

Tamkang University Academic Year 112, 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	<ul style="list-style-type: none"> ◆ General Course ◆ Required ◆ One Semester
Relevance to SDGs	<p>SDG6 Clean water and sanitation</p> <p>SDG9 Industry, Innovation, and Infrastructure</p>		

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.

Subject Departmental core competences

- A. Basic mathematical and engineering knowledge needed for water resources and environmental engineering applications.(ratio:20.00)
- B. Capabilities of engineering planning, design, and information applications.(ratio:20.00)

- C. Capabilities of logical thinking, analysis, integration, problem-solving skills, innovative design and engineering implementation.(ratio:30.00)
- D. Continuous learning of the up-to-date knowledge of professional engineering, professional foreign language skills and global perspective.(ratio:20.00)
- E. Awareness of the importance of teamwork and working attitude, and with cognition of professional ethics.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:25.00)
2. Information literacy. (ratio:15.00)
3. A vision for the future. (ratio:10.00)
4. Moral integrity. (ratio:5.00)
5. Independent thinking. (ratio:25.00)
6. A cheerful attitude and healthy lifestyle. (ratio:5.00)
7. A spirit of teamwork and dedication. (ratio:10.00)
8. A sense of aesthetic appreciation. (ratio:5.00)

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 correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
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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.	Cognitive
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The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDE	12345678	Lecture	Testing

Course Schedule

Week	Date	Course Contents	Note
1	112/09/11 ~ 112/09/17	Introduction of sewerage system. Quality and quantity of sewage	
2	112/09/18 ~ 112/09/24	Hydraulics review	
3	112/09/25 ~ 112/10/01	Pump and Pumping station design	
4	112/10/02 ~ 112/10/08	Sewer collection system design	
5	112/10/09 ~ 112/10/15	Sewer collection system design	
6	112/10/16 ~ 112/10/22	Preliminary and primary treatment processes	
7	112/10/23 ~ 112/10/29	Introduction of biological concepts	
8	112/10/30 ~ 112/11/05	Activated sludge treatment process	
9	112/11/06 ~ 112/11/12	Midterm Exam Week	
10	112/11/13 ~ 112/11/19	Activated sludge treatment process	
11	112/11/20 ~ 112/11/26	Oxygen transfer and mixing /Filed trip	
12	112/11/27 ~ 112/12/03	Attached growth treatment processes	
13	112/12/04 ~ 112/12/10	Attached growth treatment processes	
14	112/12/11 ~ 112/12/17	Anaerobic digestion	
15	112/12/18 ~ 112/12/24	Aerobic digestion	
16	112/12/25 ~ 112/12/31	Advanced wastewater treatment processes	
17	113/01/01 ~ 113/01/07	Final Exam Week	
18	113/01/08 ~ 113/01/14	Flex week, learning activities should be arranged.	

Key capabilities	self-directed learning International mobility Problem solving
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist) Competency-based education 'competency exploration' sustained competency or global issues STEEP (Society, Technology, Economy, Environment, and Politics)
Distinctive teaching	
Course Content	Environmental Safety Sustainability issue
Requirement	
Textbooks and Teaching Materials	Using teaching materials from other writers:Textbooks Name of teaching materials: https://www.amazon.com/Wastewater-Engineering-Treatment-Resource-Recovery/dp/0073401188?asin=B07574MQF8&revisionId=&format=4&depth=1
References	
Grading Policy	◆ Attendance : % ◆ Mark of Usual : 30.0 % ◆ Midterm Exam : 35.0 % ◆ Final Exam : 35.0 % ◆ Other () : %
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.