ENVIRONMENTAL ENGINEERING
The mission of the Environmental Engineering Department is to provide the high quality environmental engineering education as required by the industry and the public; to advance the understanding and application of the principles of environmental science and engineering; to enhance and maintain sustainable economic development efforts and to improve the well-being of the society in general through teaching, research and community outreach programs.

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Environmental Engineers are the technical professionals who identify and design solutions for environmental problems. Environmental Engineers provide safe drinking water, treat and properly dispose of wastes, maintain air quality, control water pollution, and remediate contaminated sites due to spills or improper disposal of hazardous substances. They monitor the quality of the air, water, and land, and they develop means to protect the environment. Environmental Engineers work in many venues, including engineering consulting firms that design and construct air and water pollution-control systems; industries that need to treat air or wastewater discharges; private and municipal groups that supply drinking water; companies that treat and dispose of hazardous chemicals; governmental agencies; laboratories that develop pollution-control systems; agencies that transfer knowledge to the developing world; and public interest groups that advocate environmental protection.

Therefore, the curriculum in the department is structured to provide students with appropriate background in the physical, chemical, biological and engineering sciences together with the mathematical, planning, management, analysis and design tools necessary to address complex environmental engineering concerns.

Prof. Bülent İçgen
About Us

The Department of Environmental Engineering has been established in January 1973 as the first department in environmental engineering program in Turkey. The establishment was in response to the growing concern over the environment and the need for fully qualified engineers capable of undertaking professional responsibilities for optimum development and prudent management of water, air and land resources. This department evolved from the Sanitary Engineering division of the Civil Engineering Department, which had been offering graduate courses in this field since 1967. As a distinct department, the Department of Environmental Engineering has started undergraduate education in 1978 and had its first graduates in 1982. The first PhD degree was given in 1988. Today our department accepts students with the highest scores taken from Turkey’s National Placement Examination among all other environmental engineering departments nationwide. Our department is the first Environmental Engineering Department in Turkey that has been accredited for its undergraduate program by ABET (Accreditation Board of Engineering and Technology). In 2002, our undergraduate program obtained substantial equivalency from ABET and the program has been accredited by the Engineering Accreditation Commission of ABET since 2007.
Graduates of our department are expected to identify and contribute to the solution of current and emerging environmental problems in a creative and independent manner. In this regard, our graduates have a highly wide range of employment opportunities and the rate of employment among them is considerably high, more than 85%. As of 2020, about 15% of our employed graduates have been working abroad. The highest proportion of our graduates (about 65%) are employed under private sector in establishments such as Tüpraş, Petkim, MNG Holding, Yüksel Proje, TAI (Turkish Aerospace Industries), REC Türkiye, DOKAY Engineering and Consultancy Ltd. Co., ENKON, Technology Development Foundation of Turkey (TTGV). Almost 25% of our graduates are employed in the public institutions such as Ministry of Environment and Urbanization, Ministry of Forestry and Water Affairs, General Directorate of State Hydraulic Works, Energy Market Regulatory Authority, Ministry of Development and Ministry of Transport, Maritime and Communications. The remaining 10% is employed in Non-Governmental Organizations (NGOs), academia and others.
Facts and Figures

- Founded in 1973

Duration of Study
- Bachelor 4 years
- Master 2 years

FULL-TIME FACULTY
- 7 Professors
- 2 Associate Professors
- 3 Assistant Professors

STUDENTS
- 341 Undergraduate
- 64 Graduate
- 20 International
- 2 Double Major
- 8 Minor

COURSE CREDITS
- 142 Undergraduate
- 21 Graduate

PROJECTS & PUBLICATIONS
- 51 TUBITAK projects
- 7 International research projects
- 13 BAP projects
- 6 DRFM projects
- 29 Consulting projects
- 69 National publications*
- 366 International publications* (journal/proceeding) (for last 5 years)*

DEGREES
- 1589 B.Sc.
- 375 M.Sc.
- 46 Ph.D.
# Undergraduate Curriculum

## First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH119</td>
<td>Calculus with Analytic Geometry</td>
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</tr>
<tr>
<td>PHYS105</td>
<td>General Physics I</td>
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<tr>
<td>CHEM107</td>
<td>General Chemistry</td>
<td>(3-2)4</td>
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<tr>
<td>ENVE101</td>
<td>Introduction to Environmental Engineering</td>
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<td>ENG101</td>
<td>English for Academic Purposes I</td>
<td>(4-0)4</td>
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<td>Occupational Health and Safety I</td>
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<td>Calculus for Functions of Several Variables</td>
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<td>General Physics II</td>
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<td>CE101</td>
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<td>ENVE102</td>
<td>Environmental Chemistry I</td>
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<tr>
<td>CENG240</td>
<td>Programming with Python for Engineers</td>
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## Third Semester

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<tr>
<td>MATH219</td>
<td>Introduction to Differential Equations</td>
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<td>ES223</td>
<td>Statics and Strength of Materials</td>
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<td>CHEM229</td>
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<td>Environmental Chemistry Laboratory</td>
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<td>ENG211</td>
<td>Academic Oral Presentation Skills</td>
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<tr>
<td>HIST2201</td>
<td>Principles of Kemal Atatürk I</td>
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## Course Descriptions

**ENVE101 Introduction to Environmental Engineering (2-0)2**

**ENVE102 Environmental Chemistry I (3-0)3**
Scope of environmental chemistry. Discussion of important relevant concepts of chemistry, and introduction of basic environmental chemical concepts including pH, alkalinity, hardness, dissolved oxygen, Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). Acid-base chemistry and its significance in environmental engineering. Dissolution and precipitation chemistry, and chemical precipitation reactions in water and wastewater treatment. Coordination chemistry, oxidation and reduction chemistry and its environmental chemical applications.

**ENVE201 Fundamentals of Environmental Engineering Processes (3-0)3**
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.

**ENVE202 Environmental Microbiology (3-2)4**

**ENVE206 Physico-Chemical Principles of Environmental Engineering (3-0)3**

**ENVE208 Environmental Chemistry Laboratory (1-4)3**
Laboratory experience for various areas of environmental chemistry. Laboratory rules and safety regulations. Selected experiments; instrument calibration, volumetric analysis, gravimetric analysis, optical methods of analysis.

**ENVE300 Summer Practice I (Non-Credit)**
The third-year undergraduate students of the Environmental Engineering Department are required to make a summer practice for 20 working days and submit reports, which are evaluated as part of their academic performance. The practice involves mainly observing a treatment system in operation and evaluating its performance.
## Undergraduate Curriculum

### Fourth Semester
<table>
<thead>
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<th>Credits</th>
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<tr>
<td>ENVE206</td>
<td>Physicochemical Principles of Environmental Engineering</td>
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<tr>
<td>ES303</td>
<td>Statistical Methods for Engineers</td>
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<tr>
<td>CHE204</td>
<td>Thermodynamics I</td>
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<td>ENVE202</td>
<td>Environmental Microbiology</td>
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<td>ENVE307</td>
<td>Air Pollution</td>
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<td>Unit Operations and Processes of Water Treatment</td>
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<tr>
<td>ENVE309</td>
<td>Fundamentals of Biological Treatment</td>
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<td>CE375</td>
<td>Environmental Engineering Hydrology</td>
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<td>CE374</td>
<td>Fluid Mechanics</td>
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<td>OHS301</td>
<td>Occupational Health and Safety II</td>
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<td>ENVE300</td>
<td>Summer Practice I</td>
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<td>TURK303</td>
<td>Turkish III</td>
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<td>Computing Methods in Engineering</td>
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<td>ENVE304</td>
<td>Unit Operations and Processes of Wastewater Treatment</td>
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<tr>
<td>ENVE312</td>
<td>Water Supply and Urban Drainage</td>
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<tr>
<td>ENVE322</td>
<td>Transport Processes in Environmental Engineering</td>
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<td>TURK304</td>
<td>Turkish IV</td>
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### Course Descriptions

#### ENVE303 Unit Operations & Processes of Water Treatment (3-0)3
Screening, coagulation and flocculation, sedimentation and flotation, ion removal by chemical precipitation, disinfection, ion exchange, adsorption, membrane processes and solids handling.

#### ENVE304 Unit Operations & Processes of Wastewater Treatment (3-0)3
Types and characteristics of wastewaters, screening-shredding, grit removal, equalization, sedimentation, floatation, gas transfer (aeration, stripping), principles of biological treatment, biological treatment processes (activated sludge and modifications, biological nutrient removal systems, membrane bioreactors, anaerobic treatment units, attached growth systems, oxidation ponds), chemical precipitation, membrane processes, advanced oxidation processes, adsorption, sludge processing and disposal.

#### ENVE307 Air Pollution (3-0)3

#### ENVE309 Fundamentals of Biological Treatment (3-0)3

#### ENVE312 Water Supply and Urban Drainage (3-0)3

#### ENVE322 Transport Processes in Environmental Engineering (3-0)3
# Undergraduate Curriculum

## Seventh Semester

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<td>ENVE404</td>
<td>Environmental Modeling</td>
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<tr>
<td>ENVE407</td>
<td>Environmental Engineering Design I</td>
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<tr>
<td>ENVE412</td>
<td>Solid Waste Management</td>
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- Technical Elective* 3

ENVE400 Summer Practice II (Non-Credit)

## Eighth Semester

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- Technical Elective* 3

- Technical Elective* 3

- Free Elective* 3

* All elective courses are at least 3 credits

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## Course Descriptions

### ENVE400 Summer Practice II (Non-Credit)
The fourth-year undergraduate students of the Environmental Engineering Department are required to make a summer practice for 20 working days and submit reports, which are evaluated as part of their academic performance. The practice involves mainly environmental management, treatment system design, etc.

### ENVE404 Environmental Modeling (3-0)3

### ENVE407 Environmental Engineering Design I (2-2)3
Concepts in engineering design, engineering ethics, principles of project management, environmental legal infrastructure, treatment plant processes, plant hydraulics and sludge handling, application of environmental engineering principles on open ended design problem software applications in process selection and design.

### ENVE408 Environmental Engineering Design II (2-2)3
Continuation of ENVE 407, tender management, safety and economical considerations in engineering design, cost analysis and project evaluation, detailed design applicable to the problem, completion of a design project in teams with a final report and presentation.

### ENVE412 Solid Waste Management (3-0)3
# Graduate Curriculum

### M.S. in Environmental Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>ENVE500</td>
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<tr>
<td>ENVE590</td>
<td>Research Methods &amp; Ethics in Environmental Engineering</td>
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<td>ENVE599</td>
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7 Elective Courses

Total minimum credit: 21
Number of courses with credit (min): 7

### Ph.D. in Environmental Engineering

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<tr>
<td>ENVE590</td>
<td>Research Methods &amp; Ethics in Environmental Engineering*</td>
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<tr>
<td>ENVE698</td>
<td>Graduate Seminar in Environmental Engineering III</td>
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<td>ENVE699</td>
<td>Graduate Seminar in Environmental Engineering IV</td>
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*If not taken previously*

Total minimum credit: 21
Number of courses with credit (min): 7

### Ph.D. on B.S. in Environmental Engineering

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>ENVE600</td>
<td>Ph.D. Thesis</td>
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<tr>
<td>ENVE590</td>
<td>Research Methods &amp; Ethics in Environmental Engineering</td>
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<tr>
<td>ENVE699</td>
<td>Graduate Seminar in Environmental Engineering IV</td>
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</table>

14 Elective Courses

Total minimum credit: 42
Number of courses with credit (min): 14

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## Course Descriptions

### ENVE500 M.S. Thesis (Non-Credit)
Program of research leading to M.S. degree arranged between student and a faculty member. Students register to this course in all semesters while the research program or write-up of thesis is in progress.

### ENVE501 Pollution Control in Sea Environment I (3-0)3
Mathematical models for flow and transport of contaminants in soil and groundwater systems. Analytical and numerical solutions of mathematical models. Stochastic aspects of subsurface flow and contaminants. Case studies and applications of selected computer programs to investigate problems of various complexity. Current research topics and directions.

### ENVE502 Modelling Soil and Groundwater Pollution (3-0)3
Mathematical models for flow and transport of contaminants in soil and groundwater systems. Analytical and numerical solutions of mathematical models. Stochastic aspects of subsurface flow and contaminants. Case studies and applications of selected computer programs to investigate problems of various complexity. Current research topics and directions.

### ENVE503 Industrial Water and Wastewater Treatment (3-0)3
Industrial wastewater and sludge treatment with special reference to hazardous wastes. Case studies for various industries; characteristics and composition of the wastes and availability of waste treatment technology. Radioactive and thermal pollution control.

### ENVE504 Pollution Transport in River Systems (3-0)3

### ENVE505 Industrial Air Pollution Control (3-0)3
Air pollution indices. Planning industrial air pollution survey; sources, inventories, emission factors, other factors, stack sampling; isokinetic sampling, sampling trains. Area sampling for industrial pollutants. Air quality monitoring design for industrial areas. Various strategies for industrial air pollution control.

### ENVE506 Advances in Water Supply Engineering (3-0)3
Use of computer models for pipe sizing of distribution network design. Computer analysis of pipe networks (Loop and Node Methods; Optimization of Networks with Discrete Methods; Extended Period Simulation). Treatment of waters, which requires non-standard (special techniques) approaches.

### ENVE507 Advanced Water and Wastewater Treatment (3-0)3
Graduate Curriculum

Course Descriptions

**ENVE508 Advanced Topics in Atmospheric Dispersion (3-0)**

**ENVE509 Contaminated Site Remediation (3-0)**
Properties of the contaminants, phase distribution, source control; site characterization and monitoring (vadose zone and aquifer characteristics, extent of contamination); in situ soil and groundwater remediation technologies e.g., pump and treat, capture zone analysis, permeable reactive barriers, air sparging, soil vapor extraction, bioventing, land treatment, monitored natural attenuation; design, operation and performance assessment of the remedial systems; remedial goal and risk assessment; assessment of remedial alternatives, cost analyses; case studies and computer applications on remedial systems.

**ENVE510 Principles of Risk Assessment and Management (3-0)**
Assessment of acute hazards of toxic and flammable materials used in chemical industries. Hazard identification using fault trees, and consequence assessment using mathematical models. Physical principles of consequence modeling. Estimation of industrial risks and comparison with other commonly understood risks. Risk management decision making in design of chemical industries and land use planning.

**ENVE513 Atmospheric Chemistry (3-0)**

**ENVE521 Environmental Applications of Biomolecular Engineering (3-0)**
Problems posed by natural and engineered environments for monitoring microorganisms; advantages and pitfalls of molecular techniques for microbial community analyses, FAME, PCR, 16S/18S rRNA sequencing, phylogenetic analysis and relationship between phylogenetic information and ecological function of the microbial communities; profiling of complex microbial populations by DGGE, TTGE, SSCP, RAPD, ARDRA, T-RFLP, LH-PCR, and RISA; enumeration, identification and monitoring of pollutant-degrading bacteria by using nucleic acid probes, FISH, MAR and SIP; omic technologies and post-genomic approaches, applications, applications of these biomolecular methods in environmental engineering.

**ENVE532 Environmental Biotechnology (3-0)**
Advanced biological reactors, enzyme reactors, treatment with immobilized cells and enzymes, biodegradation of unusual compounds and tests for biodegradability, effect of metals on biological kinetics, biological recycling of mineral wastes and residues, thermophilic microorganisms and their application to waste treatment.

**ENVE535 Advanced Biological Treatment (3-0)**

**ENVE538 Advanced Environmental Chemistry (3-0)**
Nature and properties of environmental chemistry. Ingredients of environmental chemical work, sampling and sample storage, analysis method adoption and standard methods of analysis, chemicals for environmental analysis, their grades and purification techniques. Primary standards in environmental chemical work. Case studies.

**ENVE539 Environmental Systems Engineering (3-0)**

**ENVE540 Heuristic Optimization and Modeling of Environmental Systems (3-0)**
Introduction to heuristic optimization and modeling techniques; genetic algorithms; ant colony optimization; neural networks; simulated annealing; case studies on application of heuristic optimization and simulation methods to environmental engineering problems including air pollution control, groundwater remediation, solid waste management, water quality management.

**ENVE541 Anaerobic Treatment of Wastes (3-0)**
**ENVE547 Marine Pollution (3-0)**
Present health of the oceans. The need of control of pollution due to potentially harmful substances in the ocean. Definition of potentially harmful substances; Inorganics, organics, radioactive matter, solid waste. Marine environment as a waste receiving body Environmental capacity. Potential impairment of marine ecosystems and water uses. Case studies

**ENVE573 Fate of Pollutants in the Environment (3-0)**
Fundamental concepts regarding the fate of a pollutant once released into the environment. Classification of pollutants, equilibrium partitioning between gaseous, liquid and solid phases: vapor pressure, solubility in water, air-organic solvent, air-water partitioning, organic liquid-water partitioning, sorption, solid-water distribution, partitioning to living media. Abiotic and biotic transformation processes: hydrolysis, redox and photochemical reactions, biodegradation. Transport of pollutants and modeling concepts. Case studies

**ENVE590 Research Methods and Ethics in Environmental Engineering (0-0)**
Research methods, ethics and ethical conduct in engineering research, setting a research goal, structuring a research plan, designing an independent research proposal, ethical behavior in academic writing and presentation.

**ENVE598 Graduate Seminar in Environmental Engineering II (0-0)**
It is a course in which a seminar is given by the M.S. and Ph.D. on B.S. candidates once during their graduate study. The candidate is expected to present of his/her thesis and the initial findings of his/her thesis, if available.

**ENVE599 Graduate Seminar in Environmental Engineering II (0-0)**
This is a graduate seminar course in the Ph.D. on B.S. and Ph.D. programs. Students register to this course in one of their first four semesters of their study in any semester other than the one they enroll in ENVE698.

**ENVE707 Energy and Environment (3-0)**
Energy resources in the world and in Turkey. Efficient use of resources, energy conversion technologies and their general environmental impacts, traditional and advanced energy conversion technologies based on fossil fuels, renewable energies and applications, sustainability in energy production. Green House Problem, CO2 capture and CO2 sequestration technologies, recent advances in research in this field. Comparative analysis of the existing systems with new systems and case studies on specific applications.

**ENVE742 Remote Sensing for Environmental Engineers (3-0)**
Introduction to remote sensing science and technology, data sources and structures; use of remote sensing in environmental problem detections; applications in the literature for various environmental problems and environmental system management; example applications for monitoring and management of water, soil, and air quality as well as contemporary environmental issues.

**ENVE7xx Special Topics in Environmental Engineering (3-0)**
Courses not listed in the catalogue are given as Special Topics courses. Contents vary from year to year according to interest of students and instructor in charge. Courses include various environmental engineering topics.

**ENVE8xx Special Studies (4-2)**
M.S. students choose and study a topic under the guidance of a faculty member, normally his/her supervisor.

**ENVE9xx Advanced Studies (4-0)**
Graduate students as a group or a Ph.D. student choose and study advanced topics under the guidance of a faculty member, normally his/her supervisor.
Minor Programs

Minor Program in Environmental Chemistry
This program aims to provide an opportunity to the students to gain expertise in one of the sub-areas of the Environmental Sciences, namely Environmental Chemistry. This program is designed with the consideration of the modern concepts of Environmental Chemistry and laboratory training related to the environmental sampling and analysis.

Compulsory courses:

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<td>ENVE102</td>
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<td>ENVE206</td>
<td>Physico-Chemical Principles of Environmental Engineering</td>
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<td>Fundamentals of Environmental Engineering Processes</td>
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<td>ENVE301</td>
<td>Environmental Pollution and Ecology</td>
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<td>ENVE307</td>
<td>Air Pollution</td>
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<td>ENVE310</td>
<td>Public Health</td>
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<tr>
<td>ENVE330</td>
<td>Principles of Environmental Engineering</td>
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Minor Program in Environmental Microbiology
This program aims to provide an opportunity to the students to have more expertise in one of the sub-areas of the Environmental Sciences, namely Environmental Microbiology. This program is designed with the consideration of the modern concepts of Environmental Microbiology and laboratory training.

Compulsory courses:

<table>
<thead>
<tr>
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<td>ENVE202</td>
<td>Environmental Microbiology</td>
<td>(3-2)4</td>
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<tr>
<td>ENVE301</td>
<td>Environmental Pollution and Ecology</td>
<td>(3-0)3</td>
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<tr>
<td>ENVE309</td>
<td>Fundamentals of Biological Treatment</td>
<td>(3-0)3</td>
</tr>
<tr>
<td>ENVE431</td>
<td>Molecular Tools in Environmental Engineering</td>
<td>(3-0)3</td>
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2 of the following courses

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<tr>
<th>Code</th>
<th>Course Name</th>
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<tr>
<td>ENVE201</td>
<td>Fundamentals of Environmental Engineering Processes</td>
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<td>ENVE310</td>
<td>Public Health</td>
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<td>ENVE330</td>
<td>Principles of Environmental Engineering</td>
<td>(3-0)3</td>
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<td>ENVE402</td>
<td>Wastewater Reuse</td>
<td>(3-0)3</td>
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<tr>
<td>ENVE424</td>
<td>Instrumental Analysis in Environmental Engineering</td>
<td>(2-2)3</td>
</tr>
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</table>
Research Interests

The major research activities of the Department of Environmental Engineering are: water pollution and its control; protection of water resources against pollution; drinking water supply and delivery; drinking water treatment plant system selection and planning; drinking water quality assessment; sewer and rain water supply network design; domestic and industrial wastewater treatment plant system selection, planning and operation; biomolecular analysis; discharge of treated wastewaters into receiving bodies, investigation and modelling of its possible effects; air pollution and its control; identification, monitoring, modelling and control of air pollutants resulting from heating, traffic, industry and energy production, and application of clean technologies; evaluation and planning of clean production technologies; planning related to reduction of carbon footprint; recycling and disposal processes; protection of the soil and groundwater resources against pollution; remediation of contaminated sites; environmental management and planning; pollution prevention; development of environmental regulations; development of new regulations during EU harmonization process; preparation of Environmental Impact Assessment (EIA) reports for industrial and infrastructure investments, and the process monitoring; disposal of hazardous and harmful wastes; analysis, treatment and discharge of sludge; risk assessment and analysis.
Research Laboratories

Unit Operations and Processes Laboratory

Facilities for controlled experimentation exist in this laboratory for various unit operations involved in environmental engineering such as filtration, sedimentation, aeration, etc. The units are equipped with measuring and control instrumentation for performance evaluation and flexible operation

Chemistry Laboratory

Basic facilities are available for undertaking chemical, instrumental and other analysis work routinely made in environmental engineering and sciences. This laboratory is also used for teaching purposes of related courses.

Microbiology Laboratory

Basic facilities are present for undertaking routine microbiological analysis in this laboratory. The laboratory is also equipped with research equipment including respirometers, biological reactors and AOX instrument. Laboratory is used for teaching purposes in the related courses.

In this laboratory contaminant characterization in surface waters, groundwater, and soil can be realized. Experimental remediation studies are performed. Column experiments for transport of contaminants in subsurface can be conducted.

Air Pollution Control Laboratory

In this laboratory facilities for sampling and analysis of various air pollutants are present. Emission, immision and meteorological measurements can be done with the equipment available in the laboratory.
Instrumental Analysis Laboratory

In this laboratory accredited analytical work is conducted under the quality standard of TS EN ISO/IEC 17025 Standard for General Requirements for the Competence of Calibration and Testing Laboratories. This laboratory can only be used by authorized personnel. Analyses are conducted for public institutions and private companies.

Contaminant Hydrology Laboratory

In this laboratory contaminant characterization in surface waters, groundwater, and soil can be realized. Experimental remediation studies are performed. Column experiments for transport of contaminants in subsurface can be conducted.

Membrane Wastewater Treatment Plant

The University has an advanced biological treatment plant, which was erected and commissioned in 2003 through a joint project with Berlin Technical University and Environmental Engineering Department of METU. The plant was designed to treat wastewaters originating from the faculty housing and the dormitories. The plant consists of two units: a biological treatment tank and a membrane bio-reactor. The wastewater with 200 m³/day flowrate first passes the fine screens, after which it goes into an aeration tank where it is biologically treated. A rotating vacuum membrane system separates biological sludge from the effluent, thereby producing a sparklingly clear and sterile effluent, which is used for the irrigation of lawns. The plant also serves as an experiment and demo unit to both graduate and undergraduate students and enables students and researchers operate the system under various conditions for experimental purposes. The plant has recently received Rio+20 Best Practice Examples on Sustainable Development-2012 award.

Anaerobic Biotechnology Laboratory

This laboratory has basic facilities and infrastructure required for environmental anaerobic biotechnology. Typical research conducted include biochemical methane potential analyses, treatability studies, granulation, production of renewable energy and bio-based chemicals from wastes, etc.
Student Computer Laboratory

The laboratory is designed for the use of graduate and undergraduate students. There are 30 PCs which are connected to 2 servers and to the campus network. Various software packages in the fields of water supply engineering, wastewater engineering, air pollution, soil and groundwater pollution, waste disposal, and river pollution are available for users.

Unix Laboratory

The laboratory is designed for the use of graduate students and research. There are 10 PCs that run under the linux operating system. Various software packages that require high computational power are available for users.

Major Devices Used in the Laboratory

- Atomic Absorption Spectrophotometer
- Autoclave
- Carbon Analyzer
- Clean Room
- Gas Chromatography (GC)
- High Performance Liquid Chromatography (HPLC)
- Ion Chromatography (IC)
- LC MS MS
- PCR
- Rotary Evaporator
- Soxhlet Apparatus
- Stack Gas Analyzer
- Total Organic Carbon Analyzer (TOC)
- UV Spectrophotometer
Ayşegül Aksoy  
Professor of Environmental Engineering

**Post-doc:** Civil and Environmental Engineering Dept. University of California at Davis, USA 2001  
**Ph.D:** Civil Engineering University of Virginia, USA 2000  
**M.S:** Environmental Engineering METU 1994  
**B.S:** Environmental Engineering METU 1991

**RESEARCH AREA:**  
Environmental systems engineering, Soil and groundwater pollution control, Water quality modeling and management  
Environmental remote sensing

**PUBLICATIONS:**  
• Duzgun, H. Sebnem; Uskay, S. Onur; Aksoy, Aysegul. Parallel Hybrid Genetic Algorithm and GIS-Based Optimization for Municipal Solid Waste Collection Routing. Parallel Hybrid Genetic Algorithm and GIS-Based Optimization for Municipal Solid Waste Collection Routing, Journal of Computing in Civil Engineering, 30(3); Article 04015037, 2016  

Filiz B. Dilek  
Professor of Environmental Engineering

**Post-doc:** Civil Engineering (Environmental Engineering Group) University of New Castle upon Tyne, UK 1993-1994  
**Ph.D:** Environmental Engineering METU 1991  
**M.S:** Environmental Engineering METU 1985  
**B.S:** Environmental Engineering METU 1982

**RESEARCH AREA:**  
Water and wastewater treatment, Biological treatment of wastewaters, Industrial wastewater treatment, Microbiology of wastewater treatment, Physico-chemical treatment processes

**PUBLICATIONS:**  

Bülent İçgen  
Professor of Environmental Engineering

**Post-doc:** Chemical Engineering University of Cape Town, South Africa 2003-2005  
**Ph.D:** Biotechnology, METU, 2000  
**M.S:** Biotechnology, METU 1994  
**B.S:** Biology Hacettepe University 1990

**RESEARCH AREA:**  
Bacterial degradation & transformation & detoxification, Bioremediation of contaminated environments, Biotechnology of aerobic & anaerobic waste treatment, Metabolic engineering & catabolic genes, Biomolecular tools in engineering applications, Biomarkers & bioindicators & DNA probes, Environmental omic technologies

**PUBLICATIONS:**  
Faculty

İpek İmamoğlu
Professor of Environmental Engineering

Post-doc: Civil Engineering and Mechanics University of Wisconsin-Milwaukee, USA 2001
Ph.D: Civil and Environmental Engineering University of Wisconsin-Milwaukee, USA 2001
M.S: Civil Engineering University of New Castle upon Tyne, UK 1996
B.S: Environmental Engineering METU 1995

Research Area:
Investigation of the fate of halogenated hydrophobic organic chemicals (such as PCBs, PBDEs, HBCD) in the environment via laboratory (biotic and abiotic microcosms, mesocosms) and modeling (such as chemical mass balance, factor analysis, positive matrix factorization, fate & transport model) studies.

Publications:
  - Gedik K., F. Demircioğlu and İ. İmamoğlu “Spatial distribution and source apportionment of PCBs in sediments around İzmit industrial complexes, Turkey” Chemosphere, 81, 992-999 (2010).

F. Dilek Sanin
Professor of Environmental Engineering

Post-doc: Civil Engineering North Carolina State University, USA 1996 – 1998
Ph.D: Civil and Environmental Engineering Duke University, USA 1996
M.S: Environmental Engineering METU 1987
B.S: Environmental Engineering METU 1985

Research Area:
Treatment and disposal of sludge, Wastewater treatment, Management of solid and hazardous wastes

Publications:

Kahraman Ünlü
Professor of Environmental Engineering

Research Scientist: Center for Environmental and Hazardous Materials Studies, Virginia Polytechnic Institute and State University, USA; 1990-1992.
Post-doc: Land, Air and Water Resources University of California at Davis, USA; 1989
Ph.D: Land, Air and Water Resources, University of California at Davis, USA 1989
M.S: Soil Science, Iowa State University, USA 1984
B.S: Agricultural Engineering, Ankara University 1977

Research Area:
Development, numerical implementation and application of mathematical models for flow and contaminant transport in subsurface and waste disposal systems; contaminated site (soil and groundwater) remediation; flow and contaminant fate and transport in the subsurface environment; management of solid and hazardous wastes; groundwater risk assessment.

Publications:
Faculty

Ülkü Yetiş
Professor of Environmental Engineering

Post-doc: Environmental Engineering, METU 1990
Ph.D: Ph.D: Middle East Technical University Dept. of Environmental Engineering, 1988
M.S: Chemical Engineering University of Pittsburgh, USA 1982
B.S: Chemical Engineering METU 1981

RESEARCH AREA:
Physiochemical operations in water, wastewater and hazardous waste treatment systems, Hazardous waste management, Applications of membranes processes for drinking water treatment and industrial wastewater treatment/reclamation, Integrated pollution prevention and control, Understanding of disinfection by-product formation in water treatment

PUBLICATIONS:

Emre Alp
Assoc. Professor of Environmental Engineering

Post-doc: Civil and Environmental Engineering
Marquette University, USA 2007-2008
Ph.D: Civil and Environmental Engineering
Marquette University, USA 2006
M.S: Civil and Environmental Engineering
Marquette University, USA 2002
M.S: Environmental Engineering METU 1999
B.S: Environmental Engineering METU 1997

RESEARCH AREA:
Water-energy-food nexus, Watershed management, Environmental management and policy, Energy policy, Environmental economics, Diffuse pollution, Water quality modeling, GIS and RS in watershed management

PUBLICATIONS:

Tuba Hande Ergüder Bayramoğlu
Assoc. Professor of Environmental Engineering

Post-Doc: Biochemical and Microbial Technology
Ghent University, Belgium 2007-2008
Ph.D: Environmental Engineering METU 2005
M.S: Environmental Engineering METU 2000
B.S: Environmental Engineering METU 1998

RESEARCH AREA:
Anaerobic biotechnology, Renewable energy and bio-based products, Bio-granulation, Agro-industrial waste treatment, Removal of chlorinated compounds, Biological nitrogen removal

PUBLICATIONS:
Faculty

Zöhrê Kurt
Assistant Professor of Environmental Engineering

Post-doc: Civil and Environmental Engineering
Georgia Institute of Technology, USA 2013-2015
Ph.D: Environmental Engineering
Georgia Institute of Technology, USA 2012
M.S: Chemical and Biomolecular Engineering
Georgia Institute of Technology, USA 2011
B.S: Environmental Engineering
Georgia Institute of Technology, USA 2008

RESEARCH AREA:
Assessment of microbial processes, Establishing biodegradation pathways of contaminants, Environmental biochemistry, microbiology and genomics of environmentally relevant microbes, Computational approaches to determine microbial functions and microbial adaptation, Evaluation and improvement of natural attenuation, biotransformation, bioremediation and bioaugmentation.

PUBLICATIONS:
• Kurt, Z., Minoia, M., & Spain, J. C. Resveratrol as a growth substrate for bacteria from the rhizosphere. Applied and environmental microbiology, 2018, 84, 00104-18.

Sema Sevinç Şengör
Assistant Professor of Environmental Engineering

Post-doc: Civil and Environmental Engineering
University of California-Davis, CAUSA 2008-2011
Ph.D: Civil and Environmental Engineering
University of California-Davis, CAUSA 2007
M.S: Environmental Engineering METU 2002
B.S: Environmental Engineering METU 1999

RESEARCH AREA:
Biogeochemical processes, Multi-component reactive transport modeling for contaminant transport in subsurface environments, Multi-scale modeling of hydrologic processes, mathematical modeling of groundwater flow, Uranium biogeochemistry, fate and transport.

PUBLICATIONS:

Yasemin Dilşad Yılmazel Tokel
Assistant Professor of Environmental Engineering

Post-doc: Civil and Environmental Engineering
Pennsylvania State University, USA 2014-2016
Ph.D: Civil and Environmental Engineering
Villanova University, USA 2014
M.S: Environmental Engineering METU 2009
B.S: Chemical Engineering METU 2008
B.S: Environmental Engineering METU 2007

RESEARCH AREA:
Microbial electrochemical processes, Biohydrogen production, Environmental microbiology and biotechnology, Hypertherophilic microorganisms, Wastewater engineering, Nutrient removal and recovery.

PUBLICATIONS: