



Philadelphia University

Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

- Course Title:** Strength of materials (620213)
Prerequisite: statics (620211)
Credit Hours: 3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook: Mechanics of Materials -12th edition by R. C. Hibbeler
References: Mechanics of Materials- 7th edition James M. Gear, Barry J. Goodno

Course

Description:

Study of stress, strain relation when a loads (axial, torsion, bending and buckling loads) are applied to a static solid bodies such as beams. mechanical properties of materials, pure bending, analysis and design of beam for bending, shear stress in beams, transformation of stress and strain, deflection of beams, columns, energy methods.

Course

Computer, internet connection, webcam

Requirement:

Instructor:

Dr. Nabil Musa

Office: Mechanical Engineering building, room E61206 , ext. : 2543

Office hours: Sun, Tue, Thu: 10:00-11:00

Course Topics:

Week	Topic
1	Introduction and Basic Concepts of Solid Mechanics
2	Equilibrium of a deformable body, average normal and shear stress and strain
3, 4	Design of simple connections
5,6	Tension and compression test, stress-strain diagram, stress-strain behavior of ductile and brittle materials.
7,8	Hooke's law, poisson's ratio, and elastic deformation of an axially loaded members.
9,10	Principle of superposition, force method for statically indeterminate member
10,11	Torsional deformation of circular shaft, torsional formula, power transmission, statically indeterminate torque-loaded members, stress concentration.
12,13	Shear and bending diagram, bending deformation, flexure formula..
14	Shear in straight members, shear formula.
15	Shear flow in built-up members Thin-walled pressure vessels.
16	Stress-Transformation, plane-stress, principle stress and maximum in plane shear stress.

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Introduction and Basic Concepts of Solid Mechanics, Stress and strain.	[1]
2.	Mechanical properties of materials, Axial loading.	[1 , 2]
3.	Torsion, analysis and design of beam for bending.	[1]
4.	shear stress in beams, Transverse shear, Strain transformation.	[1]
5.	transformation of stress and strain, Deflection of beams, Columns, energy methods	[1]

Teaching methodology: Online, Blended or both

Electronic platform: Microsoft-teams

Evaluation methods:

Evaluation of students' performance (final grade) will be based on the following categories:

Mid-term Shall be given at the end of the seventh week of the course in the form of multiple choice questions and (or) specific problems to be solved and uploaded by the student using the university electronic platform.

Quizzes: A number of short exams of 10-minute quizzes in the form of multiple choice questions or an assignment using the university electronic platform will be given to the students during the semester. These quizzes will cover the material discussed during the previous lecture(s).

Homework: Problem sets will be given to students in the form of assignments using the University Electronic platform. Homework should be solved by each student individually and submitted using the platform before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during the online session (lecture) and the student is assessed based on his/her response

Final Exam: The final exam will cover all the class material.

Grading policy:

Mid-term Exam.	30%
Home works, Quizzes and participation	30%
Final Exam	40%
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Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.