

Faculty of Engineering & Technology
Thermodynamics and Fluid Mechanics

Information :

Course Code : MPR 243 **Level :** Undergraduate **Course Hours :** 3.00- Hours

Department : Department of Electrical Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Mohamed Mokhtar Saad Fahim Hefny	2
Assistant Lecturer	Moustafa Raafat Aziz Shousha	3

Area Of Study :

The overall aims of this course are:

• Enrich students knowledge about the theory of fluid mechanics and the comparison between fluids and other substances.

• Enrich students knowledge about the theory of thermodynamics and heat transfer systems on different thermodynamics systems.

• Train students to measure different fluid properties and analyze different fluid systems in laboratory.

Description :

Thermodynamics: macroscopic approach to energy analysis, energy transfer as work and heat, and the first law of thermodynamics, Properties and states of simple substances, Control-mass and control-volume analysis, The essence of entropy and the second law of thermodynamics, Fluid dynamic: fluid properties, similarity of fluid flows, conservation equations, conservation of mass-momentum, Newton second law, energy conservation of mechanical energy (Bernoulli Equation), Application: flow through pipes: laminar and turbulent flow, Pipes connected in series or in parallel, branching of pipes, Measuring devices, Mathematical models.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Relate the physics background to fluids.
2 -	Define new terms; System, Thermodynamics, Fluid Mechanics.
3 -	State the difference between different fluid flow types.
4 -	Illustrate between series and parallel pipe network design.
5 -	Recognize the difference between fluids and other substances.

b. Intellectual Skills: :

1 -	Think in a creative way to solve different engineering problems related to Thermodynamics and Fluid Mechanics.
2 -	Analyze different system types found in nature.
3 -	Deduce conservation equations of mass and energy

c. Professional and Practical Skills :

1 -	Calculate experimentally the performance of fluid and thermal devices.
2 -	Practice basic experiments on Thermodynamics and Fluid Mechanics.
3 -	Follow up safety requirements at experimental work and observe the appropriate steps to manage risks.
4 -	Write a technical report on a project or an assignment.

d. General and Transferable Skills :

1 -	Collaborate effectively within multidisciplinary team.
2 -	Lead and motivate individuals.
3 -	Effectively manage tasks, time, and resources.
4 -	Refer to relevant literatures

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to fluid mechanics	10	6	4
Properties of fluids	10	6	4
Fluid statics	5	3	2
Fluid kinematics			
Fluid dynamics			
Internal flow			
Introduction to thermodynamics			
Heat transfer methods			
First law of thermodynamics			
Second law of thermodynamics			

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem Solving
Experiential Learning
Cooperative Learning
Research activity

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		to assess the skills of problem solving, understanding of related topics
o Assignments	10.00		to assess the skills of problem solving, understanding of related topics
o In class quizzes and attendance	10.00		to assess the skills of problem solving, understanding of related topics

o Midterm exams	30.00		to assess the skills of problem solving, understanding of related topics
o Participation (Lab reports, Research activity and Oral Exam	10.00		to assess the skills of problem solving, understanding of related topics

Course Notes :

No course notes are required

Recommended books :

None