Palestine Technical University-Kadoorie
College of Engineering and Technology
Course Syllabus

Course Title:	Strength of materials	**Course Number:**	12210345
Year:		**Semester:**	
Specialization:	Mechanical Engineering	**Designation:**	Compulsory
Prerequisite(s):	15010223 Engineering Mathematics 2		

Instructor: Dr. Ihab Assaf

Instructor's e-mail:

Office Hours: 12- 1.00 pm Sunday, Tuesday, Thursday, 11- 12.30 pm Sunday

Class Time: 12:30- 2:00 pm **Class Room:** 539

Course description: Application of section method, Stress Components. Strain Components, stress–strain diagrams, Hook's low. Poisson's ratio, deformations of an axially loaded member, Thermal stress. Torsion, diagrams of internal forces, Bending stresses in beams, shearing. Stresses in beams. Compound Stress. Principal stress and maximum shear stress, Mohr's Circles, Deflection of Beams, Buckling of columns.

Textbook(s): Mechanics of Materials, 8th Edition, By R. C. Hibbler, 2010.

Other required material (References):

1. Mechanics of Materials by Ferdinand Beer, Jr., E. Russell Johnston, John DeWolf and David Mazurek, 2011.
2. Mechanics of Materials: An Integrated Learning System by Timothy A. Philpot, 2010.
3. Applied Strength of Materials (5th Edition) by Robert L. Mott, 2007.

Course objectives: This course is presented to 4th year students of Mechanical Engineering in order to be familiar with the normal and shear stresses and their maximum values.

Topics covered and Calendar:

Topics	Hours
Shear Force and bending moment diagrams (Review) • Shear force versus load relationship. • Bending Moment versus shear force relationship.	3
Average Normal and shear Stresses • Average Normal stress. • Average shear stress. • General Stress state. • Isotropic and ourthotropic materials. • Allowable Stress.	4
Strain • Normal Strain. • Shear Strain.	2
Material Properties • Stress- strain Diagram. • Ductile and Brittle Materials. • Hooke's Law. • Poisson's Ratio. • Hook's law for shear. • General Hooke's Law. • Fatigue and Creep of materials. • Strain Hardening.	4

Deformation of Axially loaded Members • Deformation Equation (Statically Determinate members). • Statically indeterminate axially loaded members. • Thermal Stress.	4
Torsional Stress • Shear strain due to torque. • Shear stresses due to torque. • Angle of Twist. • Statically indeterminate members Subjected to torque.	4
Bending Stresses in Beams • Normal Strain. • Normal Stresses. • Composite Beams.	4
Transverse Shear Stress in Beams • The shear formula. • Shear stress in beams.	4
Combined Loadings • State of stress caused by combined loadings.	4
General Equation of Plane- Stress • General Equation for normal stress. • General Equation for shear Stresses. • Principal Stresses and their orientations. • Maximum Shear Stress and its orientation. • Mohr's Circles.	5
Deflection of Beams • Deflection of statically determinate beams using integration method. • Statically indeterminate beams.	4
General Equation of Plane- Stress • Critical load. • Columns with pin support. • Columns with various types of supports.	4

Class/laboratory schedule:
2 class sessions each week; 75 minutes each, or
3 class sessions each week; 50 minutes each

Grading Plan:

First Exam	(25 Points)	
Second Exam	(25 Points)	
Final Exam	(50 Points)	Will be announced by the registrar

General Notes:
Class policies

1-University regulation Regarding absentees will be Applied.
2-Names will be read in the first 10 minutes anyone coming after that will be marked absent.
3- All mobiles must be switched off during class.

Relationship to program outcomes:

ABET (a-k)		Program Outcomes
a	****	ability to apply knowledge of math engineering and science
b		ability to design and conduct experiments and ability to analyze and interpret data
c		ability to design system components or process to meet a need
d		ability to function in multidisciplinary teams
e		ability to identify, formulate and solve engineering problems
f		understanding professional and ethical responsibility
g		ability to communicate effectively
h		Broad education to understand the impact of engineering solutions in a global and societal context
I		recognition of need and ability to engage in life long learning
j		knowledge of contemporary issues
k		ability to use techniques, skills and tools in engineering practice

Prepared by: Dr Ihab Assaf **Date:**