



BENHA UNIVERSITY



FACULTY OF ENGINEERING AT SHOUBRA

Model No.12
Course Specifications (2014-2015)
Structural Mechanics

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

1- Course Data

Course Code: MDP 213

Course Title: Structure Mechanics

Specialization: Mechanical Production Engineering

Course Type: Compulsory **Study Year:** Second Year

Teaching Hours: Lecture: 3

Tutorial: 2

Practical: 0

Total: 5

2- Course Aims

For students undertaking this course, the aims are to be:

1. Design of several components subjected to combined loading and thermal stresses such as pressure vessels.
2. Design of beams subjected to different types of loads.
3. Design of mechanical structures subjected to variable, alternated, repeated and impact loads.

3- Intended Learning Outcomes of Course (ILO's)

- a. **Knowledge and Understanding Skills:** On completing this course, students will be able to demonstrate the knowledge and understanding of:
 - a.1) The basic principles of normal force shear bending moment and twisting moment in structures. (A.3)
 - a.2) Characteristics of engineering materials and types of the load. (A.4)
 - a.3) principles and theories related to structural mechanics. (A.19)
- b. **Intellectual Skills:**
At the end of this course, the students will be able to:
 - b.1) Analyze and interpret data to obtain primary data to analysis the design of a structure (B.1).
 - b.2) Interpret numerical data and apply analytical methods for engineering design purposes (B.2).
- c. **Practical and Professional Skills:** On completing this course, the students are expected to be able to:
 - c.1) Apply knowledge of stress analysis to solve engineering problems. (C.1)
 - c.2) Design pressure vessels and structures (C3)
- d. **General and Transferable Skills:** At the end of this course, the students will be able to:
 - d.1) Refer to relevant literatures (D.1)



4- Course Contents

Week no.	Topics
1	Introduction: normal force, shear force, bending moment and twisting moment in structures
2	Stresses in curved beams due to normal forces and bending moments
3	Stresses in curved beams due to normal forces and bending moments
4	Stress in structures under combined loading
5	Stress in structures under combined loading
6	Effect of variable ,alternated, repeated and impact loads on mechanical structures
7	Effect of variable ,alternated, repeated and impact loads on mechanical structures
9	Thermal stresses applications
10	Thermal stresses applications
11	Stresses thin and thick walled vessels
12	Stresses thin and thick walled vessels
13	Deflection in beams under different types of loads
14	Deflection in beams under different types of loads

5- Teaching and Learning Methods

- 5.1 Lectures
- 5.2 Assignments/homework
- 5.3 Case study

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment

a- Student Assessment Methods

1. Five Assignments to assess knowledge and intellectual skills.
2. Two Quizzes to assess knowledge, intellectual and professional skills.
3. Midterm exam to assess knowledge, intellectual, professional and general skills.
4. Final exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	3, 5, 6, 10, 12
2	Quiz	6, 12
3	Midterm exam	8
4	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	20
Final Term Examination	64
Oral Examination	00
Semester Work	16
Other Types of Assessment	00
Total	100



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8- List of References

a- Course Notes prepared by instructor

b- Recommended Books

- ER.C.L. VERMA, "strength of material" Handbook.
- SHIGLEY's "mechanical engineering design" eighth edition.
- D.N.GHOSH "Engineering mechanics & strength of materials "Handbook 1981.

Course Coordinator: Prof. Dr. Mervat Tawfik Abdul Rahman & Dr. Samah Samir

Head of Department: Prof. Dr. Osama Ezzat Abdelatif



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FACULTY OF ENGINEERING AT SHOUBRA

Model No.11A

Course Specifications: Structure Mechanics

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Matrix of Knowledge and Skills of the Course

no.	Topics	Week no.	Knowledge and Understanding	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Introduction: normal force, shear force, bending moment and twisting moment in structures	1	a.1, a.2, a.3			
2	Stresses in curved beams due to normal forces and bending moments	2		b.1	c.1	
3	Stresses in curved beams due to normal forces and bending moments	3		b.2	c.2	
4	Stress in structures under combined loading	4	a.2	b.1	c.1, c.2	
5	Stress in structures under combined loading	5	a.2	b.2	c.1, c.2	
6	Effect of variable, alternated, repeated and impact loads on mechanical structures	6	a.2	b.2	c.1	d.1
7	Effect of variable, alternated, repeated and impact loads on mechanical structures	7		b.2	c.1	d.1
8	Midterm Exam	8				
9	Thermal stresses applications	9	a.1	b.2	c.2	d.1
10	Thermal stresses applications	10	a.2	b.2	c.1	
11	Stresses thin and thick walled vessels	11		b.2	c.2	
12	Stresses thin and thick walled vessels	12	a.2	b.1	c.2	d.1
13	Deflection in beams under different types of loads	13	a.2	b.2	c.1	d.1
14	Deflection in beams under different types of loads	14	a.1, a.2, a.3			
15	Midterm Exam	15				

Course Coordinator: Prof. Dr. Mervat Tawfik Abdul Rahman & Dr. Samah Samir

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Matrix of Course Aims and ILO's

Course Title: Structural Mechanics

Course Code: MDP 213

Teaching Hours: Lecture: 3 Tutorial: 2 Total: 5

Major or minor element of program: Major

Program on which the course is given: B.Sc. Mechanical Production Engineering

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Academic year / level: 2014-2015 Second Year / First Semester

Date of specifications approval: 16/3/2010

Course aims	a	b	c	d
1. Design of several components subjected to combined loading and thermal stresses such as pressure vessels.	a1 a3	b1		d1
2. Design of beams subjected to different types of loads.	a1 a2	b2	c1 c2	
3. Design of mechanical structures subjected to variable, alternated, repeated and impact loads.	a2 a4		c2	d1

Course Coordinator: Prof. Dr. Mervat Tawfik Abdul Rahman & Dr. Samah Samir

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