COURSE PLAN

FIRST: AUTOMOTIVE ENGINEERING

College	
College	: Faculty of Engineering Technology
Department	: Mechanical Engineering

Course	
Course Title	: Basics of Fluids and Hydraulic Machines
Course Code	: 020201243
Credit Hours	: 2 (2 Theoretical, 0 Practical)
Prerequisite	: 020000161

Instructor	
Name	Eng. Mohammad Noor Ibrahim Al Shraifeen
Office No.	:
Tel (Ext)	:
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Office Hours	

Class Times

Building	Day	Start Time	End Time	Room No.
00	00	00	00	00

Text Book	
Title	: • Textbook of Hydraulics, Fluid Mechanics and Hydraulic Machines by R.S. Khurmi, Publisher: S Chand, New Delhi (May 1987), ISBN: 8121901626. • Giles R V et al, *"Schaum's Outline of Theory and Problems of Fluid Mechanics and Hydraulics"*, 3rd Edition, McGraw-Hill, 1994.

References

- E John Finnemore and Joseph B Franzini, Fluid Mechanics with Engineering Applications,10th Edition, Printed in the United States of America 1 2 3 4 5 XX 12 11 10 09, 2010

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

This course specifies a theoretical knowledge of fluid properties, fluid static's, fluid motion, continuity equation, momentum principle, energy principle, fluid flow in pipes, pipe friction, introduction to pumps, types, selection and application of pumps.

COURSE OBJECTIVES

The objective of this course is to enable the student to do the following:
• Explain the principles of fluid properties, fluid statics and motion.
• Explain the principles of continuity equation, energy principle and fluid flow in pipes.
• Explain the characteristics and performance of pumps and compressors

COURSE LEARNING OUTCOMES

By the end of the course, the students will be able to:

CLO1. Explain the fluid's physical properties
CLO2. Explain the basics of static fluids
CLO3. Explain the pressure measurements
CLO4. Explain the metacenter
CLO5. Explain the basics of types of flow
CLO6. Explain the basics of energy
CLO7. Explain the basics of fluid motion equations
CLO8. Explain the flow measurement
CLO9. Explain the Reynolds number
CLO10. Explain the basics of power and efficiency calculation
CLO11. Explain the pumps
CLO12. Explain the air compressors

COURSE SYLLABUS

Week	Topic	Topic Details	Reference (Chapter)	Proposed Assignments
1	**Introduction**	• Fluid physical properties • Universal hand tools	**CLO1**	
2	**Fluid's physical properties**	• Density, specific weight • Viscosity • Surface tension • Compressibility	**CLO1**	
3	**Static fluids**	• In static fluid • Pressure head • Gage and absolute pressure • Fluid pressure • Pascal's law • Pressure variation	**CLO2**	
4	**Pressure measurements**	• Pressure measurements • Barometer • Manometers • Piezometer • Bourdon tube • Engineering applications of hydrostatics fluids	**CLO3**	
5	**Metacenter**	• Metacenter and metacentric height • Permanent Magnet Starter Motor • Condition of Equilibrium • Oscillation floating body	**CLO4**	

6	**Types of flow**	• Types of flow:
		  - Laminar flow
		  - Turbulent flow
		  - Uniform flow
		  - Steady flow
		  - Unsteady flow
		  - Incompressible flow
		  - Compressible flow
			CLO5	

7	**Energy**	• Fluid energy: - Internal energy - Kinetic energy - Potential energy - Pressure energy	**CLO6**	
8	**Mid Exam**			
9	**Fluid motion equations -1**	• Fluid motion equations: - Continuity equation - motion for steady flow	**CLO7**	
10	**Fluid motion equations -2**	• Bernoulli equation	**CLO7**	
11	**Flow measurement**	• Flow through Venturi Orifice • Flow over notches • Piton tube • Rota Meter • Discharge coefficients	**CLO8**	
12	**Reynolds number**	• Types of flow in pipes • Reynolds number • Boundary layer and flow in pipes • Loss head in pipes • Bach formula of head in pipes • Relation between friction coefficient and Reynolds	**CLO9**	
13	**Power and Efficiency Calculation**	• Friction loss in sudden contraction and expansion • Friction loss in fittings and valves • Velocity distributions in pipe flow • Positive displacement pumps • Characteristics Curves	**CLO10**	
14	**Pumps**	• Positive displacement pumps • Gear and screw pumps • Centrifugal pumps • Pumps performance and characteristics curves • Power and efficiency calculations • Reciprocating compressors	**CLO11**	
15	**Air Compressors**	• Types of Air compressors • Pump power and efficiency • Net positive section head • Centrifugal Compressors • Flow fluctuations	**CLO12**	
16	**FINAL EXAM**			

COURSE LEARNING RESOURCES

The effectiveness of teaching in this course depends on making students familiar with the basic of fluid properties, fluid static's, fluid motion, continuity equation, momentum principle, energy principle, fluid flow in pipes, pipe friction, introduction to pumps, types, selection and application of pumps

Teaching methods:

- Lectures and HomeWorks: using PowerPoint for, example, by the teacher to provide the students with the all information that they need, and to give them a home work as a research method or/and report

- Online research skills, watching related videos such as you tube, on topics related to course objectives and recent developments in the field of specific work

Learning skills and adaptability: Developed by transferring students and reconfiguring work teams to enable them to adapt to other individuals from time to time

ONLINE RESOURCES

https://enwikipediaorg/wiki/Fluid_mechanics

ASSESSMANT TOOLS

(Write assessment tools that will be used to test students ability to understand the course material and gain the skills and competencies stated in learning outcomes

ASSESSMENT TOOLS	%
Quizzes	10
Researches and Reports	
Participation	
Oral Exams	
Activities/attendance	
Presentation	10
Mid Exam	30
Final Exam	50
TOTAL MARKS	100

THIRD: COURSE RULES

ATTENDANCE RULES

Attendance and participation are extremely important, and the usual University rules will apply Attendance will be recorded for each class Absence of 10% will result in a first written warning Absence of 15% of the course will result in a second warning Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination Should a student encounter any special circumstances (ie medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records

GRADING SYSTEM
Example:

0 – 49 Fail
50 – 100 Pass

REMARKS

{The instructor can add any comments and directives such as the attendance policy and topics related to ethics}

COURSE COORDINATOR

Course Coordinator: Eng Mohammad Noor Ibrahim Al Shraifeen	**Department Head:**
Signature:	**Signature:**
Date:	**Date:**