COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P+L Hour*	*Credits*	*ECTS*
Advanced Strength of Materials	CE 521	-	3+0+0	3	10

Prerequisites	-

Language of Instruction	English
Course Level	Master's Degree (Second Cycle Programs)
Course Type	Departmental Elective
Course Coordinator	Prof. Dr. Nesrin Yardımcı
Instructors	Prof. Dr. Nesrin Yardımcı
Assistants	-
Goals	The goal of this course is to develop the necessary background information for the theory of elasticity, elastic stability and plasticity.
Content	Introduction; theory of elasticity; fracture hypothesis; bending with shear; shear center; elastic curve; bending with torsion; beams on elastic foundation; curved beams; energy principles; elastic stability; plasticity; collapse analysis.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
Basic understanding of bending; shear center and elastic foundation.	1,2,3,4	1,2	A,C
Basic understanding of fracture analysis and collapse analysis.	1,2,3,4	1,2	A,C
Basic understanding of energy principles.	1,2,3,4	1,2	A,C
Basic understanding of theory of elasticity and plasticity.	1,2,3,4,8,9.14	1,2	A,C
Basic understanding of elastic stability.	1,2,3,4,8,9,14	1,2	A,C

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction	Lecture Notes and Textbook
2	Shear center; Bending with shear	Lecture Notes and Textbook
3	Elastic curve; Bending with torsion; Beams on elastic foundation	Lecture Notes and Textbook
4	Worked examples	Lecture Notes and Textbook
5	Worked examples	Lecture Notes and Textbook
6	Energy principles; Fracture hypothesis	Lecture Notes and Textbook
7	Theory of elasticity	Lecture Notes and Textbook
8	Midterm Exam	Lecture Notes and Textbook
9	Theory of elasticity	Lecture Notes and Textbook
10	Theory of plasticity	Lecture Notes and Textbook
11	Worked examples	Lecture Notes and Textbook
12	Elastic stability	Lecture Notes and Textbook
13	Midterm Exam	Lecture Notes and Textbook
14	Collapse analysis	Lecture Notes and Textbook
15	Worked examples	Lecture Notes and Textbook

RECOMMENDED SOURCES	
Lecture Notes	Notes prepared by the instructor
Textbook	Ferdinand P. Beer, E. Russell Johnston, Jr, John T. De Wolf. Mechanics of Materials, McGraw Hill. Hibbeler, R., C., Statics and Mechanics of Materials, Pearson Prentice Hall.

MATERIAL SHARING

Documents	Lecture notes delivered to the students
Assignments	Homeworks are returned to students after they are graded
Exams	Exams questions are solved if demanded

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	50
Quizzes	2	30
Assignment	4	20
Lab Work	-	-
Term Project	-	-
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

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: 12x Total course hours)	13	3	39
Hours for off-the-classroom study (Pre-study, practice)	13	3	39
Midterm examination	2	3	50
Homework	4	10	40
Quiz	2	2	30
Final examination	1	3	40
Total Work Load			238
Total Work Load / 25 (h)			10
ECTS Credit of the Course			10