MENG 222 – Strength of Materials

Eastern Mediterranean University
Faculty of Engineering

Department:
Mechanical Engineering

Program Name: Mechanical Engineering	**Program Code:** 23	Year/Semester: 2018-2019 FALL			
Course Code: MENG222	**Course Title:** Strength of Materials	Credit hours			
		Lec.	Tut	Lab/Activity	Total
		4	1	1	4

Criterion 5:
Subject Area:
☐ (a) College-level mathematics and basic sciences with experimental experience appropriate to the program.
☐(b) Engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design,and utilizing modern engineering tools.
☒(c) a broad educatiın component that complements the technical content of the curriculum and is content with the program educational objectives.
☐(d) a culminating major engineering design experience that
- ☐ 1) Incorporates appropriate engineering standards and multiple constrains
- ☐ 2) Based on the knowledge and skills acquired in earlier course work.

Hourly Contribution
☐ Basic Science (1)
☐ College-level Mathematics ()
☐ Complex Engineering Problems ()
☐ Engineering Design ()
☒ Engineering Science (3)
☐ Team ()

Types of Course
☒Engineering or Area Core
☐Engineering course offered by other programs
☐Engineering or Area Elective
☐Mathematics and Basic Sciences
☐General Education

Prerequisite(s): CIVL 211

Catalog Description:
Review of Statics. Stress and strain, and Hooke's law. Constitutive relations. Analysis of stress and strain of a structure. Axially loaded members. Torsion. Stresses and deformations in beams. Shearing stresses and deformations in beams. Combined stresses. Deflection of members. Design of beams and shafts. Columns.

Course Web Page:

Textbook(s): Mechanics of Materials by Beer and Johnston, McGraw-Hill,

Topics Covered and Class Schedule:
(4 hours of lectures and 1 hour of tutorial or lab work per week)
Week 1-2 Chapter 1 Concept of Stress
Week 2-3 Chapter 2 Axial Loading
Week 4-5 Chapter 3 Torsion
Week 6 Chapter 4 Pure Bending
Week 7-8 **Midterm Examination Week**
Week 8-9 Chapter 5 Analysis and Design of Beams For Bending
Week 10 Chapter 6 Shearing Stress in Beams and Thin-walled Members
Week 11 Chapter 7 Transformation of Stress and Strain
Week 12 Chapter 8 Principal Stress Under a Given Loading

Week 13 Chapter 9 Deflection of Beams Week 14 Chapter 10 Buckling Week 15-16 **Final Examination Week**

Lecture and Tutorial Learning Outcome	Student Outcomes	Performed Assessments and Percentage
At the end of the course, student must be able to • Review the important principles of statics and determine the internal resultant loadings in a body. Using the concept of normal stress and shear stress for specific applications to analyzed or design of members subjected to an axial load or direct shear loads. • Find the stress and deformations in an axially loaded and thermally loaded members using the equilibrium equations and the compatibility equations for the statically indeterminate cases. • Find the shear stress an angle of twist of a shaft or tube subjected to torsional loading using the equilibrium equations and the compatibility equations for the statically indeterminate cases.. • Draw the shear force and bending moment diagrams and calculating bending stress of the beams made of homogeneous and composite materials that behaves a linear elastic manner. • Develop a method for finding the shear stress in a beam having a prismatic cross section made from homogeneous material that behaves in a linear-elastic manner. • Finding the stresses for thin walled pressure vessels and for members loaded in axial, torsional, bending and shear acting simultaneously on a member's cross-section. • Express the plane-stress transformation from one coordinate system into components with a coordinate system having a different orientation. The principal stresses and the maximum in plane shear stress using the Mohr's circle method. • Design a beam and shaft to resist both to bending and shear loads. • Determine the buckling of columns subjected to an axial compressive load.	**a, e, k**	Midterm 30% Final %40

Lab. Experiment Title and Lab. Equipment Used	Lab Learning Outcome	Student Outcomes	Performed Assessments and Percentage
1 Torsion Test 2 Bending Test 3 Thin Walled Cylinder 4 Thick Walled Cylinder	Being able to conduct a test, collect the data perform engineering analysis test the validity of the result and prepare a report	**b**	Lab Report %30(minimum 2)

Important Notes:

University rules and regulations are applied to this course.