

COURSE INFORMATION					
Course Title	Code	Semester	L+P+L Hour	Credits	ECTS
Water and Wastewater Treatment Plants	CE 572	-	3+0+0	3	10

Prerequisites	-
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Language of Instruction	English
Course Level	Master's Degree (Second Cycle Programmes)
Course Type	Departmental Elective
Course Coordinator	Asst. Prof. Dr. Börte Köse Mutlu
Instructors	Asst. Prof. Dr. Börte Köse Mutlu
Assistants	-
Goals	The goal of the course is to gain students knowledge about methods of: -the technology used at the water and wastewater treatment plants. -the fundamental design of water and wastewater systems -current and emerging practices and procedures for the design, construction, and operation of water and wastewater facilities.
Content	Introduction to water management. Water and wastewater sources and characteristics. Fundamentals of water and wastewater treatment. Flow chart and units in water and wastewater treatment plants. Design criteria for units in water and wastewater treatment plants. Hydraulics in water and wastewater treatment plants. Construction and operation of water and wastewater treatment plants. Regulations and standards.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Ability to understand and identify the critical issues and challenges in designing, constructing, and operating water and wastewater treatment plants	2,3,4,9,11	1	A, B, C
2) Ability to organize all the major unit operations and unit processes associated with water and wastewater treatment into a complete flow-chart	2,3,4,9,11	1,2,3	A, B, C

Teaching Methods:	1: Lecture, 2: Problem solving by instructor, 3: Problem solving assignment
Assessment Methods:	A: Written exam, B: Homework, C: Presentation

COURSE CONTENT		
Week	Topics	Study Materials
1	Introduction to water management	Lecture Notes
2	Water and wastewater sources and characteristics-I	Lecture Notes
3	Water and wastewater sources and characteristics-II	Lecture Notes
4	Fundamentals of water and wastewater treatment	Lecture Notes
5	Water and wastewater treatment plants: Flow chart and units	Lecture Notes
6	Water and wastewater treatment plants: Design criteria-I	Lecture Notes
7	MIDTERM	-
8	Water and wastewater treatment plants: Design criteria-II	Lecture Notes
9	Water and wastewater treatment plants: Hydraulics-I	Lecture Notes
10	Water and wastewater treatment plants: Hydraulics-II	Lecture Notes
11	Water and wastewater treatment plants: Construction	Lecture Notes
12	Water and wastewater treatment plants: Operation	Lecture Notes
13	Regulations and standards.	Lecture Notes
14	Case studies from national treatment plants	Lecture Notes
15	Case studies from international treatment plants	Lecture Notes

RECOMMENDED SOURCES	
Lecture Notes	The lecture notes are supplied by the instructor.
Textbook	-
Additional Resources	<p>Öztürk, İ., Koyuncu, İ. Köse-Mutlu, B., Yıldız, O. (2015) Atıksu Arıtma Tesisleri İşletimi El Kitabı, Türkiye Belediyeler Birliği, Ankara, Türkiye.</p> <p>Qasim, S. R., Motley, E. M., & Zhu, G. (2000). Water works engineering: planning, design, and operation. Prentice Hall.</p> <p>Metcalf, L., Eddy, H. P., & Tchobanoglous, G. (1979). Wastewater engineering: treatment, disposal, and reuse. New York: McGraw-Hill.</p>

	<p>Qasim, S. R. (2017). Wastewater treatment plants: planning, design, and operation. Routledge.</p> <p>Spellman, F. R. (2016). Water and Wastewater Conveyance: Pumping, Hydraulics, Piping, and Valves. CRC Press.</p> <p>Bergendahl, J. (2008, May). Treatment system hydraulics. American Society of Civil Engineers.</p>
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MATERIAL SHARING

Documents	-
Assignments	-
Exams	Exams questions are solved if demanded.

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Midterm	1	60
Homework	1	10
Term project	1	30
Total		100
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		50
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		50
Total		100

COURSE CATEGORY	Expertise Courses
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COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Attains knowledge through wide and in-depth investigations his/her field and surveys, evaluates, interprets, and applies the knowledge thus acquired.					
2	Has a critical and comprehensive knowledge of contemporary engineering techniques and methods of application.				√	
3	By using unfamiliar, ambiguous, or incompletely defined data, completes and utilizes the required knowledge by scientific methods; is able to fuse and make use of knowledge from different disciplines.		√			
4	Has the awareness of new and emerging technologies in his/her branch of engineering profession, studies and learns these when needed.			√		
5	Defines and formulates problems in his/her branch of engineering, develops methods of solution, and applies innovative methods of solution.					
6	Devises new and/or original ideas and methods; designs complex systems and processes and proposes innovative/alternative solutions for their design.					
7	Has the ability to design and conduct theoretical, experimental, and model-based investigations; is able to use judgment to solve complex problems that may be faced in this process.					
8	Functions effectively as a member or as a leader in teams that may be interdisciplinary, devises approaches of solving complex situations, can work independently and can assume responsibility.					
9	Has the oral and written communication skills in one foreign language at the B2 general level of European Language Portfolio.				√	
10	Can present the progress and the results of his investigations clearly and systematically in national or international contexts both orally and in writing.					
11	Knows social, environmental, health, safety, and legal dimensions of engineering applications as well as project management and business practices; and is aware of the limitations and the responsibilities these impose on engineering practices.				√	
12	Commits to social, scientific, and professional ethics during data acquisition, interpretation, and publication as well as in all professional activities					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	10	140
Midterm	1	3	3
Homework	1	20	20
Term project (Presentation)	1	30	30
Final	1	3	3
Total Work Load			238
Total Work Load / 25 (h)			10
ECTS Credit of the Course			10