



Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Mechanical Engineering (Mechatronics) Program

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form no. (12)
Course Specification

1- Course Data

Course Code: ME 276	Course Title: Stress analysis	Academic Year/Level: 2nd year / 4th semester	
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.	Practical 2 hrs.

2- Course Aim

To present the advanced concepts and modern techniques of stress and strain analysis with applications to mechanical components and various structures and to introduce the students to the finite element method

3- Intended Learning Outcomes

e- Knowledge and Understanding	Through knowledge and understanding, students will be able to: K1) Concepts and theories of mathematics and sciences, appropriate to the discipline K3) Characteristics of engineering materials related to the discipline K4) Principles of design including elements design, process and/or a system related to specific disciplines.
f- Intellectual Skills	Through intellectual skills, students will be able to: I2) Select appropriate solutions for engineering problems based on analytical thinking. I9) Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact I11) Analyze results of numerical models and assess their limitations. I12) Create systematic and methodic approaches when dealing with new and advancing technology.
g- Professional Skills	Through professional and practical skills, students will be able to:
h- General Skills	Through general and transferable skills, students will be able to:

4- Course Content

Week No.1	Introduction to the concept of stress and strain: Normal stresses and strains.
Week No.2	Shear stresses, shearing strains and bearing stresses.
Week No.3	Shear stresses and deformations due to torsion.
Week No.4	Normal forces, shearing forces and bending moments in beams.

Week No.5	Stresses due to bending.
Week No.6	Stress and strain transformations: Introduction.
Week No.7	Stress and strain transformations: Principal stresses and planes and Mohr's circle of stress / 7th week evaluation
Week No.8	Maximum shear stress, yield criteria, analysis of strain.
Week No.9	Analysis of stresses in thin walled and thick walled pressure cylinders.
Week No.10	Stress concentration in machine elements.
Week No.11	Experimental stress analysis: strain gauges.
Week No.12	Deflection due to bending: Double integration / 12 th week evaluation
Week No.13	Deflection due to bending: Strain energy and Castigliano's method..
Week No.14	Buckling of columns: Euler equation.
Week No.15	Buckling of columns: Eccentric loading of slender columns.
Week No.16	Final examination

5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures
 - Tutorials
 - Reports & sheets
 - Laboratories
 - Seminars
- Academic Support:**
- The general academic advisor appoints an academic supervisor for handicapped students.
 - Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes. 2-Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills.	
b- Schedule:	Assessment 1 Assessment 2 Assessment 3 Assessment 4	7 th Week Assessment 12 th Week Assessment Continuous Assessments 16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Evaluation 12 th Week Evaluation Final-term Examination Oral Examination Practical Examination Semester Work Total	30 % 20 % 40 % 00 % 00 % 10 % 100%

8- List of References:

a- Course Notes	N/A
b- Required Books (Textbooks)	<ul style="list-style-type: none"> • R. C. Hibbler, “Mechanics of Materials,” Latest edition.
c- Recommended Books	<ul style="list-style-type: none"> • Beer and Johnson "Mechanics of Materials", McGraw Hill, 1992, 2nd edition. • Benham, Crawford and Armstrong "Mechanics of Engineering Materials", Prentice Hall, 1996, 1st edition. • West "Fundamentals of Structural Analysis" John Wiley and Sons, 1993, 1st edition. • Gere and Timoshenko "Mechanics of Materials ", PWS. Publisher, 1997, 4th edition. • Muvadi and McNabb "Engineering Mechanics of Materials", Macmillan Pr., 1984, 2nd edition. • Hibbeler "Mechanics of Materials", Prentice Hall, 2007, 7th edition.
d- Periodicals, Web Sites, etc.	N/A

Course coordinator:

Program Manager: