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 Ahmed Mahmoud Karali	
TEACHING ASSISTANT	Zakaria Mostafa Abdo Salim Marouf	

Area Of Study :

1. Understand fundamentals of thermodynamics, fluid statics and dynamics
2. Apply the fundamental principles of Fluid Mechanics for the solution of practical Engineering problems
3. Applying the fundamental principles of thermodynamics
4. Explore the fundamental principles of thermo dynamics and fluid mechanics through experimentation
5. Develop skills for analyzing experimental data and working in teams
6. Share ideas and work in a team.
7. The student shall attain the above mentioned objectives efficiently under controlled guidance and supervision while gaining the experience through application and analysis of realistic power system data.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define the fluid properties and thermodynamics
2 -	Define the first and second law of thermodynamics
3 -	Explain the fundamentals of fluid flow and Euler’s equation
4 -	Draw the Total Energy Line and Hydraulic Gradient Line of flow
5 -	Define the force exerted by moving fluids that helps in analysis and design many hydraulic devices.
6 -	Explain the concept of pipe flow that helps in the design of pipe networks.
b.Intellectual Skills: :	
1 -	Ability to define and solve problems
2 -	Ability to analyze experimental data.
c.Professional and Practical Skills: :	
1 -	Using of hydraulic laboratory devices
2 -	Writing technical reports

d.General and Transferable Skills: :	
1 -	Ability to work in a team.
2 -	Ability to share ideas and communicate with others
3 -	Ability to deal with others according to the rules of the professional Ethics

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Thermodynamics: macroscopic approach to energy analysis, energy transfer as work and heat, and the first law of thermodynamics	10	6	4
Second law of thermodynamics	10	6	4
Fluid properties, similarity of fluid flows	5	3	2
Conservation equations, conservation of mass-momentum, Newton second law	10	6	4
Energy conservation of mechanical energy (Bernoulli Equation)	12	6	6
Flow through pipes: laminar and turbulent flow, Pipes connected in series or in parallel, branching of pipes,	13	9	4
Measuring devices	5	3	2
Mathematical models	5	.3	2

Teaching And Learning Methodologies :

Lectures
Tutorials
Internet search
Local visits

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment 1	2.00	2	to assess the skills of problem solving, understanding of related topics
Assignment 2	2.00	5	to assess the skills of problem solving, understanding of related topics
Assignment 3	2.00	8	to assess the skills of problem solving, understanding of related topics
Assignment 4	2.00	9	to assess the skills of problem solving, understanding of related topics
Assignment 5	2.00	10	to assess the skills of problem solving, understanding of related topics
Assignment 6	2.00	13	to assess the skills of problem solving, understanding of related topics
Final exam	40.00	14	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied

Lab	10.00	6	to assess the ability of implementing a simple electric circuit that shows knowledge and understanding of different technical issues.
Mid term exam 1	15.00	7	to assess the skills of problem solving, understanding of related topics
Mid term exam 2	15.00	12	to assess the skills of problem solving, understanding of related topics

Books :

Book	Author	Publisher
Fundamentals of Thermal-Fluid Sciences	Yunus A.Cengel	McGraw Hill

Course Notes :

No course notes are required

Recommended books :

None