Course Information	
Course title	Biological Treatment Processes
Semester	114-2
Designated for	COLLEGE OF ENGINEERING GRADUATE INSTITUTE OF ENVIRONMENTAL ENGINEERING
Instructor	Chang-Ping Yu
Curriculum Number	EnvE7032
Curriculum Identity Number	541EM1050
Class	
Credits	3.0
Full/Half Yr.	Half
Required/ Elective	Elective
Time	Thursday 7,8,9,10,A(14:20~19:15)
Remarks	Restriction: within this department (including students taking minor and dual degree program) The upper limit of the number of students: 30.
Course introduction video	
Table of Core Capabilities and Curriculum Planning	Association has not been established
Course Syllabus	
Please respect the intellectual property rights of others and do not copy any of the course information without permission	
Course Description	“Biological Treatment Processes” will introduce the rapidly evolving field of biological wastewater engineering technology and that have occurred over the last one hundred years in this discipline, including traditional biological wastewater treatment technologies to meet regulatory standards and advanced biological wastewater treatment technologies to achieve a new view of a wastewater as a source of energy, nutrients and potable water. The Biological Treatment Processes Lab will provide students with valuable hands-on experience of operating important biological reactors. The field trip to the wastewater treatment plant will facilitate the understanding of what has been learn during the lectures in the classroom. The course contents will be useful for students, who are interested in

	environmental engineering, who are majored in environmental engineering or who want to become environmental engineering professionals. Prerequisite: no prerequisite course is required, but students are recommended to have basic knowledge in Chemistry, Biology, Water Pollution Control and Environmental Microbiology.
Course Objective	"Biological Treatment Processes" will cover a diverse range of topics of the biological treatment of organic matters and nutrients in wastewater and provide students with underlying knowledge of fundamental microbial metabolism and kinetics and engineering reactor design and operation. Students who successfully complete "Biological Treatment Processes" will be able to: • Build on their understanding of wastewater characteristics and treatment processes in the wastewater treatment plants. • Determine the microbial kinetics in wastewater treatment. • Describe the biological unit processes in wastewater treatment for organic matter removal. • Explain the biological unit processes of the wastewater treatment systems for nitrogen and phosphorus removal. • Explain fundamentals of bioreactor operation principles in wastewater treatment. • Predict the treatment efficiency of a wastewater treatment system based on wastewater parameters. • Explain the process principles in traditional and advanced biological wastewater treatment. • Develop skill in solving problems related to the concepts above. • Develop hands-on experience in operating the bioreactor for wastewater treatment. • Relate wastewater treatment plant field trip observations to concepts of the course listed above. • Demonstrate data analysis and scientific writing skills.
Course Requirement	The course consists of: (WEEKLY) One required two 50-minute lectures, 3-hour working in the lab, online submission of your completed lab reports (NTU COOL); (OCCASIONALLY) 3-hour field trip to a wastewater treatment plant, online submission of your field trip report (NTU COOL), one 3-hour Midterm Exam, and a 3-hour Final Exam. Supplemental pre-recorded lecture videos are available online in NTU COOL. You are strongly encouraged to ask any question related to the course contents during lectures and office hours.
Student Workload (Expected weekly study hours before and/or after class)	
Office Hours	Thu. 14:00~14:20
Designated reading	Designated Reading: Wastewater Engineering: Treatment and Resource Recovery, 5th Edition, Metcalf & Eddy/AECOM, 2014

References	References: Lecture notes, updated literatures and My anaerobic sustainability story, by: Gatze Lettinga (2014), LeAF

Grading

No.	Item	%	Explanations for the conditions
1.	Presentation	10%	
2.	Midterm exam	30%	
3.	Final exam	30%	
4.	Lab performance and report	30%	

1. NTU has not set an upper limit on the percentage of A+ grades.
2. NTU uses a letter grade system for assessment. The grade percentage ranges and the single-subject grade conversion table in the NATIONAL TAIWAN UNIVERSITY Regulations Governing Academic Grading are for reference only. Instructors may adjust the percentage ranges according to the grade definitions. For more information, see the Assessment for Learning Section.

Adjustment methods for students

Teaching methods	Assisted by video
Assignment submission methods	
Exam methods	
Others	

Progress

Week	Date	Topic
No data		