

(It will be applied from 2016-2017 Fall)

**İZMİR INSTITUTE OF TECHNOLOGY
GRADUATE SCHOOL OF ENGINEERING AND SCIENCES
DEPARTMENT OF ENVIRONMENTAL ENGINEERING
CURRICULUM OF THE Ph.D. PROGRAM IN ENVIRONMENTAL SCIENCE AND
ENGINEERING**

Core Courses

ENV 600	Ph.D. Thesis	(0-1)NC
CHE 533	Mass Transport in Environmental Engineering	(3-0)3
ENV 591**	Technical Writing, Research Methods and Ethics	(0-2)NC
ENV 601*	Fundamentals of Environmental Technology	(3-0)3
ENV 602	Advanced Environmental Chemistry	(3-0)3
ENV 698	Seminar	(0-2)NC
ENV 8XX	Special Studies	(8-0)NC

*Mandatory for graduates of other than either BSc or MSc in Environmental Engineering

** Mandatory for students who have not successfully completed this or an equivalent course for masters degree.

Total credit (min.)	: 21 (for students with M.S. degree)
Number of credited courses (min.)	: 7 (for students with M.S. degree)
Total credit (min.)	: 42 (for students with B.S. degree)
Number of credited courses (min.)	: 14 (for students with B.S. degree)

Elective Courses

ENV 603	Environmental Statistics	(3-0)3
ENV 580	Special Topics in Environmental Engineering	(3-0)3
ENV 502	Environmental Biotechnology	(3-0)3
ENV 503	Sustainable Energy and Environment	(3-0)3

Elective courses are selected from related courses in other departments and other interdisciplinary graduate programs.

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Course Descriptions

- ENV 600 Ph.D. Thesis** (0-1)NC
Original research work done by the student under supervision of an advisor and written in the graduate thesis format.
- ENV 698 Seminar** (0-2)NC
Literature survey, critical review, research study proposal, oral presentation.
- CHE 533 Mass Transport in Environmental Engineering** (3-0)3
Mass transport equations of environmental engineering processes. Equations of sorption kinetics in continuous flow reactors. Transport equations of fixed film exchange. Electrodialysis. Biological processes. Fixed culture processes and suspended culture processes.
- ENV 601 Fundamentals of Environmental Technology** (3-0)3
Water quality and control, air quality and control, solid waste management
- ENV 602 Advanced Environmental Chemistry** (3-0)3
Chemical processes in environmental systems, equilibrium conditions in aquatic systems and atmospheric reactions. Acid-base, dissolution-precipitation, air-water exchange, and oxidation-reduction reactions.
- ENV 603 Environmental Statistics** (3-0)3
Numerical-Graphical Data Representation-Summary, Random Variables-Probability Distributions, Hypothesis Testing, Simple and Multiple Linear Regression, Nonparametric Tests, QA/QC Measures, Data Censoring.
- ENV 580 Special Topics in Environmental Engineering** (3-0)3
Directed group study of special topics in environmental engineering
- ENV 591 Technical Writing, Research Methods and Ethics** (0-2)NC
Literature survey, critical review, research study design, conveying results of a study, research publication system, manuscript preparation, seminar preparation, ethical issues in research, ethical issues in publishing.

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ENV 8XX Special Studies

(8-0)NC

Graduate students supervised by the same faculty member study advanced topics under the guidance of their advisor.

ENV 502 Environmental Biotechnology

(3-0)3

Microorganisms in the nature readily conduct many different types of conversion processes that are vital in the operation of biosphere. Environmental biotechnology is a rather new and very dynamic domain that aims at utilizing microbial processes for treatment purposes. In order to understand the microbial processes, one needs to deconstruct the microbial ecology responsible for those processes. At this point, the relationship between phylogeny and function within microbial community should be elucidated through employing recent advances in molecular techniques such as FISH, MAR, SIP, metagenomics, and proteomics. Moreover the means to manipulate microbial communities and pure cultures in order to conduct desired process (treatment, energy production) will be discussed.

ENV 503 Sustainable Energy and Environment

(3-0)3

Estimation and evaluation of energy resources will be covered following the relationship between sustainable energy and sustainable development. Local, regional and global environmental effects of energy and sustainability metrics for energy systems will be investigated. Fossil fuels, nuclear power, and renewable energy resources will be addressed in terms of developed technology and sustainability metrics. Sustainability model applications will be discussed over current scientific literature.