FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Heat Transfer

Information :

Course Code :	MPR 451	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Professor	Mahmoud Abdelrasheed Nosier Touny	10
Lecturer	Zakaria Mostafa Abdo Salim Marouf	7
Lecturer	Ahmed Sayed Saber Sayed	1
Teaching Assistant	Mohamed Moharam Abdulaziz Elsayed Komiha	

Area Of Study :

By the end of the course the students will be able to:
1. Develop the student knowledge of heat transfer mechanisms.
2. Enhance the students mastering of the fundamentals of heat ex-changers including their different types and their operating performance.
3. Augment the student knowledge of heat transfer definitions and terminology, including heat flux, thermal conductivity and heat transfer coefficients.
4. Train the student to apply formula of conduction , equivalent resistance, convection and the overall heat transfer coefficient, as well as radiant heat transfer including: black bodies, grey bodies and emissivity.
5. Train the student to perform experiments related to heat, analyze the results and present them in a professional report.

Description :

Mechanisms of heat transfer, steady and transient conduction, forced and natural convection, radiation. Thermal resistance characteristics of materials, thermal networks and heat generation. Types and analysis of heat exchangers.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Explain principles of heat transfer by conduction and apply the knowledge to various bodies.
2 -	Explain principles of heat transfer by convection and apply the knowledge to various surfaces.
3 -	Explain principles of heat transfer by radiation and apply the knowledge to various geometries.
4 -	Explain applications and uses of heat exchangers.
b.Intellectual Skills: :	
1 -	Asses the theory of heat transfer by different methods.
2 -	Choose between different methods for heat transfer processes
3 -	Analyse heat transfer process in complex- mode situation.

c.Professional and Practical Skills: :	
1 -	Select an appropriate heat transfer method.
2 -	Calculate correctly the coefficient for each transfer process.
3 -	Perform experiments for heat transfer.
d.General and Transferable Skills: :	
1 -	Write reports in accordance with standard scientific guide lines.
2 -	Work efficiently within a team.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Steady heat in plane walls, cylinders and spheres. Contact thermal resistance.	10	4	6
Thermal resistance concept, networks.	6	4	2
Critical radius of insulation. Optimum thickness of insulation.	6	4	2
Heat transfer from fins. Transient heat conduction.	8	4	4
Forced convection on fat plate, cylinder, spheres, and inside pipes.	6	4	2
Basics of heat radiation.	4	2	2
Mechanisms of heat transfer	6	4	2
Types and analysis of heat exchangers.	8	4	4

Teaching And Learning Methodologies :

Interactive Lectures
Discussions
Problem-based Learning
Reports
Experiential Learning
Thermodynamics Lab

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00	15	
Laboratory reports	15.00		
Midterm Exam 1	15.00	6	
Midterm Exam 2	15.00	11	
Oral Exam	10.00		
Quizzes	5.00		

Recommended books :

Fundamentals of Thermal-Fluid Sciences, Yunus A. Cengel et. al., Third Edition, McGraw-Hill, 2003 New York, USA.