Model No.12
Course Specifications: Theory of Machines

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: MDP234 **Course Title:** Theory of Machines
Specialization: Mechanical Power Engineering **Course Type:** Compulsory **Study Year:** Second Year
Teaching Hours: Lecture: 4 Tutorial: 2 Practical: 0 Total: 6

2- Course Aims

For students undertaking this course, the aims are to Provide the students with the knowledge and skills for understanding and analyzing the relative motion between the various parts of a machine.

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 concepts and theories of mathematics and sciences, appropriate to Theory of Mechanics as, the types of mechanisms, cams, gears and governors. (A.1)

a.2) The current engineering technologies as related to disciplines. (A.8)

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

b.1) Select appropriate solutions for engineering problems based on analytical thinking. (B.2)

b.2) Think in a creative and innovative way in problem solving and design. (B.3)

b.3) Evaluate the performance of governors and cams. (B.4)

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

c.1) Solve the problem of gear train, balance of rotating masses, cams and governors. (C.2)

c.2) Sketch the cam profile with knife-edge, flat or roller follower. (C.8)

c.3) Sketch the velocity and acceleration diagram of the different mechanisms. (C.9)

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

d.1) Communicate effectively. (D.3)

d.2) Lead and motivate individuals. (D.5)

d.3) Effectively manage tasks, time, and resources. (D.6)

4- Course Contents

Week no.	Topics
1	Introduction to theory of machines
2	Degree of freedom
3	Types of mechanisms
4	Absolute velocity and relative velocity
5	Constructing velocity and acceleration diagrams
6	Instantaneous center of velocity
7	Cams
9	static force analysis
10	Dynamic force analysis
11	Gear trains
12	Balancing of rotating masses-1
13	Balancing of rotating masses-2
14	Governors

5- Teaching and Learning Methods

5.1 Lectures
5.2 Class activity
5.3 Assignments/homework

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment

a- Student Assessment Methods

1. Eight Assignments to assess knowledge and intellectual skills.
2. Four 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	2, 3, 5, 6, 7, 9, 11, 13
2	Quiz	3 , 7, 10, 12
3	Midterm exam	8
4	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	20
Final Term Examination	67
Oral Examination	00
Practical Examination	00
Semester Work	13
Other Types of Assessment	00
Total	**100**

8- List of References

a- Course Notes prepared by instructor

b- Recommended Books

- Kurmi." Theory of machines" 1980.
- Thomas B. "The theory of machines" 1969.
- Shariff A. "Theory of machines" 1977.

Course Coordinator: Prof. Dr. Abdelkader Abdelkerim & Assoc. Prof. Dr. Ahmad Jaffar

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Model No.11A
Course Specifications: Theory of Machines

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 theory of machines	1	a1	b2		
2	Degree of freedom	2	a1	b1, b2	c3	d1
3	Types of mechanisms	3	1a	b2	c3	
4	Absolute velocity and relative velocity	4	a1	b2	c3	d1, d2
5	Constructing velocity and acceleration diagrams	5	a1, a2	b1, b2	c1, c3	d2, d3
6	Instantaneous center of velocity	6	a1	b2, b3	c2	d2
7	Cams	7	a1	b2, b3	c1, c2	
8	Midterm Exam	8				
9	Static force analysis	9	a2	b1	c1	d1
10	Dynamic force analysis	10	a1, a2	b1	c1	
11	Gear trains	11	a1, a2	b1	c1	
12	Balancing of rotating masses-1	12	a2		c1	d3
13	Balancing of rotating masses-2	13	a2		c1	d1
14	Governors	14	a1	b2		
15	Final Exam	15				

Course Coordinator: Prof. Dr. Abdelkader Abdelkerim & Assoc. Prof. Dr. Ahmad Jaffar

Head of Department: Prof. Dr. Osama Abdelatif

Matrix of Course Content and ILO's

Course Title: Theory of Machines

Course Code: MDP234

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

Major or minor element of program: Major

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

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

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

Date of specifications approval: 16/3/2010

Course contents	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3
Introduction to theory of machines	✓		✓								
Degree of freedom	✓		✓	✓		✓			✓		
Types of mechanisms	✓		✓			✓					
Absolute velocity and relative velocity	✓		✓			✓			✓	✓	
Constructing velocity and acceleration diagrams	✓	✓	✓	✓		✓	✓			✓	✓
Instantaneous center of velocity	✓		✓		✓			✓		✓	
Cams	✓		✓		✓		✓	✓			
Static force analysis		✓		✓			✓		✓		
Dynamic force analysis	✓	✓		✓			✓				
Gear trains	✓	✓		✓			✓				
Balancing of rotating masses-1		✓					✓				✓
Balancing of rotating masses-2		✓					✓		✓		
Governors	✓	✓			✓						

Course Coordinator: Prof. Dr. Abdelkader Abdelkerim & Assoc. Prof. Dr. Ahmad Jaffar

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Course Curriculum Map

Course Title: Theory of Machines

Course Code: MDP234

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

Major or minor element of program: Major

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

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

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

Date of specifications approval: 16/3/2010

Course contents	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3	Teaching Methods	Assessment Methods
Introduction to theory of machines	✓		✓									• Lecture • Tutorial	Tutorial assignment, quizzes, midterm exam, and written final exam
Degree of freedom	✓		✓	✓		✓			✓			• Lecture • Tutorial	
Types of mechanisms	✓		✓			✓						• Lecture • Tutorial	
Absolute velocity and relative velocity	✓		✓			✓			✓	✓		• Lecture • Tutorial	
Constructing velocity and acceleration diagrams	✓	✓	✓	✓		✓	✓			✓	✓	• Lecture • Tutorial	
Instantaneous center of velocity	✓		✓		✓			✓		✓		• Lecture • Tutorial	
Cams	✓		✓		✓		✓	✓				• Lecture • Tutorial	
Static force analysis		✓		✓			✓		✓			• Lecture • Tutorial	
Dynamic force analysis	✓	✓		✓			✓					• Lecture • Tutorial	
Gear trains	✓	✓		✓			✓					• Lecture • Tutorial	
Balancing of rotating masses-1		✓					✓				✓	• Lecture • Tutorial	
Balancing of rotating masses-2		✓					✓		✓			• Lecture • Tutorial	
Governors	✓	✓			✓							• Lecture • Tutorial	

Course Coordinator: Prof. Dr. Abdelkader Abdelkerim & Assoc. Prof. Dr. Ahmad Jaffar

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Matrix of Course Aims and ILO's

Course Title: Theory of Machines

Course Code: MDP234

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

Major or minor element of program: Major

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

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

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

Date of specifications approval: 16/3/2010

Course aims	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3
Provide the students with the knowledge and skills for understanding and analyzing the relative motion between the various parts of a machine.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Course Coordinator: Prof. Dr. Abdelkader Abdelkerim & Assoc. Prof. Dr. Ahmad Jaffar

Head of Department: Prof. Dr. Osama Ezzat Abdelatif