Biological Wastewater Treatment

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	E010
	Target students Division/major/grade	Environmental and safety Engineering/Junior	Opening semester	2020 1ST SEMESTER
	Class time and classroom	Tue B(WEB239)Thu A(WEB239)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses	수질분석		
	Recommended concurrent courses			
	Related advanced courses			

Instructor	Name (title/division)	Chang-Gu Lee(Assistant Professor, Environmental and safety Engineering)				
	Office Room Number	팔달관 706	Office phone Number	2405	e-mail	
	Office hours	TBA		Homepage address		
Teaching Assistant	Name (title/division)					
	Office Room Number	서관241호	Office phone Number		e-mail	

1. Introduction

Key theoretical objective of the Biological Wastewater Treatment is to understand biological kinetics.In this class, the treatment principle of domestic wastewater & Indutrial wastewater including organic material, process and design factor is presesnted and students are required to sketch the flow and design for biological treatment processes.

2. Course Objectives

To learn principles of biological treatment process
Ability be able to understand the knowledge of mathematics, basic science, information Tech. and Engineering
Ability be able to sketch out the flow and system for biological treatment process
bility be able to arrange the time table for the experiment
Ability be able to recognize main problems from the engineering perspective
Ability be able to work out as an one of group members
Ability ba able to communicate with the others

A

3. Class types and activities

Lecture in English
Assignments

4. Teaching Method

- [V] lecture
- [ ] discussion and debate
- [ ] team project(presentation and case studies)
- [ ] experiments(role-playing,etc)
- [ ] designing and production
- [ ] on-site learning(on-site training)
- [ ] others

5. Support Systems in Use

- [V] AjouBb
- [ ] automatic recording system
- [ ] web-based assignment
- [ ] cyber lecture
- [ ] online content
- [ ] class behavior analyazing system
- [ ] others

6. Teaching Tools

- [ ] PBL(Problem Based Learning)
- [V] CBL(Case Based Learning)
- [ ] TBL(Team Based Learning)
- [ ] UR(Undergraduate Research)
- [ ] FL(Flipped Learning)
- [ ] DSAL(Data Science Active Learning)
- [ ] others

7. Knowledge and ability required for taking this course

- Presentation skill
- English

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	Attendance
midterm exam		40%	Midterm Exam
final exam		40%	Final Exam
quiz			
presentation			
discussion			
homework	2 times over	10%	Report
etc			
study hours	3hrs/week		

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Wastewater Engineering (Treatment and Resource Recovery)	Metcalf & Eddy	McGrawHill	2014

10. Class system and Class shedule

To study principles and key processes of Biological wastewater treatment, theoretical class including introduction, Biological growth kinetics, activated sludge method and Biological nitrogen & phosphorus removal process and design class including activated sludge treatment design are done simultanously.

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction	E	Chang-Gu Lee	lecture		
2	Microorganism in Biological treatment	E	Chang-Gu Lee	lecture		
3	Bacterial Growth, Energetics, and Decay	E	Chang-Gu Lee	lecture		
4	Microbial Growth Kinetics	E	Chang-Gu Lee	lecture		
5	Modeling Suspended Growth Treatment Processes	E	Chang-Gu Lee	lecture		

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Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
6	Attached Growth Treatment Process	E	Chang-Gu Lee	lecture		
7	Biological Oxidation of Inorganic Nitrogen	E	Chang-Gu Lee	lecture		
8	Mid term Exam	E	Chang-Gu Lee			
9	Denitrification / Anaerobic Ammonium Oxidation	E	Chang-Gu Lee	lecture		
10	Enhanced biological Phosphorous Removal	E	Chang-Gu Lee	lecture		
11	Anaerobic Fermentation and Oxidation	E	Chang-Gu Lee	lecture		
12	Activated-Sludge Process	E	Chang-Gu Lee	lecture		
13	Fundamentals of Process Selection, Design, and Control	E	Chang-Gu Lee	lecture		
14	BOD Removal and Nitrification	E	Chang-Gu Lee	lecture		
15	BOD Removal and Nitrification	E	Chang-Gu Lee	lecture		
16	Final Exam	E	Chang-Gu Lee			

11. Other items of notification