TED UNIVERSITY

CE 434
Coastal Engineering

SYLLABUS/FALL 2022

Course Information

Required or Elective	☑Required ☐Elective	**Date Prepared**	September 2022
Semester	Fall 2022	**Class Hours, Lab. Hours and Classrooms**	Class Hours: Tue. 14:00-16:00 (G101) Wed. 09:00-10:00 (G101)
Course Credit Hours/ ECTS credits	(3+0+2) 4 / 6	**Pre-requisite/ Co-requisite**	CE 331
Level of Course	Senior	**Language of Instruction**	☑ English ☐ Turkish
Instructors and their office hours	Dr. Aslı Numanoğlu Genç (asli.genc@tedu.edu.tr) (Office: D301) The office hours can be set by appointment.		
Teaching Assis-tant(s)	Res.Asst. Neslihan Pınar Gödek (npinar.godek@tedu.edu.tr)		
Student Assis-tant(s)	NA		
Textbook	Ergin, A. *Coastal Engineering,* 2nd Ed., METU Press, 2019.		
Recommended Readings	1. Lecture notes on *lms.tedu.edu.tr* 2. Bascom, W. and McCoy, K., *Waves and Beaches-The Powerful Dynamics of Sea and Coast,* 3rd Ed., Patagonia Press, 2020. 3. Dean, R.G and Dalrymple, R.A., *Water Wave Mechanics for Engineers and Scientists,* World Scientific, 2009.		
Course Web Pages	Please register to Moodle page http://lms.tedu.edu.tr and regularly follow this link to have access to course materials.		

Course Description

Linear wave theory, wave transformations (shoaling, refraction, breaking, diffraction, reflection), wind-generated waves and their prediction, wave climate, design of rubble mound and vertical wall breakwaters.

Course Objective

The objective of this course is to introduce the water wave theories and the applications of these theories in coastal engineering. This course aims to enable the students to understand the linear wave theory, engineering wave properties and wave statistics and spectra. An understanding of design of coastal structures will also be introduced.

Course Learning Outcomes

On successful completion of this course, a srudent will be able to explain basic concepts of coastal engineering and wind generated waves, assess forces acting on breakwaters and vertical wall structures.

Specifically, students will be able to,

1. Identify and understand various characteristics water wave parameters and characteristics **[B1]**.
2. Analyze the wave transformations **[B4]**.
3. Apply appropriate equations and principles to analyze the progressive waves **[B3]**.
4. Predict wind generated waves **[B6]**.
5. Determine the forces acting on coastal structures **[B4]**.

Course Assignments

A. ***Quizzes (20%):*** There will be 4 quizzes each having 5% weight of overall grade.
B. ***Mid*-Term Exam (30%):** There will be one mid-term exam having a 25% weight of overall grade.
C. ***Project (20%):*** Students are expected to complete an analysis on wave climate using the HYDRO-TAM3D software.
D. ***Final Exam (30%):*** There will be a cumulative final exam at the end of the semester.

Course Assessments & Learning Outcomes Matrix

Assessment Methods	Course Learning Outcomes
Quizzes	All
Mid-Term Exam	All
Project	All
Final Exam	All

Relationship to Program Outcomes

This course contributes to fulfillment of the following program outcomes:

- Identify, formulate, and solve engineering problems **[PO6]**.
- Engage in life-long learning to face the future challenges and to achieve an enduring professional development **[PO10]**.
- Employ state-of-the-art engineering techniques and computing tools necessary for creative engineering solutions Identify, formulate, and solve engineering problems **[PO11]**.

Teaching Methods & Learning Activities

☑ Telling/Explaining
☑ Discussions/Debates
☑ Questioning
☑ Reading
☐ Peer Teaching
☐ Scaffolding/Coaching
☑ Demonstrating
☑ Problem Solving
☑ Inquiry
☐ Collaborating
☐ Think-Pair-Share
☐ Predict-Observe-Explain
☐ Microteaching
☐ Case Study/Scenario Analysis
☐ Simulations & Games
☐ Video Presentations
☐ Oral Presentations/Reports
☐ Concept Mapping
☐ Brainstorming
☐ Drama/Role Playing
☐ Seminars
☐ Field Trips
☐ Guest Speakers
☐ Hands-on Activities
☐ Service Learning
☐ Web Searching

☐ Experiments

☐ Other(s):

Student Workload

☑ Lectures ..... **42** ...hrs
☑ Course Readings ..... **30** ...hrs
☐ Workshop ....hrs
☐ Online Discussion..... .....hrs
☐ Debate..... .....hrs
☐ Work Placement ....hrs
☐ Field Trips/Visits ....hrs
☐ Observation..... .....hrs
☐ Lab Applications ..... **..**.....hrs
☐ Hands-on Work..... .....hrs
☑Exams/Quizzes ..... **35** ...hrs
☐ Resource Review..... .....hrs
☐ Research Review .... hrs
☐ Report on a Topic .... hrs
☑ Case Study Analysis ..... **30** .. hrs
☐ Oral Presentation..... ..... hrs
☐ Poster Presentation..... ..... hrs
☐ Demonstration .... hrs
☐ Web Designs..... ..... hrs
☐ Mock Designs .... hrs
☑ Team Meetings..... **15** ..... hrs
☐ Other:..... … … hrs
TOTAL ..... **152** .. hrs

Assessment Methods

☑ Test/Exam
☑ Quiz
☐ Oral Questioning
☐ Performance Project
☐ Written ☐Oral
☐ Observation
☐ Self-evaluation
☐ Peer Evaluation
☐ Portfolio
☐ Presentation (Oral, Poster)
☑ Other(s): Project work

Course Outline

Week	Topic
1	1. INTRODUCTION 1.1. The field of coastal engineering 1.2. Continental shelf and coastal area
2	2. WAVE HYDRAULICS 2.1. Coastal hydraulics 2.2. Flow of ideal fluids – Fundamental concepts
3	3. FORMULATION OF SURFACE WAVE PROBLEM 3.1 Equations and unknowns 3.2 Boundary conditions 3.3 Difficulties in obtaining the solution (QUIZ 1)
4	4. SMALL AMPLITUDE WAVE THEORY 4.1. Linearization of the Surface Wave Problem 4.2. Solution for the Velocity Potential 4.3. Wave Celerity, Length and Period
5	4.4. Basic Wave Parameters 4.5. Particle Velocities and Orbital Motion 4.6. Particle Trajectory (QUIZ 2)
6	4.7. Wave Pressure 4.8. Pressure within a Progressive Wave 4.9. Wave Energy-Wave Power 4.10. Wave Reflection
7	5. WAVES IN SHOALING WATER 5.1. Basic definitions 5.2. Wave shoaling and wave refraction
8	5.3. Wave diffraction 5.4. Wave breaking (MID-TERM EXAM)
9	6. DESCRIPTION OF OCEAN WAVES 6.1. Statistical properties of sea waves 6.2. The statistical distribution of wind wave heights (QUIZ 3)
10	6.3 Applications on "Description of ocean waves"
11	7. WIND GENERATED WAVES 7.1. Development of wave field 7.2. Prediction of wind waves
12	7.3 Applications on "Wind Generated Waves"
13	8. BREAKWATERS 8.1. Rubble mound breakwaters 8.2. Vertical wall (QUIZ 4)
14	8.3. Applications on "Breakwaters"

Course Policies and Some Remarks

General

1. Date for the final exam will be announced at the end of the semester by the University. The final exam will cover all topics.
2. Cell phones should be turned off and kept out of sight during the classes. You are not also allowed to use your computers/ tablets etc. at the classroom.
3. If you are late for more than 10 minutes, please do not enter the class.
4. You are not allowed to use cell phones during the exams.

Attendance

Attendance is strongly recommended for this course. Hands on exercises and application on the knowledge gained will be carried out in classes.

Make Up Exams

Make-ups for midterm exams will NOT be offered generally. If you have a legitimate reason for missing an exam, then you must arrange to make up the exam BEFORE the scheduled time of the exam. The only exceptions are illness or emergency. In case of an illness or emergency you need to supply a documentation that supports your claim. Also please read the document given in the link: http://www.tedu.edu.tr/tr/main/yonetmelikler-ve-yonergeler

Calculator Policy

You may use a calculator during exams.

Plagiarism

All of the following are considered plagiarism:

- "Turning in someone else's work as your own
- Copying words or ideas from someone else without giving credit
- Failing to put a quotation in quotation marks
- Giving incorrect information about the source of a quotation
- Changing words but copying the sentence structure of a source without giving credit
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not" (www.plagiarism.org)

Plagiarism is a very serious offense and will be penalized accordingly by the university disciplinary committee. The best way to avoid accidentally plagiarizing is to work on your own before you ask for the help of other resources. Collaboration on non-collected homework and in studying is strongly encouraged; however, the work you hand in must be solely your own. For more information on TEDU policy on intellectual integrity see the "Student Handbook" in the following link: https://student.tedu.edu.tr/tr/student

Cheating

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following: copying answers on exams, homework and lab works, using prohibited material on exams, lying to gain any type of advantage in class, providing false, modified or forged data in a report, plagiarizing, modifying graded material to be re-graded, causing harm to colleagues by distributing false information about an exam, homework or lab. Cheating is a very serious offense and will be penalized accordingly by the university disciplinary committee. For more information on TEDU policy on intellectual integrity, see the "Student Handbook" in the following link: https://student.tedu.edu.tr/tr/student.

Disability Support

If you have a disabling condition which may interfere with your ability to successfully complete this module, please see Handbook for Registered Students.

STUDENT SERVICES INFO:

Student Development and Psychological Counseling Center:

Student Development and Psychological Counseling Centre is mandated with providing crisis intervention and supportive listening services to the campus community. The Center conducts individual counseling, group guidance studies, workshops, seminars, and orientation studies for all students in need. You may apply to the Center in order to deal with all your current problems.

For further information and/or questions:

ogrencidanismamerkezi@tedu.edu.tr

http://csc.tedu.edu.tr/

TEDU Without Barriers Unit:

Please inform the *TEDU Without Barriers* Unit and the instructor of the course about the specific issues in case you have a physical or mental disability and are having trouble with anything related to this course—such as accessing the material, participating in the class, taking notes, preparing for, attending or managing to complete the exams. Your situation will be reviewed by commission, in accordance with the principle of confidentiality, and if deemed appropriate, facilitating measures will be taken so that you can take the course more efficiently.

For further information and/or questions:

engelsiz@tedu.edu.tr

https://www.tedu.edu.tr/engelsiz-tedu