Model No.12
Course Specifications (2014-2015)
Design of Machine Elements (1)

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: MDP212 **Course Title:** Design of Machine Elements (1)
Specialization: Mechanical Production Engineering **Course Type:** Compulsory **Study Year:** Second Year
Teaching Hours: Lecture: 2 Tutorial: 2 Practical: 0 Total: 4

2- Course Aims

1. Provide the students with the basic concepts of machine design and design methodology.
2. Help students to perform complete stress analysis for a machine component.
3. Design of several simple mechanical parts.

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:

a1) Characteristics of engineering materials for mechanical design (A1).
a2) Principles of design including elements design, Stress concentrations & Factor of safety (A1).
a3) The design of keys and journal bearings (A4)
a4) The Concepts, principles and theories of mechanical design. (A5).
a5) Steps to approach problem solution (A5).
a6) The basic theories and principles of mechanical engineering design (A8).

b. Intellectual Skills: At the end of this course, the students will be able to:

b1) Assess a creative and innovative way in solving mechanical design problems (B5).
b2) Analyze and interpret data to obtain primary data (B8).
b3) Interpret numerical data and apply analytical methods for engineering design purposes(B12)

c. Practical and Professional Skills: On completing this course, the students are expected to be able to:

c1) Apply knowledge of materials science, stress analysis and production technology to solve engineering problems (C1).
c2) Design of machine elements to carry out specialized engineering designs (C4).

d. General and Transferable Skills: At the end of this course, the students will be able to:

d.1) Refer to important literatures (D2)

4- Course Contents

Week no.	Topics
1	Introduction to Machine Design, meaning of design and design steps.
2	Stress analysis: static & stresses normal & tangential, and combined stresses
3	Mohers circle, stress and strain relationship.
4	Dynamic stresses. Stresses in curved beams & Elastic instability in long beams.
5	Stress concentrations & Factor of safety.
6	Design of power screws and nuts.
7	Design of power screws and nuts.
9	Design of shafts,
10	Keys
11	journal bearings.
12	Design of fasteners: Fitted bolts subjected to central and eccentric loads.
13	Through bolts subjected to central and eccentric loads.
14	Pre-stressed bolts.

5- Teaching and Learning Methods

5.1 Lectures
5.2 Class activity
5.3 Assignments/homework
5.4 Case study
5.5 Tutorial problem session

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment

a- Student Assessment Methods

1. Three Assignments to assess knowledge and intellectual skills.
2. One Quiz to assess knowledge, intellectual and professional skills.
3. Midterm exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	4, 6, 11
2	Quiz	5
3	Midterm exam	8
4	Oral exam	-
5	Final exam	-

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	50
Final Term Examination	-
Semester Work	50
Other Types of Assessment	
	100

8- List of References

a- Course Notes

1- Prepared by instructor.

b- Recommended Books

1- Joseph Edward Shigley, Mechanical Engineering Design, McGraw-Hill; 8th, in SI units edition, 2006.
2- Black and Adams, Machine Design, McGraw-Hill, 1968.
3- GalalShawki, Design Data Tables.

Course Coordinator: Prof. Dr. Fareda Sayed Ahmed & Dr. Samah Samir

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Model No.11A
Course Specifications: Design of Machine Elements (1)

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 to Machine Design, meaning of design and design steps.	1	a.1, a.2	b.1		
2	Stress analysis: static & stresses normal & tangential, and combined stresses	2	a.3, a.6	b.2	c.1	
3	Mohers circle, stress and strain relationship.	3	a.4, a.5	b.2		d.1
4	Dynamic stresses. Stresses in curved beams & Elastic instability in long beams.	4	a.1, a.5	b.3	c.2	
5	Stress concentrations & Factor of safety.	5	a.2, 1.6	b.1		
6	Design of power screws and nuts.	6	a.3, a.4, a.6	b.1	c.1	
7	Design of power screws and nuts.	7	a.5, a.6	b.1	c.1, c.2	d.1
8	Design of shafts,	8	a.1, a.2, a.6	b.2	c.1, c.2	d.1
9	Keys	9	a.6	b.1	c.2	
10	journal bearings.	10	a.2	b.3	c.1, c.2	d.1
11	Design of fasteners: Fitted bolts subjected to central and eccentric loads.	11	a.3		c.1	d.1
12	Through bolts subjected to central and eccentric loads.	12	a.1, a.2	b.1		
13	Introduction to Machine Design, meaning of design and design steps.	13	a.1	b.3	c.1, c.2	
14	Stress analysis: static & stresses normal & tangential, and combined stresses	14	a.6	b.2	c.1	
15	Final Exam	15				

Course Coordinator: Prof. Dr. Fareda Sayed Ahmed & Dr. Samah Samir

Head of Department: Prof. Dr. Osama Abdelatif

Matrix of Course Aims and ILO's

Course Title: Design of Machine Elements (1)

Course Code: MDP212

Teaching Hours: Lecture: 2 Tutorial: 4 Total: 6

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
Provide the students with the basic concepts of machine design and design methodology.	a1 a3	b1	c1	d1
Help students to perform complete stress analysis for a machine component.	a2 a4 a6	b2 b3	c2	d1
Design of several simple mechanical parts.	a2 a5	b3	c1 c2	d1

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Head of Department: Prof. Dr. Osama Ezzat Abdelatif