Tamkang University Academic Year 105, 1st Semester Course Syllabus

Course Title	WASTEWATER ENGINEERING	Instructor	LI, CHI-WANG
Course Class	TEWBB3A DIVISION OF ENVIRONMENTAL ENGINEERING, DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING, 3A	Details	◆ Required ◆ One Semester ◆ 3 Credits

Departmental Aim of Education

Ⅰ. Educating students with the fundamental knowledge of mathematics, science and engineering to enable them to succeed in the practice or academic research related to water resources and environmental engineering.

1. Training students with engineering basics to equip them with the capabilities of construction supervision and operation management.
2. Cultivating students with ability of applying engineering theory and pursuing innovation to equip them with the capabilities of researching, planning, engineering design, integration and assessment.
3. Training students with capacity to apply information technology in the engineering business.

Ⅱ. Cultivating students to become professional engineers with care in environment and professional ethics.

1. Cultivating students with characters of respecting the nature and humane care.
2. Cultivating students with engineering ethics and law-abiding character.
3. Preparing students with the capabilities of exploring, analyzing, interpreting, and dealing with problems.

Ⅲ. Preparing students with the capabilities of engaging in domestic and international engineering business.

1. Cultivating students with the capabilities of project management, presentation and communication skills, and teamwork.
2. Preparing students with the capabilities of applying professional foreign language and expanding their global perspective.
3. Cultivating students with cognitive and habits of continuous learning.

Departmental core competences

A. Basic mathematical and engineering knowledge needed for water resources and environmental engineering applications.

B. Engineering drawings, measurement, design, construction, operation, and management capabilities.

C. Capabilities of basic programming and application of information related tools.

D. Logical thinking, analysis, integration, and problem-solving skills.

E. Innovative design and engineering implementation capacity.

F. Professional foreign language skills and global perspective.

G. Awareness of the importance of teamwork and working attitude, and with cognition of professional ethics.

H. Continuous learning of the up-to-date knowledge of professional engineering.

Course Introduction	In this course, following topics are discussed. Introduction of the types of sewerage systems. Quality and quantity of sewage. Design of sewer. Introduction of preliminary, primary, secondary, and advanced wastewater treatment processes. Introduction of sludge treatment processes.

The Relevance among Teaching Objectives, Objective Levels and Departmental core competences

I.Objective Levels (select applicable ones) :

(i) Cognitive Domain : C1-Remembering, C2-Understanding, C3-Applying, C4-Analyzing, C5-Evaluating, C6-Creating

(ii) Psychomotor Domain : P1-Imitation, P2-Mechanism, P3-Independent Operation, P4-Linked Operation, P5-Automation, P6-Origination

(iii) Affective Domain : A1-Receiving, A2-Responding, A3-Valuing, A4-Organizing, A5-Charaterizing, A6-Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :

(i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.

(ii) If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)

(iii) Determine the Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	1. Students will be able to demonstrate their understanding of the design parameters for sewer collection system and treatment processes by applying these parameters to design a sewerage system.	C4	ACD

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment

1	1. Students will be able to demonstrate their understanding of the design parameters for sewer collection system and treatment processes by applying these parameters to design a sewerage system.	Lecture, Discussion, Problem solving	Written test, Participation

This course has been designed to cultivate the following essential qualities in TKU students

Essential Qualities of TKU Students	Description
◇ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◇ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◇ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◇ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◇ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◇ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◇ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◇ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

Course Schedule

Week	Date	Subject/Topics	Note
1	105/09/12 ~ 105/09/18	Introduction of sewerage system. Quality and quantity of sewage	
2	105/09/19 ~ 105/09/25	Hydraulics review	
3	105/09/26 ~ 105/10/02	Pump and Pumping station design	
4	105/10/03 ~ 105/10/09	Sewer collection system design	
5	105/10/10 ~ 105/10/16	Sewer collection system design	1st exam
6	105/10/17 ~ 105/10/23	Preliminary and primary treatment processes	
7	105/10/24 ~ 105/10/30	Introduction of biological concepts	
8	105/10/31 ~ 105/11/06	Activated sludge treatment process	

9	105/11/07 ~ 105/11/13	Activated sludge treatment process	
10	105/11/14 ~ 105/11/20	Midterm Exam Week	
11	105/11/21 ~ 105/11/27	Oxygen transfer and mixing	
12	105/11/28 ~ 105/12/04	Attached growth treatment processes	
13	105/12/05 ~ 105/12/11	Attached growth treatment processes /Filed trip	
14	105/12/12 ~ 105/12/18	Anaerobic digestion	2nd exam
15	105/12/19 ~ 105/12/25	Aerobic digestion	
16	105/12/26 ~ 106/01/01	Advanced wastewater treatment processes	
17	106/01/02 ~ 106/01/08	Advanced wastewater treatment processes	
18	106/01/09 ~ 106/01/15	Final Exam Week	

Requirement	
Teaching Facility	Computer
Textbook(s)	Water and wastewater Engineering, Machenzie Davis
Reference(s)	
Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance： % ◆ Mark of Usual：20.0 % ◆ Midterm Exam： 20.0 % ◆ Final Exam： 20.0 % ◆ Other〈Two exams〉：40.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php . **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**