



BENHA UNIVERSITY



FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.12

Course Specifications: Hydraulic 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: MPE391

Course Title: Hydraulic Machines

Specialization: Mechanical Production Engineering

Course Type: Compulsory

Study Year: Third Year

Teaching Hours: Lecture: 2

Tutorial: 2

Practical: 0

Total: 4

2- Course Aim

For students undertaking this course, the aims are to:

1. Understand the applications of fluid the equipment and machines.
2. Have knowledge of the fundamentals and main components of hydraulic circuits including, pumps, valves and actuators.
3. know how to control the power required from the pumps and hydraulic motors

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 components of hydraulic circuits and symbols. (A10).
 - a.2) The different types of hydraulic pumps and motors. (A4).
 - a.3) The function of each hydraulic valve in the hydraulic circuit. (A4).
 - a.4) The physical properties of hydraulic oil. (A1).
 - a.5) The different methods of hydraulic circuit connections. (A4).
 - a.6) The hydraulic circuits maintenance. (A4).
- b. Intellectual Skills:** At the end of this course, the students will be able to:
 - b.1) Compare between the different hydraulic valves and their connection method to the hydraulic circuit. (B11)
 - b.2) Analyze the hydraulic circuit to know its function. (B12).
 - b.3) Evaluate the pump and hydraulic motor performance. (B6).
 - b.4) Compare between the hydrostatic and hydrodynamic pumps. (B12).
- c. Practical and Professional Skills:** On completing this course, the students are expected to be able to:
 - c.1) Apply modifications on the hydraulic circuit to improve the performance. (C2).
 - c.2) Use the simple hydraulic circuit and apply it actually by simple components. (C12).
 - c.3) Draw the characteristic curves for pumps performance. (C9)



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

- d.1) Cooperate successfully within a team (D.1).
- d.2) Work in stressful surroundings and within restrictions. (D.2).
- d.3) Search for information, refer to hydraulic machines literatures. (D.6)

4- Course Contents

Week no.	Topics
1	Introduction to fluid power
2	Hydraulic and Pneumatic symbols
3	positive displacement pumps types
4	positive displacement pumps types
5	pumps performance and control
6	directional control valves
7	pressure control valves
8	flow control valves
9	Hydrostatic transmission systems
10	open and closed loops
11	Types of hydraulic circuits for different machines
12	Application of fluid power drives
13	Fluid power circuit

5- Teaching and Learning Methods

- 5.1- Lectures
- 5.2- Practical training / laboratory
- 5.3- Class activity
- 5.4- Case study
- 5.5- Assignments / homework

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment

a- Student Assessment Methods

1. Four 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. Oral exam to assess knowledge and intellectual skills.
- 5, Final exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	3,6,9,11
2	Quiz	5,9
3	Midterm exam	8
4	Oral exam	14
5	Final exam	15



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c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	10
Final Term Examination	60
Oral Examination	10
Practical Examination	10
Semester Work	10
Other Types of Assessment	0
Total	100

8- List of References

a- Course Notes: 1- Course notes prepared by instructor.

b- Recommended Books

- 1."Power Hydraulic", Michael J. Pinches and John G. Ashby, First Edition, 1989 Prentice Hall International Ltd.
2. "Practical Hydraulic Systems", Ravi Doddannavar and Andries Barnard, 2000.

c- Web Sites

1. www.fluidpower.net

Course Coordinator: Prof. Dr. Mohammed Moawd & Prof. Dr. Ahmed Reda El-Shamy

Head of Department: Prof. Dr. Osama Ezzat Abdelatif



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COURSE SPECIFICATIONS (2014-2015)

Model No.11A

Course Specifications: Hydraulic 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 Skills	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Introduction to fluid power	1	a1,a4			d3
2	Hydraulic and Pneumatic symbols	2	a1,a4			
3	positive displacement pumps types	3	a2	b3,b4		d2
4	positive displacement pumps types	4	a2	b3,b4		d2
5	pumps performance and control	5	a2	b3,b4	c3	d1
6	directional control valves	6	a1,a3	b1,b2	c2	d1
7	pressure control valves	7	a1,a3	b1,b2	c2	d1
8	flow control valves	9	a1,a3	b1,b2	c2	d1
9	Hydrostatic transmission systems	10	a1,a3.a5	b2	c1,c2	d1, d2
10	open and closed loops	11	a1,a3.a5	b2	c1,c2	d1, d2
11	Types of hydraulic circuits for different machines	12	a1,a3.a5	b2	c1,c2	d1
12	Application of fluid power drives	13	a1,a3	b2	c1,c2	
13	Fluid power circuit	14	a1,a3.a5	b2	c1,c2	d1,d3

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Matrix of Course Aims and ILO's

Course Title: Hydraulic Machines

Course Code: MPE391

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

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 Third Year / First Semester

Date of specifications approval: 2014

Course aims	Basic Knowledge	Intellectual skills	Professional skills	General skills
Understand the applications of fluid the equipment and machines.	a1, a3	b1, b3	c1, c3	d1, d3
Have knowledge of the fundamentals and main components of hydraulic circuits including, pumps, valves and actuators.	a1, a2	b2, b3	c1, c2, c3	d2, d3
know how to control the power required from the pumps and hydraulic motors.	a2	b1, b2	c1	d1, d2, d3

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