

**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	Anas Mohamed Abdelrahman Ali	2
Assistant Lecturer	Moustafa Raafat Aziz Shousha	3

**Area Of Study :**

- 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, The first law of thermodynamics, Properties and states of pure substances, Control-mass and control-volume analysis, The essence of entropy and the second law of thermodynamics, Fluid Mechanics: Fluid properties, Similarity of fluid flows, Fluid statics; Pressure, Fluid dynamics; Conservation equations of mass and mechanical energies (Bernoulli equation), Energy and momentum conservation equations and applications, Flow through pipes; Laminar and turbulent flows, Pipes connected in series and parallel, branching of pipes, Measuring devices.

**Course outcomes :**

**a.Knowledge and Understanding: :**

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

**b.Intellectual Skills: :**

1 -	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	4	3	1
Properties of fluids	6	3	3
Fluid statics	6	3	3
Fluid kinematics	4	3	1
Fluid dynamics	14	9	5
Internal flow	6	3	3
Momentum equation	5	3	2
Introduction to thermodynamics	6	3	3
Heat transfer methods	9	6	3
First law of thermodynamics	9	6	3
Second law of thermodynamics	6	3	3

**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
Assignments	5.00		
Final Exam	40.00		
Lab Exper.	10.00		

Mid- Exam I	15.00		to assess the skills of problem solving, understanding of related topics
Mid- Exam II	15.00		
Oral Exam	10.00		
Quizzes	5.00		

**Course Notes :**

No course notes are required

**Recommended books :**

None