Department of Environmental Engineering

▶ General Introduction

Dept. of Environmental Engineering studies for analysis and understanding about water, air, soil, waster, and noise. Especially, Dept. of Environmental Engineering covers treatment systems for wastewater, polluted air, contaminated soil, solid wastes and restoring the destroyed ecosystem. We develop the program 'STEP' which is about the special study program oriented field problems for environment. therefore, our students have higher adaptability about on-th-spot environmental problem after graduation. We are trying to produce students with higher capabilities for solving environmental problem and strong devotion for environment and nature.

▶ Education Objectives

1. Study on the environmental analysis experiments and basic science about environmental engineering
2. Higher adaptability about on-th-spot environmental problem using theoretical class
3. Study on the environmental facilities (water, air, wastes, etc.) and environmental design about environmental pollution control

▶ Course Descriptions

Category	Seme-ster	Years	Code	Courses	Credit	Hours		Note
						theory	practice	
Basic courses	1	Freshman	01095	Biology	3	3		
			03117	Environmental Science	3	3		
Basic courses	2	Freshman	02215	Introduction to Chemistry	3	3		
			02325	Mathematics	3	3		
Required courses	1	Sophomore	01679	General Chemistry Lab.	2		4	
			01538	Engineering Mathematics	3	3		
			03118	Water Quality Principles	3	3		double major
			03119	Air Pollution and Control	3	3		double major
Elective courses	1	Sophomore	02330	Environmental Chemistry	3	3		
			03120	Environmental Microbiology	3	3		
			02938	Environmental Microbiology and Lab	3	2	2	
Required courses	2	Sophomore	01654	Analytical Chemistry and Lab.	3	2	2	
			01469	Basic Engineering Calculation	3	3		
Elective Courses	2	Sophomore	03121	Environmental Mathematics & Statistics	3	3		
			02328	Hydraulics and Hydrology	3	3		
			02329	CAD in Environmental Engineering	3	2	2	
			01471	Environmental Ecology	3	3		
			03122	Water Engineering Principles	3	3		double major

Required courses	1	Junior	02677	Environmental Planning	3	3		
Elective courses	1	Junior	01478	Physicochemical wastewater treatment Engineering	3	3		double major
			02331	Water Supply Engineering	3	3		
			03123	Fluid Machinery and CAD Practices	3	2	2	
			03124	Soil & Ground Water Pollution Control	3	3		double major
			03125	Environmental Analysis and Lab.	2		4	double major
			03126	Practice on Ecological Field Survey	3	3		
Elective courses	2	Junior	03127	Water Engineering Design and Practice	3	2	2	
			03128	Water Quality Engineering Practices	3	3		
			01488	Biological wastewater Treatment Engineering	3	3		double major
			03129	Solids waste Treatment Principles	3	3		
			03130	Soil and Groundwater Restoration Engineering	3	3		
			03131	Environmental LAW and Policy	3	3		
Elective courses	1	Senior	01484	Instrumental Analysis & LAb.	2	1	2	
			01495	Water Quality Management & Modeling	3	3		
			03132	Sludge & Recycling Engineering	3	3		
			03133	Environmental Impact Assessment & Practice	3	2	2	
			03134	Water Environmental Engineering Project-1	3	3		
			02680	Ecological Engineering	3	3		
Elective courses	2	Senior	03136	Advanced Wastewater Treatment Design	3	3		
			03137	Water Environmental Plan & Construction	3	3		
			03135	Water Environmental Engineering Project-II	3	3		
			02337	Environmental Colloquium	3	3		
			03138	Environmental Treatise Study	2	2		

▶ 01095 Biology

The fundamental conception will be studied with the understanding of biological species, biological structures and functions, and other biological traits. Thereby, students will comprehend eventually what is life?

▶ 03117 Environmental Science

In this course, students will study various environmental management policies and basic understandings about comprehensive environmental problems on earth. And also, This course provides students with estimates and diagnosis about present environmental issues on domestic and global scales. Generally, this course embraces

broad environmental concerns; water quality, air quality, solid and hazardous wastes and other environmental issues.

▶ 02215 Introduction to Chemistry

Some basic conception of chemistry will be understood through fundamental chemical subjects: The construction, the characteristics, the mutual change of matters. Thereby, students will comprehend ultimately what is a chemistry?

▶ 02325 Mathematics

This course is to introduce to the students majoring in environmental engineering Euclidean geometry and the important concept of differential geometry, that is, curvature of curve and surfaces. Even if some contents of calculus is included, it is minimized to the amount which is absolutely necessary to learn the geometry.

▶ 01679 General Chemistry Lab

This course introduces the experimental chemistry. It covers laboratory techniques, preparation of solution, the effect of pressure and temperature on gas volume, acid-base titration, redox reaction, the concepts of chemical equilibrium and analysis of cations and anions.

▶ 01538 Engineering Mathematics

In this subject, we learn ordinary differential equation (O.D.E.), linear differential equation (L.D.E.), series, series solution in differential equations and Laplace transportation systematically based on differential and integral calculus (fundamental prerequisite). Moreover, we improve ability to make these basic concepts and principles applicable.

▶ 03118 Water Quality Principle

This subject deals with the understanding of basic water quality. In this course the student will explore the overall theories of water qualities before studying the detailed water quality analysis and management such as various wastewater treatment engineering and aquatic ecosystem simulations, etc.

▶ 03119 Air Pollution and Control

Students study on the concept of air pollution, climate, dispersion of pollutants, and combustion. Students will also discuss critical and mobile sources of air pollution, such as dust, SOx, NOx, and odors, and ways to control them.

▶ 02330 Environmental Chemistry

For students with desire of advanced and environmental chemical knowledge. The advanced concepts of new chemical materials and their application to a variety of industry are introduced. Topics include materials for environmental issues.

▶ 03120 Environmental Microbiology

The role of microbes in both the cycles of matter and the degradation of various pollutants is so immense. Through this course, some basic concepts about microbe's traits, classification, and microbial degradation of recalcitrants will be lectured. And then, those will be practised by microbial laboratory. So, students will

apply these learning to the environmental fields.

▶ 02938 Environmental Microbiology and Lab

The role of microbes in both the cycles of matter and the degradation of various pollutants is so immense. Through this course, some basic concepts about microbe's traits, classification, and microbial degradation of recalcitrants will be lectured. And then, those will be practised by microbial laboratory. So, students will apply these learning to the environmental fields.

▶ 01654 Analytical Chemistry and Lab.

Analytical chemistry is one of the most important subject in environmental engineering: The research of various chemicals and environmental pollutants, and the calculation of their amount. Thereafter, basic conception will be lectured about various quantitative analyses: The basic conception of analytical solution, the manipulating analytical data, the acid-base titration, the oxidation-reduction titration, and so on.

▶ 01469 Basic Engineering Calculation

This course deals with the principles of mass and energy conservation regarding environmental issues and it advances to the material balance, energy balance, ideal gas and application of combined material and energy balances for steady state.

▶ 03121 Environmental Mathematics and Statistics

This course is offered for those who have finished fundamental and engineering mathematics. This course includes the following subjects: partial differential equations, statistics, Fourier analysis, complex analysis which are the fundamental tools for the engineering analysis.

▶ 02328 Hydraulics and Hydrology

This course introduces the basic concepts of diverse hydraulic flows such as river flows, channel flows, and pipe-lined water way. And also, students will study actual cases about hydraulic and hydrological factors for flood runoff. Therefore, this course embraces the fundamental theories about hydrography and hydrology. Definition of hydrology; hydrologic cycle; hydrologic meteorology; precipitation, streamflow, evaporation and evapotranspiration; ground water flow, surface runoff, unit hydrograph; hydrologic and hydraulic routing; statistics in hydrology and application of hydrology in design of hydraulics structure.

▶ 02329 CAD in environmental engineering

This course aims to develop student's ability in geometric modeling, design, engineering analysis, and visualization of civil infrastructure systems with CAD/CAE software. Spreadsheet applications for civil engineering data manipulation and analysis, algorithm development and engineering data visualization are also taught to cultivate the student's ability to manage and visualize complex engineering data.

▶ 01471 Environmental Ecology

Ecology is a great place in which innumerable organisms are living together and various matters are circulating. How the ecology has those certain traits? How the every member of that has classified, and how they have mutual interrelationship? And human's influence on the ecology as one of the innumerable organisms. Finally ecological philosophy for maintaining the pleasant ecology will be taught as a scheme overwhelming the crisis of natural destruction.

▶ 03122 Water Engineering Principles

From water quality engineering point of view, this subject deals with the understanding of basic water quality engineering. In this course the student will explore the overall theories of water quality engineering such as tap water and wastewater treatment systems, and sludge disposal.

▶ 02677 Environmental Planning

This subject deals with the understanding of various environmental issues except environmental engineering. Environmental problems embraces actually Legal, ethical, and political aspects about a specific environmental issue. Therefore, this course help students with multi-approach study for diverse learnings about environments.

▶ 01478 Physicochemical Wastewater Treatment Engineering

Introduces theories and technologies dealing with control of water quality, protection from environmental pollution, and waste water treatment with physical and chemical treatment methods. Systematic recycling and reuse of treated water and sludge generated are also covered through lectures.

▶ 02331 Water Supply Engineering

This subject covers master plan for water supply, reservoir, intake, transmission, purification, distribution and service water that are now essential for modern industrialized urban and suburban communities. Theories and actual experiments for analysis of water quality and water processing methods are included.

▶ 03123 Fluid Machinery and CAD Practices

Based on the knowledge of fluid machinery concerning to environmental engineering design, it introduces Computer Aided Drawing and some manual drafting. Two and Three dimensional CAD modeling are covered. Through CAD and drawing, the course teaches the simplification of design by automation of repeated tasks and by free exchange of data among diverse designs through standardization and portability. Weekly excercise include production of drawing with CAD software.

▶ 03124 Soil & Ground Water Pollution Control

This course covers recent environmental issues of contaminated and groundwater sites. This course deals with municipal solid wastes, industrial wastes, nuclear wastes, and so on from generation to disposal, such as incineration, recycling and risk assessment.

▶ 03125 Environmental Analysis and Lab.

In this course, some basic concepts about water pollution will be lectured and practised according to the Standard Methods: The collection, analysis, measurement of various water pollutants. Therefore students will elevate their ability to analyze water pollutants, and will prepare for the examination of Environmental Engineer.

▶ 03126 Practice on Ecological Field Survey

In this course, ecological field survey for preparing Natural Ecology Bioremediation Engineer will be prior educated. And then, there are some teachings on both the vegetable and animal ecology, and also on the systematic classification, which may be widely understood by students.

▶ 03127 Water Engineering Design and Practice

This course is oriented to study the basic treatment system of drinking water and design diverse Pipe & Instrument drawings on water treatment plant. Besides, this course will cover theoretical concepts and the design of treatment system for rain water and graywater.

▶ 03128 Water Quality Engineering Practices

This course is oriented to study the basic treatment system of drinking water and design diverse Pipe & Instrument drawings on water treatment plant using CAD software. Besides, this course will cover theoretical concepts and the design of treatment system for rain water and graywater.

▶ 01488 Biological Wastewater Treatment Engineering

Water and Wastewater Treatment Engineering is an important part of the civil engineering to efficiently use and conserve the water resources that is indispensible to human beings. The course is designed to offer students fundamental knowledge for planning and designing water supply and treatment facilities and sewage collection and treatment facilities.

▶ 03129 Solids Waste Treatment Principles

Students study the fundamental theory related to terminology classification, emissions, qualities, collection, transportation, cutbacks, and others in various wastes.

▶ 03130 Soil and Groundwater Restoration Engineering

This course covers recent environmental remediation technology of contaminated sites. This course deals with waste treatment methods including control systems of various wastes(municipal solid wastes, industrial wastes, nuclear wastes, and so on) from generation to disposal, such as incineration, recycling and risk assessment. This course also let students to know how to design landfills and how to properly treat landfill gas as well as leachate.

▶ 03131 Environmental Laws and Policy

This subject provides general understandings of laws and policies about the various environmental issues in Korea and overseas. Especially, this course will focus on legal characteristics and relevant policies about water, wastewater, aquatic ecosystem, soil and solid wastes, etc. Students will have wide and objective views on environmental issues after completing this course.

▶ 01484 Instrumental Analysis & Lab.

This course discusses basic issues concerning gathering, analyzing and measuring various water pollutants in accordance to the Water Pollution Assessment Regulations. Students practice qualitative and quantitative analysis of water pollutants with instrumental analysis such as GC, HPLC and LC etc.

▶ 01495 Water Quality Management & Modeling

This course introduces the basic concepts of water quality predictions and water quality management. Students will study the aquatic ecosystem mechanisms for water quality simulation about river, lake, and oceans. This course provide students with experience by using QUAL2E model which is a most usable software to predict water qualities in river.

▶ 03132 Sludge & Recycling Engineering

Students study sludge that is discharged from sewer, Korea's special excrement treatment/purification, and processing, reusing and recycling of urban and industrial wastes.

▶ 03133 Environmental Impact Assessment & Practice

Environmental impact assessment and practice is a system that is currently implemented to assess how various developmental activities impact the surroundings. In this course, students study various theories and realities of environmental impact assessment. Students will actually produce environmental impact assessment reports on certain developmental projects.

▶ 03134 Water Environmental Engineering Project-I

This course, first of all, introduces the basic concepts of wastewater treatment system. And then, Students will have various field experiences by using theoretical studies. Therefore, Students will have outstanding ability about wastewater treatment engineering through the balanced studies between on-the-spot study and theoretical studies.

▶ 02680 Ecological Engineering

This subject deals with the understanding of their functions and structures and basic ecosystem theories. the major ecosystems are wetlands, reservoirs, and rivers. Recently, many ecosystems are threatened by extinction and in great danger. Therefore, urgent measures might be restoration measures for the destroyed ecosystem. Students will study various engineering skills for restoration alternatives such as pollutes rivers, deteriorated wetlands, and reservoir ecosystems.

▶ 03136 Advanced Wastewater Treatment Design

Students learn how to treat waste water using advanced treatment, where physicochemical and biological treatment methods are employed. It deals with the biochemical measures and designing processes, operating systems, and efficiency/diagnostics evaluation methods. Class will use both theoretical knowledge and field experience.

▶ 03137 Water Environmental Plan & Construction

This Introduces the methods for assessing, controling, managing environmental pollution and conservation. This course mainly covers the method of environmental concerns related to water and wastewater. Systematically presents water pollution, water quality index, water and wastewater processing, water quality management and standard.

▶ 03135 Water Environmental Engineering Project-II

This course, first of all, introduces the basic concepts of river, lake, soil systems. And then, Students will have various field experiences by using theoretical studies. Therefore, Students might have outstanding ability about diverse engineering skills for river and lake water quality, soil restoration through the balanced studies between on-the-spot study and theoretical studies. This subject will be connected to the course which is 'Water Environmental Engineering Project-I'.

▶ 02337 Environmental Colloquium

Our students have to higher adaptability about on-the-spot environmental problems after graduation. We are

trying to produce students with higher capabilities for solving field environmental problem. This course embraces seminars and colloguim about various environmental fields before graduation.

▶ 03138 Environmental Treatise Study

Curriculum embraces broad environmental concerns: water and wastewater treatment, water quality management and modeling, solid and hazardous wastes treatment, soil restoration technology, etc. It is needed to focus on the deep study about a specific environmental problem. This course will deal with the task which mentioned above.