Faculty of Engineering & Technology

Fluid Mechanics

Information :

Course Code : MPR 252	**Level :** Undergraduate	**Course Hours :** 4.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Anas Mohamed Abdelrahman Ali	
Assistant Lecturer	Moustafa Raafat Aziz Shousha	1

Area Of Study :

By the end of the course the students will be able to:
1) Demonstrate knowledge of incompressible and compressible fluid flows, fluid statics, kinematics of flows and essential basic hydrodynamics.
2) Define and solve problems in fluid dynamics in various engineering applications
3) Predict necessary fluid parameters of full scale projects by performing simple model experiments.
4) Share ideas and work in a team in an efficient and effective manner under controlled supervision or independently.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Identify basic applied and engineering science.
2 -	Identify principles in the of design of mechanical components, different materials, and manufacturing technologies in the field of mechanical power engineering and some other engineering disciplines.
3 -	Identify principles in the field of design of fluid flow, thermodynamics, gas dynamics, turbo- machinery, heat transfer engineering and fundamentals of thermal and fluid processes
4 -	Develop conceptual and detailed design of construction projects and fluid power systems.

b.Intellectual Skills: :

1 -	Define the mechanical power engineering problems and evaluate designs, processes, and performance and propose improvements.
2 -	Derive different solution alternatives for the engineering problems, analyze, interpret data and design experiments to obtain new data, and evaluate the power losses in the fluid transmission lines and networks
3 -	Analyze the performance of the basic types of internal combustion engines, hydraulic machines, fluid power systems, subsystems and various control valves and actuators. Analyze the solution alternatives and choose the optimum one.
4 -	Creative thinking.

c.Professional and Practical Skills: :

1 -	Use laboratory, workshop equipment and field devices competently and safely.

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2 -	Analyze the record data in the laboratory.	
3 -	Prepare engineering drawings, computer graphics, and write specialized technical reports.	
4 -	Write computer programs pertaining to mechanical power and energy engineering to describe the basic thermal and fluid processes mathematically, and use the computer software for their simulation and analysis.	

d.General and Transferable Skills: :

1 -	Collaborate effectively within multidisciplinary team.
2 -	Share ideas, communicate effectively and work in stressful environment and within constraints.
3 -	Lead and motivate individuals and work with others according to the rules of the professional Ethics.
4 -	Use digital libraries and/or Learning systems and demonstrate efficient IT capabilities.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction and Basic Concepts History of Fluid Mechanics, No-slip condition, Classification of fluid flows.	4	4	0
Fluid Properties, Vapor pressure and Cavitation, Compressibility and speed of sound, Viscosity, Surface tension and capillary effect.	12	6	6
Pressure and Fluid Statics Hydrostatic Forces on Submerged Plane Surfaces, Hydrostatic Forces on Submerged Curved Surfaces, Buoyancy and Stability.	12	6	6
Fluid Kinematics Lagrangian and Eulerian Descriptions, Flow Patterns and Flow Visualization, Vorticity and Rotationality.	12	6	6
Mass, Bernoulli, and Energy Equations Mechanical Energy and Efficiency, The Bernoulli Equation.	7	4	3
Mass, Bernoulli, and Energy Equations General Energy Equation, Energy Analysis of Steady Flows.	7	4	3

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Written Exam	40.00	16	
First Assignment	5.00	4	
Mid Term Exam	25.00	6	
Oral Exam	5.00	15	
Second Midterm	25.00	11	

Recommended books :

Douglas, Gassiorik and Swaffield , "Fluid Mechanic,"   6th Edition, Pearson, New York, USA
Streeter, V.L., Wylie, E, B., and Bedford, K. W., " Fluid Mechanics, " 9th Edition , McGraw Hill, New York, USA