

Faculty of Engineering & Technology

Thermal Analysis

Information :

Course Code : PHY 401

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Department of Petroleum Engineering

Instructor Information :

Title	Name	Office hours
Associate Professor	Ahmed Mohamed Farag Abdelbary	6
Associate Professor	Ahmed Mohamed Farag Abdelbary	6
Assistant Lecturer	Moustafa Raafat Aziz Shousha	
Teaching Assistant	Mostafa Hesham Mahmoud Naim	

Area Of Study :

- Enrich students knowledge about Heat Transfer.
- Train students to perform experiments related to thermal analysis of different engineering systems.
- Prepare students for the practical filed in the work market of Mechanical Engineering.

Description :

Basics of thermal analysis and heat transfer concepts using the FEA environment of Solid Works Simulation. The importance of thermal analysis, transient and steady state analyses, Conduction, Convection, Radiation and the thermal simulation process. Analyzing thermal effects on models.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Demonstrate the use of studied Physics and Fluid Mechanics in our course.
2 -	Associate the difference between the words "Heat" and "Temperature".
3 -	Distinguishes between sensible heat and latent heat with applications.
4 -	Distinguishes between different heat transfer mechanisms; Conduction, Convection and Thermal Radiation.
5 -	Describe the importance of using Fins in heat transfer devices.
6 -	Distinguishes between steady and transient applications in heat transfer.
7 -	List the factors affecting the heat transfer convection coefficient.

b. Intellectual Skills: :

1 -	Solve different engineering problems related to Heat Transfer.
2 -	Analyse different system types found in nature.
3 -	Deduce Heat equations.

c. Professional and Practical Skills: :

1 -	Evaluate the performance of thermal devices.
2 -	Practice basic experiments on Heat Transfer.
3 -	Follow up safety requirements at experimental work and observe the appropriate steps to manage risks.
4 -	Analyse experimental results.
5 -	Write a technical report on a project or an assignment.

d. General and Transferable Skills: :

1 -	Write a technical report on a project or an assignment.
2 -	Refer to relevant literatures.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to Heat Transfer	9	6	3
Conduction Heat Transfer	10	6	4
Extended Surfaces (Fins)	12	6	6
Transient Heat Conduction	9	6	3
Introduction to Convection	6	3	3
External Forced Convection	9	6	3
Internal Forced Convection	11	6	5
Free Convection	9	6	3

Teaching And Learning Methodologies :

Lecture
Problem solving
Laboratory experiments
Research activity

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00		
Final Exam	40.00		
Lab. Exper.	5.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
Oral Exam	5.00		
Participation	5.00		
Quizzes	5.00		

Recommended books :

• Fundamentals and Applications, 2010.