

# Syllabus (2022-Summer)

<b>Course Title</b>	Carbon neutrality, Sustainability, and Environmental Engineering	<b>Course No.</b>	-
<b>Credit</b>	3 credits	<b>Hours</b>	45 Hours
<b>Class Time Classroom</b>	9AM–11:30AM Mon to Thr Classroom TBA		
<b>Instructor</b>	<b>Name</b> Yeomin Yoon	<b>Department</b> Environmental Engineering	
	<b>E-mail</b> yoony@cec.sc.edu	<b>Phone</b> -	
<b>Office Hours Office Location</b>	Office hours TBA Office location TBA		

## I. Course Overview

### 1. Course Description

This class is intended to introduce the basic science and engineering aspects of carbon neutrality and environmental engineering sustainability associated with water, land and air pollution and their control.

### 2. Prerequisites

None

### 3. Course Format

Lecture	Discussion/Presentation	Experiment/Practicum	Field Study	Other
90%	10%	%	%	%

### 4. Course Objectives

- quantitatively describe critical characteristics and properties of water, air and soil resources applying physical, chemical, thermodynamic, and biological principles.
- describe basic environmental legislation and its relationship to environmental management.
- develop and use fundamental material or energy balances to produce mathematical models assessing the fate and effects of contaminants in the water, air and land (natural and built environments).
- identify conventional treatment trains available for water, air and/or solid waste management applying the various techniques engineers use to make decisions.
- sequence and configure fundamental treatment units into systems. Size the units based on typical physical, chemical and/or biological design parameters

### 5. Evaluation Systems

Relative evaluation  Absolute evaluation (for Ewha International Summer College students only)  Others

Midterm Exam	Final Exam	Quizzes	Presentation	Projects	Assignments	Participation	Others
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40%	40%	5%	5%	5%	%	5%	%
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## II. Course Materials and Additional Readings

### 1. Required Materials

Lecture notes will be given ahead of the class as a form of PDF. Both midterm and final exams will be held offline. The classroom and time will be announced

### 2. Supplementary Materials

None

### 3. Optional Additional Readings

None

## III. Course Schedule

Day	Date	Topics & Class Materials, Assignments
Day 1	(6/30)	Introduction to class; <b>Ch. 1. Sustainable Design, Engineering, and Innovation I</b> Intro. to course obj. graded requirements Intro. to envr. engr. and envr. science Environmental ethic and carbon neutrality
Day 2	(7/4)	<b>Ch. 1. Sustainable Design, Engineering, and Innovation II</b> Fundamental Environmental Engineering Concepts
Day 3	(7/5)	<b>Ch. 2. Environmental Measurements.</b> <b>Ch. 3. Chemistry</b> Units, stoichiometry, chemical equilibrium, Rxn kinetics, solution, soil and air chemistry
Day 4	(7/6)	<b>Ch. 2. Environmental Measurements.</b> <b>Ch. 3. Chemistry</b> Units, stoichiometry, chemical equilibrium, Rxn kinetics, solution, soil and air chemistry
Day 5	(7/7)	<b>Ch. 4 Physical Processes</b> Laws of conservation, state of mixing, reaction kinetics, reactor design
Day 6	(7/11)	<b>Ch. 7. Water: Quantity and Quality</b> Ecosystems, water pollutants & sources, BOD and DO modeling in rivers, acid rain, alkalinity, buffering/carbonate equilibria
Day 7	(7/12)	<b>Ch. 8. Water Treatment I</b> Characteristics and standards, types of water treatment plants, coagulation and flocculation,
Day 8	(7/13)	<b>Ch. 8. Water Treatment II</b> Hardness & water softening, sedimentation, filtration, disinfection, advanced treatment
Day 9	(7/14)	<b>Midterm Exam</b>

Day	Date	Topics & Class Materials, Assignments
<b>Day 10</b>	(7/18)	<b>Ch. 9. Wastewater Treatment I</b> Overview of Microbiological principles, characteristics of wastewater, types of wastewater treatment plants & standards for disposal, pre/primary treatment
<b>Day 11</b>	(7/19)	<b>Ch. 9. Wastewater Treatment II</b> Secondary/biological processes, secondary sedimentation, sludge management, advanced wastewater treatment
<b>Day 12</b>	(7/20)	<b>Ch. 11. Air Quality Engineering and Carbon Neutrality</b> Risk assessment, chemistry (effects & fate), automobiles and air quality, indoor air pollution
<b>Day 13</b>	(7/21)	<b>Ch. 10. Solid-Waste Management and Carbon Neutrality</b> Characteristics, management, source reduction, disposal
<b>Day 14</b>	(7/25)	<b>Student Presentation</b>
<b>Day 15</b>	(7/26)	<b>Final Exam</b>
Makeup Classes 1	(mm/dd)	None
Makeup Classes 2	(mm/dd)	None

#### IV. Special Accommodations

\* According to the University regulation section #57-3, students with disabilities can request for special accommodations related to attendance, lectures, assignments, or tests by contacting the course professor at the beginning of semester. Based on the nature of the students' request, students can receive support for such accommodations from the course professor or from the Support Center for Students with Disabilities (SCSD). Please refer to the below examples of the types of support available in the lectures, assignments, and evaluations.

Lecture	Assignments	Evaluation
<ul style="list-style-type: none"> <li>. Visual impairment: braille, enlarged reading materials</li> <li>. Hearing impairment: note-taking assistant</li> <li>. Physical impairment : access to classroom, note-taking assistant</li> </ul>	Extra days for submission, alternative assignments	<ul style="list-style-type: none"> <li>. Visual impairment: braille examination paper, examination with voice support, longer examination hours, note-taking assistant</li> <li>. Hearing impairment: written examination instead of oral examination</li> <li>. Physical impairment: longer examination hours, note-taking assistant</li> </ul>

-Actual support may vary depending on the course.

\* The contents of this syllabus are not final—they may be updated.