental engineering, applying knowledge in real-world settings.	

ENV413 Solid Waste Engineering	Environmental Engineering/B.Sc.	Teaches waste management principles, focusing on sustainable disposal and recycling methods. Focuses on the principles and practices of managing solid waste, from generation to disposal, with an emphasis on sustainable and engineered solutions. Study methods for efficient waste collection, handling, and transportation, focusing on logistics, route optimization, and cost-effective practices. Learn the principles of landfill design, construction, and operation, including liner systems, leachate collection, and gas management.	
ENV415 Environmental Modeling	Energy Systems Engineering/B.Sc.	Covers modeling techniques to predict environmental impacts and assess pollution control strategies. Apply mathematical principles and computational techniques to construct models for various environmental systems (e.g., water, air, soil). Develop models for specific environmental systems, including hydrology, air quality, climate, and ecological interactions.	

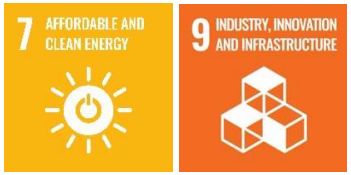
ENV440 Industrial Wastewater Treatment	Energy Systems Engineering/B.Sc.	Focuses on the knowledge and skills needed to manage wastewater from industrial sources, focusing on treatment methods, regulatory compliance, and sustainable practices. Study key regulations and guidelines governing industrial wastewater discharge, such as international standards, local guidelines, and international frameworks. Study key regulations and guidelines governing industrial wastewater discharge, such as EPA standards, local ordinances, and international frameworks.	
ENV444 Hazardous Waste Management	Energy Systems Engineering/B.Sc.	This course aims to equip students with the knowledge and skills to manage hazardous waste safely and effectively, with an emphasis on regulatory compliance, risk assessment, and sustainable practices. Demonstrate an understanding of ethical considerations in hazardous waste management, including corporate responsibility, transparency, and environmental justice. Prepare students to responsibly manage hazardous waste while ensuring safety, regulatory compliance, and sustainability.	
ENV452 River Basin Management	Energy Systems Engineering/B.Sc.	This course focuses on understanding and managing the complex interactions within river basins to balance ecological, social, and economic needs. Examine the complexities of managing transboundary	

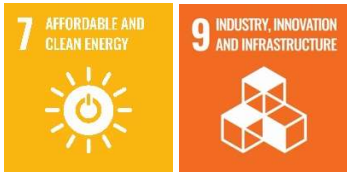
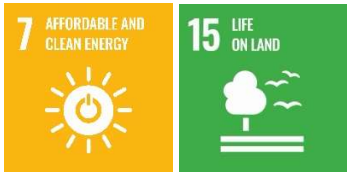
		rivers, including legal and diplomatic challenges. Learn strategies for conflict resolution and cooperation among different stakeholders, countries, or regions sharing river basin resources.	
ENV458 Energy, Sustainability, and the Environment	Energy Systems Engineering/B.Sc.	Examines sustainable energy solutions and their environmental impact. The course aims to equip students with a holistic understanding of energy's role in society, the environmental impact of energy choices, and the pathways toward sustainable energy solutions.	
ESE342 Energy Systems Engineering Economics	Energy Systems Engineering/B.Sc.	Introduction to economics. Basic economic analysis and terminology. The logic of markets. Economic decision making. Engineering Economics for Energy Projects. The time value of money. Economic equivalence. Decision making for individual projects. Rate of return methods. Project comparisons. Decision making under uncertainty. Markets for energy. Markets for electricity. The demand and supply for electricity. Energy policy.	
ESE401 Energy Systems Engineering Design I	Energy Systems Engineering/B.Sc.	This first part of the design course provides students with the knowledge to design an energy system and act in accordance with ethical values, realism of	

		innovation, entrepreneurship and consultancy.	
ESE402 Energy Systems Engineering Design II	Energy Systems Engineering/B.Sc.	This second part of the design course is the realization of the work designed and planned in ESE 401.	
ESE405 Heat Exchanger Design	Energy Systems Engineering/B.Sc.	Introduction to heat exchangers. Heat transfer mechanism. Flow arrangements. Basic design methods: log-mean temperature difference, the effectiveness-NTU method. Double pipe heat exchangers. Heat exchanger pressure drop. Fouling of heat exchangers. Shell-and-tube heat exchangers. Plate type heat exchangers. Condensers and evaporators.	
ESE406 Introduction to Geothermal Energy	Energy Systems Engineering/B.Sc.	Introduction to geothermal energy. Application areas of geothermal energy. Electricity generation. Direct use applications: space and district heating, space cooling, greenhouse heating, heat pumps, aquaculture, industrial applications. Environmental impacts of	

		geothermal applications. Geothermal laws and regulations. Field trips to a geothermal power plant and some geothermal direct use applications.	
ESE407 Energy Efficiency	Energy Systems Engineering/B.Sc.	General overview of energy efficiency: Energy consumption, efficiency measures, laws and regulations. Energy efficiency in buildings. Energy efficiency in industry. Energy efficiency in transportation. Building energy efficiency: Thermal comfort in buildings. Low Carbon Buildings. Energy survey, monitoring of buildings. Energy Management. Energy efficient control of buildings. Dynamic Building energy modelling.	
ESE408 Exergy	Energy Systems Engineering/B.Sc.	Exergy and Energy Analyses, Exergy, Environment and Sustainable Development, Applications of Exergy in Industry, Exergy Analysis of Heat Pump Systems, Exergy Analysis of Thermal Energy Storage Systems, Exergy Analysis of Renewable Energy Systems, Exergy Analysis of Steam Power Plants, Exergy Analysis of Cogeneration and District Energy Systems, Exergy Analysis of Fuel Cell Systems, Exergoeconomic analysis, Exergetic Life Cycle Assessment.	

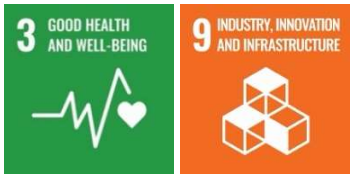
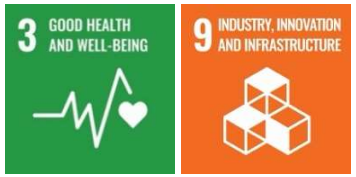
ESE409 Heating Ventilating and Air Conditioning	Energy Systems Engineering/B.Sc.	Fundamentals, air properties, psychometry, basic processes, and summer and winter air conditioning. Comfort, IAQ, equipment analysis and selection, load estimation, ventilation methods and system design, national and international standards for HVAC systems.	
ESE410 Introduction to Wind Energy	Energy Systems Engineering/B.Sc.	In the course, students will learn about all the layers of wind energy other than economy.	
ESE411 Geographic Information Systems for Energy Systems Engineers	Energy Systems Engineering/B.Sc.	The course is taught using two open source GIS software. SAGA GIS and qGIS. The student can choose one of these two software with similar features or choose to use both together. Students will learn how to produce decision support mechanisms by learning all the GIS digital definitions and processing the raw data.	
ESE420 Introduction to Bioenergy	Energy Systems Engineering/B.Sc.	Biomass energy and types of biomass. Heat and power generation from biomass. Methods and technologies for biofuels production in solid, liquid and gaseous forms. Utilization of organic municipal waste using biomass conversion technologies.	

ESE421 Unit Operations in Energy Processes	Energy Systems Engineering/B.Sc.	This course provides detailed coverage of several unit operations and unit processes employed in energy related processes. Each operation/process is presented starting from the fundamentals to the recent advances. The course deals with Material and Energy balances, Heat transfer and design of Heat Exchangers, Diffusional Mass transfer and Gas – Liquid Absorption, Simultaneous heat and mass transfer, Extraction and Adsorption and Reactor design.	
ESE423 Hydrogen Energy and Fuel Cells	Energy Systems Engineering/B.Sc.	This course provides an introduction to basic principles and theory of hydrogen production and storage technologies and fuel cell systems. The course includes a detailed analysis hydrogen production and storage Technologies and their energetic, economic and environmental evaluations. Basic principles of fuel cells, fuel cell thermodynamic, reaction kinetic, charge transfer, mass transfer, fuel cell modelling, fuel cell types, technical, economic and environmental evaluations of fuel cell systems are covered.	
ESE431 Introduction to Power System Analysis	Energy Systems Engineering/B.Sc.	Basic structure of electrical power systems. Electrical characteristics of transmission lines, transformers and generators. Representation of power systems. Per Unit System. Symmetrical	

		three-phase faults. Symmetrical components. Unsymmetrical faults.	
ESE432 Power System Analysis and Control	Energy Systems Engineering/B.Sc.	Matrix analysis of power systems networks and methods of solution. Load flow and short circuit analysis. Transient stability analysis.	
ESE442 Chemistry in Geothermal Systems	Energy Systems Engineering/B.Sc.	Introduction to geothermal systems, geothermal fluids and gases, solution theory and thermodynamics, chemical potentials and open systems, Gibbs phase rule, Duhem's phase rule, Clausius-Clapeyron equations, Van't Hoff equations, ideal solutions – Non-ideal solutions, the effects of dissolution/precipitation of minerals on the porosity and porosity-permeability relationship in the rocks, reactive transport modeling, CO2 capture, and storage techniques.	
ESE443 Integrative Energy Systems for Buildings	Energy Systems Engineering/B.Sc.	This course explores the principles of energy system engineering for building design across four major contexts: global, site-specific, building-specific, and renewable energy. It also covers design tools and methods essential for designing energy-efficient buildings. The course includes case studies of existing sustainable and energy-efficient buildings, along with other practical applications.	

FE105 Introduction to Food Engineering	Food Engineering/B.Sc.	This course covers fundamental principles in food science and engineering as applied to food production, processing, and preservation. Introduce the key scientific and engineering principles that influence food processing, including thermodynamics, fluid mechanics, and mass and heat transfer. Teach methods to ensure food safety, focusing on the microbiological, chemical, and physical aspects that affect food quality and the regulatory standards governing them.	
FE305 Food Chemistry	Food Engineering/B.Sc.	This course entails the chemical composition, structure, properties, and transformations of foods. Examine the chemical and biochemical reactions that occur in food during processing, storage, and cooking, including Maillard reaction, caramelization, and oxidation. Learn about methods and tools used for the chemical analysis of food, including spectroscopy, chromatography, and other laboratory techniques.	
ID 403 Limited Elective Industrial Design Studio V-2: Context Based Design	Industrial Design/B.Sc.	The course involves issues concerning design problem-solving processes in a context, dynamic relations between spaces, places, people and products, research on context, anthropometry and ergonomics, materials and manufacturing techniques, sustainability and economics.	

IWR510 Advanced Hydrogeology	International Water Resources/M.Sc.	Develop Advanced Knowledge of Groundwater Flow: Students will learn about complex groundwater flow concepts, including anisotropic and heterogeneous aquifers, confined/unconfined aquifer systems, and multi-layered systems. Apply Mathematical and Numerical Modeling: Use advanced numerical models to simulate groundwater flow and solute transport, and understand the strengths and limitations of various models in different hydrogeological contexts.	
IWR515 Water Legislation	International Water Resources/M.Sc.	This course focuses on understanding the laws, policies, and regulations that govern water resources. Identify and understand the roles of local, national, and international agencies responsible for water management and regulation, such as the Environmental Protection Agency (EPA) in the U.S. or similar entities in other countries. Analyze laws and regulations related to water quality standards, pollution control measures, and environmental protection, including the Water Framework Directive.	
MBG406 Genomics and Proteomics	Molecular Biology and Genetics/ B.Sc.	This course aims at giving students a comprehensive understanding of the principles, techniques, and applications in the fields of genomics (the study of genomes) and proteomics (the study of	

		proteins on a large scale). Understand the structure, function, and dynamics of proteins in biological systems. Study post-translational modifications and protein-protein interactions.	
ME 557 Medical Technology Management	Mechanical Engineering/B.Sc.	Topics will include product life cycle, ISO standards, CE marking and FDA approvals, risk management procedures while designing or developing medical devices by following the rules and regulations in biomedical field providing a vision for low cost and failure free engineering solutions with the practical application of QMS in their projects. Projects will be a group work and skills for working with interdisciplinary environment is to be practiced and internalised by the students by following rules and regulations.	
ME 528 Metallic Biomaterials	Mechanical Engineering/B.Sc.	This course aims to introduce students to metallic biomaterials and their use in various medical applications such as dental implants, orthopedic hip replacements or cardiovascular stents. Critical phenomena influencing the success of medical treatment, such as biocompatibility and stress shielding effect will be explained. Physical, mechanical and chemical properties of materials required for various biomedical applications will be explained and related	

		material characterization methods will be introduced. ImageJ software will be used to examine adhesion behavior of cells on metallic biomaterials.	
ME 499 Cooperative Education Course	Mechanical Engineering/B.Sc.	Students will have two weeks' theoretical education, then they will work in the companies one day a week throughout the semester. They will prepare a report about their works and submit it to department.	
ME 554 Geothermal Engineering	Mechanical Engineering/B.Sc.	Introduction to geothermal energy. Fluid flow: fluid mechanics, single phase pipe flow. Cycles: geothermal cycles, exergy. Heat transfer: heat exchangers, downhole heat exchangers. Mass transfer and waste heat rejection: moisture transfer, cooling towers, condensers. Gas extraction. Fiels trips. Design project.	
ME 550 Wind Power	Mechanical Engineering/B.Sc.	Theory of wind turbines. Theory of wind streams. Types of wind turbines. Design of wind turbines. Wind farms. Economic analysis of wind power plants. Technical potentials.	
ME 545 Direct Use of Geothermal Energy	Mechanical Engineering/B.Sc.	Introduction to geothermal energy. Geothermal direct use applications in the world. Space heating equipment and space heating systems. Heat exchangers, downhole heat exchangers, piping. Geothermal greenhouse design. Aquaculture. Refrigeration. Industrial	

		usage. Ground-source heat pumps. Environmental considerations. Field trips. Design project.	
ME 543 Advanced Technologies for Pollutants Control in Engines	Mechanical Engineering/B.Sc.	Mechanisms of formation of pollutants. Measure of particles and the gaseous emissions. Gas analyzers and their operation principle. Pollutants formation control in engines. Fuel sprays development and evolution in CI and SI engines. Fuel sprays development and evolution in CI and SI engines. Diesel engines: advanced combustion strategies. Diesel engines: advanced technology. Spark ignited engines: operating modes and stratified charge combustion. Homogeneous Charge Compression Ignition (HCCI) Catalyst systems Hybrid Electric Vehicles (HEV): configurations and control strategies.	
ME 432 Introduction to Geothermal Energy	Mechanical Engineering/B.Sc.	Introduction to geothermal energy. The use of geothermal energy. Electricity generation. Direct use applications: space and district heating, space cooling, greenhouse heating, heat pumps, aquaculture, industrial applications. Environmental impacts of geothermal applications. Geothermal laws. Field trips to a geothermal power plant and some geothermal direct use applications. Term project.	

ME 427 Introduction to Renewable Energy Resources	Mechanical Engineering/B.Sc.	Introduction to renewable energies. Principles of renewable energies. Basic laws of heat transfer and fluid mechanics. Uses of renewable energies: solar, wind, geothermal, bio, tidal, wave, etc. Storage of energy and its distribution.	
ME 328 Manufacturing Engineering	Mechanical Engineering/B.Sc.	An Overview of Manufacturing Processes. Time Analysis and Cost Estimation. Process Planning. Layout Design. Quality Control. The use of Computers and Industrial Robots in Manufacturing. Cost Analysis in Manufacturing.	
ME 401 Engineering Economics and Design	Mechanical Engineering/B.Sc.	The Design Philosopy and Methodology. Engineering Economics and Economics Decision Making for a Process or a Product. Application of Optimization Principles to a Specific Engineering Problem. Cost Estimation. A term Project will be given during the Course.	
MTH424 Hydrogen and Fuel Cell Technology	Energy Systems Engineering/B.Sc.	The importance of hydrogen energy, hydrogen production methods (chemical, thermochemical, electrochemical methods), hydrogen storage methods, electrochemical reactions, types of fuel cells, working principles of fuel cells, fuel cell applications will be explained.	
MTH425 Climate Change Oriented Planning	Energy Systems Engineering/B.Sc.	The following topics will be covered: basic concepts of climate change, climate projections, national and international framework within the scope of climate change, impacts of climate change and	

		risk analysis, greenhouse gas emission inventories, adaptation and mitigation strategies, climate finance.	