TISHK INTERNATIONAL UNIVERSITY
FACULTY OF ENGINEERING
Department of CIVIL ENGINEERING,
2020-2021 Spring
Course Information for CE 212 MECHANICS OF MATERIALS II

Course Name:	MECHANICS OF MATERIALS II

Code	Regular Semester	Theoretical	Practical	Credits	ECTS
CE 212	4	4	-	4	

Name of Lecturer(s)-Academic Title:	Najmadeen Saeed -
Teaching Assistant:	-
Course Language:	English
Course Type:	Main
Office Hours	Wednesday 15:30¬-16:30 & Thursday 11:00-¬12:00
Contact Email:	najmadeen.qasre@tiu.edu.iq Tel:07501533372
Teacher's academic profile:	-B.Sc. Building Engineering (2002) -M.Sc. Structural Engineering (2010) -Ph.D. Structural Engineering (2015)
Course Objectives:	This course is the second part of a two-course sequence.To teach students the principles of Mechanics of Materials and to develop engineering problem solving skills in stress/strain/deflection analysis through application of these principles. Topics covered include: behavior of axially loaded members; torsion in circular shafts; stresses and deflections in beams with symmetric cross sections; design adequacy; stress and strain transformation when coordinate systems are rotated; principle stresses; triaxial stresses and maximum shear stress; response in thin walled pressure vessels. The course will rely on the students' prerequisite knowledge of mathematics and basic science in developing principles and analytical techniques of mechanics of materials
Course Description (Course overview):	Introduction, course outline, Compound stresses, Introduction, Superposition, Force applied parallel to member's axis, Unsymmetrical bending, Superposition of shearing stresses, Analysis of Plane Stress and Strain, Introduction, the basic problem, Equations of the transformation of plane stress, Principal stresses, maximum shearing stresses, Mohr's circle of stress, Construction of Mohr's circle of stress, Construction of Mohr's circle of stress, Combined Stresses- Pressure Vessels- Failure Theories, Thin-walled pressure vessels, Failure theories, Design of Members by Strength Criteria, Introduction, design of axially loaded members, Design criteria for prismatic members, Shear and moment diagrams by summation, Shear and moment diagrams by summation, Deflection of Beams, Introduction, strain-curvature and moment-curvature relations, Differential equations of elastic beams, boundary conditions, Solution by direct integration, Solution by direct integration, Statically Indeterminate Problems Introduction, general approach, stresses caused by temperature, Analysis of indeterminate systems based on superposition, Columns Introduction, stability of equilibrium, Euler's formula, Limitations, design of columns.

COURSE CONTENT

Week	Hour	Date	Topic
1	4	31/1-4/2/2021	Chapter 6 Bending, Shear and Moment Diagrams
2	4	7-11/2/2021	Chapter 6 Graphical Method for Constructing Shear and Moment Diagrams
3	4	14-18/2/2021	Chapter 6 Bending Deformation of a Straight Member, and The Flexure Formula
4	4	21-25/2/2021	Chapter 6 Composite Beams
5	4	28/2-4/3/2021	Chapter 6 Reinforced Concrete Beams
6	4	7-11/3/2021	Chapter 6 Stress Concentrations
7	4	28/3-1/4/2021	Chapter 7 Deflection of Beams and Shafts, The Elastic Curve
8	4	4-8/4/2021	Chapter 7 Slope and Displacement by Integration
9	4	11-15/4/2021	Midterm Exam

10	4	18-22/4/2021	Midterm Exam
11	4	25-29/4/2021	Chapter 7 Slope and Displacement by Moment Area Method
12	4	2-6/5/2021	Chapter 7 Slope and Displacement by Moment Area Method
13	4	9-13/5/2021	Chapter 7 Method of Superposition, Statically Indeterminate Beams and Shafts, Statically Indeterminate Beams and Shafts-Method of Integration
14	4	16-20/5/2021	Chapter 7 Statically Indeterminate Beams and Shafts-Moment-Area Method, Statically Indeterminate Beams and Shafts-Method of Superposition
15	4	23-27/5/2021	Chapter 8 Buckling of Columns, Critical Load, Ideal Column With Pin Supports
16	4	30/5-3/6/2021	Chapter 8 Ideal Column With Pin Supports
17	4	6-10/6/2021	Final Exam
18	4	13-17/6/2021	Final Exam

COURSE/STUDENT LEARNING OUTCOMES

1	Understand the fundamental concepts of stress and strain and the relationship between both through the strain-stress equations in order to solve problems for simple tridimensional elastic solids
2	Finding critical shear and moment and their locations for a specific loading system.
3	Determine the deflection of beams
4	Solve problems relating to pure and nonuniform bending of beams and other simple structures
5	Be prepared for more advanced study in this field for example structural engineering, steel design and concrete design

COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES

(Blank : no contribution, I: Introduction, P: Profecient, A: Advanced)

	Program Learning Outcomes	**Cont.**
1	Apply principles of mathematics, science, and engineering	P
2	Design and conduct experiments, as well as analyze and interpret data accurately.	P
3	Design an engineering system, component, or process to meet desired industrial needs.	I
4	Identify, formulate and solve complex engineering problems	P
5	Apply, in design and construction, the most modern design codes, standards and specifications such as; AISC, ACI, ASCE 7, IBC, etc.	P
6	Use the techniques, skills, and modern engineering tools, such as surveying instruments, and designing software that are necessary for engineering practices.	
7	Apply knowledge and skills in construction project management and recognition of international standards and methodologies	
8	Manage to work with multi-disciplinary teams and communicate effectively.	
9	Identify the moral values that ought to guide the Civil Engineering profession and resolve the moral issues in the profession.	
10	Apply the principles of sustainable development in their professional duties which go in line with the paramount safety, health and welfare of the public.	
11	Analyze the impact of engineering solutions in a global and social context	I
12	Identify the need and have the ability to engage in lifelong learning and knowledge of contemporary issues.	

Prerequisites (Course Reading List and References):	Engineering mechanics, Mechanics of materials I
Student's obligation (Special Requirements):	Lecture notes, Calculator
Course Book/Textbook:	Mechanics of Materials, R.C. Hibbeler, 10th Ed., Pearson, 2015.
Other Course Materials/References:	1 1. Mechanics of Materials, James M. Gere and Barry J. Goodno, 8th Ed., Cengage Learning, 2011 2 R.C.Hibbeler, 2011, Mechanics of Materials, 8th edition in SI units. Pearson education south Asia Ltd. 3 F. L.Singer, A. Pytel, Strength of Materials, 3rd Ed. New York. 4 Gere, James M. "Mechanics of materials." 6 Ed. Thomsons. 5 V. S. Prasad. "Strength of Materials" 1st Edtion Galgotia. 2007 6 Beer, Johnston, DeWolf &Mazurek,

	2012, Mechanics of Materials, 6th edition,McGraw-Hill 7 D.K. Singh, 2009. Strength of Materials, 2nd edition, New Delhi, India, Ane Books Pvt. Ltd. 8 J. Case, L, Chilver &Carl T.F. Ross, 1999. Strength of Materials and Structures, 4th edition, Oxford, UK, Butterworth-Heinemann. 9 Pytel, A., and J. Kiusalaas. "Mechanics of Materials, vol. 14." Thomson, Pacific Grove, CA 20 (2003). 10 Nasha, William A. "Strength of Materials, SI(Metric) 2nd Ed. 2006
Teaching Methods (Forms of Teaching):	Lectures, Excersises, Presentation, Assignments, Weekly quizzes

COURSE EVALUATION CRITERIA

Method	Quantity	Percentage (%)
Participation	1	5
Quiz	3	5
Homework	4	2.5
Midterm Exam(s)	1	30
Final Exam	1	40
Total		**100**

Examinations: Essay Questions, True-False, Fill in the Blanks, Multiple Choices, Short Answers, Matching

Extra Notes:

ECTS (ALLOCATED BASED ON STUDENT) WORKLOAD

Activities	Quantity	Workload Hours for 1 quantity*	Total Workload
Theoretical Hours	18	4	72
Practical Hours	18	0	0
Final Exam	1	12	12
Participation	1	1	1
Quiz	3	5	15
Homework	4	5	20
Midterm Exam(s)	1	5	5
Total Workload			**125**
ECTS Credit (Total workload/25)			**5**

Peer review

Signature:	Signature:	Signature:
Name:	Name:	Name:
Lecturer	Head of Department	Dean