**Dersler**

**ENVE 101 Introduction to Environmental Engineering**

**Scope and definition of Environmental Engineering. Overall integrated view of nature of environmental problems,water pollution, municipal and industrial wastewaters and their treatment methods, introduction to atmospheric science, solid and hazardous waste, noise pollution and pollution prevention, principles of environmental impact assessment**

**ENVE 201 Environmental Chemistry I**

**Introduction to environmental chemistry concepts and experiments: Classification of Pollution Parameters. Analytical Chemistry and Quantitative Analysis. Units and Data Processing. Basic Concepts of Volumetric Analysis. Alkalinity / Acidity. Basic Concepts of Strong Acid-Strong Base Titrations. Basic Concepts of Weak Acid-Strong Base Titrations. Titrimetric Analyses of Chloride. Basic Concepts of Gravimetric Analysis: Solubility, Common Ion Effect, Gravimetric Analysis of Sulfate. Hardness. Dissolved Oxygen. Instrumental Analysis: Optical Methods of Analysis.**

**ENVE202 Environmental Chemistry II**

**Continuation of Environmental Chemistry I. Environmental sampling and sample preservation, environmental pollution parameters, biochemical oxygen demand. chemical oxygen demand, nitrogen and phosphorous, oil and grease, and surfactants. Introduction to environmental organic chemicals, molecular geometry, molecular polarity, and intermolecular forces, Equilibrium Partitioning Between Gaseous, liquid, and solid phases. Thermodynamics and vapor pressure. Organic chemical solubility and intermolecular attractions. Organic acids and bases. Instrumental Analysis: chromatographic methods of analysis**

**ENVE 204 Environmental Microbiology**

**Introducing structure of cells and types of microorganisms (viruses and bacteria) Defining different types of microorganisms, Introducing physiology of bacteria and baterial growth, Introducing the methods for izolation and characterization of bacteria, Introducing the physiological methods for determination of microbial activity, Understanding how microorganisms can be used for removal of organic and metal pollutants and bioremediation, Learning the function of indicator microorganisms, Defining the pathogenic and Indicator microorganisms, Knowing disinfection methods for waste water and drinking water.**

**ENVE 203 Statistical Methods for Engineers**

**An introduction to main concepts of probablility and statistics with an emphasis on engineering applications, including descriptive statistics, tests of hypotheses, nonparametric methods, linear regression, analysis of variance, elementary experimental design.**

**Prerequisite: MATH101**

**ENVE205 Hydrology and Water Resources**

**Introduction to Hydrology. The water/hydrologic cycle. Watersheds. Water Resources. Improvement of water resources - Precipitation, Evaporation, Infiltration, Groundwater Flow. Surface Runoff. Hydrometry. Hydrograph Analysis (Components of a hydrograph and hydrograph separation, Unit hydrograph method, S-Hydrograph and routing of hydrograph in rivers and reservoirs). Urban Drainage. Flood control. Application of Statistical Methods in Hydrology**

**ENVE206 Fundamentals of Env.Eng. Processes**

**Introduction to environmental environmental systems & processes , analysis of pollution control processes: gas/liquid/solid process and system characterization and design concepts. rate concepts, material balance, integration of reaction into material balance, examples of environmental pollution control processes and system modeling,**

**ENVE207 Environmental Geology**

**Introduction to Environmental geology. Rocks and minerals. Soil and environment. Eartquakes and environmental impacts. Landslides and environmental impacts. Surface and groundwater pollution. Mining and environmental impacts. Energy sources and environmental impacts. Environmental impacts of wastes. Medical geology and environmetal health. Planing Soil usage. Landfills and geology.**

**ENVE 210 Fluids Mechanics**

**Course material includes an introduction to the concepts and applications of fluid mechanics and dimensional analysis with an emphasis on fluid behavior, internal and external flows, analysis of engineering applications of incompressible pipe systems, and external aerodynamics, ideal fluid flow including potential flow theory, and computer solutions in ideal fluid flow.**

**Prerequisite: MATH 102**

**ENVE 301 Water Treatment**

**Study the principles and design of water treatment processes, including coagulation, flocculation, sedimentation, filtration, disinfection, advanced oxidation, and membrane filtration.**

**Prerequisite: ENVE 201**

**ENVE 303 Water Quality Management**

**Information on water quality management by taking into consideration the balance in between water usage and its protection. Specific topics covered in the course include identification of sources and types of water pollution, regulatory approaches to water quality management, water quality standards and criteria, behavior of water pollutants on the basis of water supplies and data assessment.**

**ENVE 305 Air Pollution**

**Air pollution history, atmosphere, air pollutants, air quality regulation, meterology, dispersion of pollutants, air sampling and monitoring, combustion chemistry, control of Particulate matter and gaseous pollutants, mobile sources, global climate change**

**ENVE 307 Solid Waste Management**

**Sources, composition, and properties of solid waste, generation of solid wastes, collection of solid wastes and separation and processing and transformation of waste materials, reduction, recycling/reuse and recovery or treatment; and creating public awareness on the waste management and recycling industry, regulations on waste management, solid waste management and planning issues and planning, siting, and permitting of waste management facilities**

**ENVE 309 Water Supply and Sewerage System**

**Planing and designing of drinking water and sewage infrastructure components, determination of conceptual requirements, improving assessment and design skills, basin-water resources and infastructure relationship, general overview of infrastructure systems, population forcestasting methods**

**ENVE308 Transport Processes**

**An introduction to fluid mechanics, heat transfer and mass transport in environmental flows, covering the derivation and solutions to the differential form of mass conservation equations.**

**ENVE302 Wastewater Treatment**

**Describe the physical, chemical, and biological processes necessary for designing and managing primary, secondary, tertiary and advanced wastewater treatment processes and solids handling systems. Teach laws and regulations pertaining to Wastewater Treatment and Sludge Handling**

**Prerequisite: ENVE 201**

**ENVE304 Laboratory for Unit Operations and Processes**

**Introduction to unit operation experiments. Selected experiments: coagulation and flocculation, sedimentation, filtration, chemical precipitation, aeration, carbon adsorption and ion exchange.**

**ENVE306 Ecology and Toxicology**

**Environmentally important pollutants, their effects on the environment and living organisms; learning the test methods for toxicity, and risk assesment and regulations to be applied for decreasing release of these pollutants.**

**ENVE 310 Understanding Climate Change and Solutions**

**The evolution of the earth’s atmosphere, A basic understanding of the atmospheric processes leading to climate change, climate change science, climate models and sensitivity, the scientific consensus on climate change, climate change mitigation, international dimensions of climate change, the Impacts of Climate Change, adaptation strategies for different regions of the World, future scenerios, importance of innovation**

**ENVE 312 Hazardous Waste Management**

**Hazardous waste definitions, classifications of hazardous wastes, determination of hazardous wastes, recycling, treatment and disposal options, treatment storage disposal technologies, control methods and hazardous waste management systems.**

**ENVE401 Environmental Design Project**

**Designing appropraite units for treatment and handling of selected waste streams (water, wastewater,air, or solid waste) ,Learing concepts in engineering design, engineering ethics, principles of project management, environmental legal infrastructure, safety and economical considerations in engineering design, presenting an environmental design problem and requesting detailed design applicable to the problem, completion of a design project in teams with a final report and presentation.**

**ENVE402 Graduation Project**

**Under the supervision of assigned advisor selecting a environmental engineering research topic, doing literature survey, planing works toward the set aim of the projects, data collection and interpret and report the obtained results.**

**ENVE403 Environmental Modeling**

**Introduce principles of Environmental Modeling, including conceptual, stochastic and deterministic models, components of models, uncertainty and sensitivity, validation of the model and examples covering water and air quality models, hydrological and integrated models**

**ENVE407 Principles of Cleaner Production**

**Environmental, technical and legal aspects of waste minimization techniques and applications, the effect of Cleaner Production on industrial economy, Cleaner Production Methodology / Waste reduction methods, Environmental life cycle assessment, explaining the ecologically friendly products, environmental designation, concept of eco-design, waste minimization techniques in process development and design applications, waste minimization applications and biotechnology and clean energy**

**ENVE 421 Biomass and Waste Technologies**

**Systematic and comprehensive knowledge of the sources of biomass waste and the range of technologies available for conversion into energy. The topics also include opportunities and potential for biomass to contribute to the production of renewable energy, power generation and transport fuels together with the potential for reducing CO2 emissions.**

**ENVE 423 Soil and Groundwater Remediation**

**Scientific and technical knowledge, design and operation methodologies of soil and groundwater remediation will be given. Topics include contaminant characteristics and partitioning, soil vapor extraction, in situ air sparging, in situ bioremediation, vacuum-enhanced recovery, in situ reactive walls, in situ reactive zones, hydraulic and pneumatic fracturing**

 **ENVE 425 Environmental Biotechnology**

**The course presents new solutions to the environmental problems through the analyzing the processes used in environmental biotechnology. Topics include basics of microbiologymicrobial kinetics, biofilm kinetics, reactors, the activated sludge process, lagoons, aerobic biofilm processes, Nitrification, denitrification, phosphorus removal, anaerobic treatment by methanogenesis, bioremediation**

**ENVE 422 Environmental Engineering in Practice**

**Gaining an understanding of current practice and thinking in the field of environmental engineering by attending seminars given by experienced professionals in water treatment system operation, environmental law in Practice, industrial waste water treatment plant operation, integrated watershed management, preparation of EIA reports, softwares used in the area and real scale clean technology applications, pumps and pump selection, environmental ethics, energy efficient building design /sustainable buildings**

**ENVE424 Environmental Risk Assessment**

**Introduction to Human Health and Ecological Risk Assessment , Basic Concepts , Regulatory framework, explaining the overall process of risk assessment and define this from risk management and communication,Numerical aspects of risk calculations; the role of estimation, variability and uncertainty, Fundamental Concepts in Toxicology, Aquatic toxicology Human Health Risk Assessment Data collection and models, Exposure pathways, Exposure models**

**Prerequisite: ENVE 301**

**ENVE 426 Air Sampling**

**Scientific basis to understand the reasons, principles and techniques of air sampling to be able to determine environmental and health effects of air pollution as well as to evaluate regulatory compliance. Topics include basic gas laws, standards, calibration, gas flow rate and velocity measurements, pumps, particle sampling and analysis, particle size distribution measurment,**

**Principles of CO, Ozone, SO2 and NOx analysis, source sampling methods and sampling train**

**ENVE 428 Waste Minimization and Recycle**

**Atık minimizasyonun tanımı, teknikleri ve uygulama prensipleri: Tanımlar, uygulanmasındaki engeller ve faydalar, atık azaltımı metotları, çevresel yaşam döngüsü , proses geliştirilmesi ve dizaynında yapılabilenecek atık azaltım uygulamaları, ofislerde atık azaltım uygulamaları, çevresel yönetim sistemleri, temiz enerji kaynakları**

**ENVE 430 Atmospheric Chemistry**

**The basic concepts to understand the chemical and physical transformations of the trace gas and particulate material in the atmosphere and their sources and sinks and to survey the current research topics in the atmospheric chemistry**

**ENVE 432 Industrial Waste Management**

**Endüstrilerin kirlenme profilleri, karakterizasyonu, kontrol metotları, teknolojileri hakkında olan ders endüstriyel kirlenme ve endüstriyel sistem tanımları, endüstriyel atıkların sınıflandırılması, endüstriyel atıkların kirlenme bazında sınıflandırılması, endüstriyel kirlenme tanımı yaklaşımları, endüstrilerin incelenmesi ve proses değerlendirme, endüstriler için çevre yönetim sistemleri, kirlilik önleme, temel prensipler, araçlar ile endüstri örneklerini konularını içermektedir.**

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