GAU, Faculty of Engineering

Course Unit Title	Heat transfer I
Course Unit Code	ME306
Type of Course Unit	Mechanical Engineering students
Level of Course Unit	3rd Year BSc
National Credits	3
Number of ECTS Credits Allocated	4 ECTS
Theoretical (hour/week)	3
Practice (hour/week)	
Laboratory (hour/week)	
Year of Study	3
Semester when the course unit is delivered	6
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisities and co-requisities	MT206
Recommended Optional Programme Components	An adequate background in calculus, physics. The completion of first courses in thermodynamics, fluid mechanics prior to taking heat transfer is desirable.

Objectives of the Course:

- To cover the basic principles of heat transfer.
- To present a wealth of real-world engineering applications to give students a feel for engineering practice.
- To develop an intuitive understanding of the subject matter by emphasizing the physics and physical arguments

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	Understand the principles of heat transfer and their applications	1
2	Learn how to calculate heat conduction in stationary systems	1,2,3
3	Learn how to calculate transient heat conduction	1,2,3
4	Learn how to apply numerical methods in heat conduction	1,2
5	Learn how to analyze heat transfer associated with laminar flow and turbulence flow of fluids in forced and natural convection	1,2
6	Learn how to analyze heat transfer associated with laminar flow and turbulence flow of natural convection	1,2

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	5
2	Ability to design and conduct experiments as well as to analyze and interpret data	2
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	1
4	Ability to apply systems thinking in problem solving and system design	3
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	4
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	4
7	Ability to express their ideas and findings, in written and oral form	1
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	4
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
10	Ability to get technical knowledge as to engineering, mathematics and natural science with a view to mechanical engineering, which allows students to perform scientifically demonstrated work	4
11	Ability to improve the overall efficiency of mechanical systems	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Contents

Week			Exams
1	Chapter 1	Basics of heat transfer (1 Week)	
2	Chapter 2	Heat conduction equation (1 Week)	
3	Chapter 3	Steady heat conduction (2 Weeks)	
4			
5	Chapter 4	Transient heat conduction (2 Weeks)	
6			
7	Chapter 5	Numerical methods in heat conduction (2 Weeks)	
8			Quiz
9			Midterm
10	Chapter 6	Fundamentals of convection (1 Week)	
11	Chapter 7	External forced convection (2 Weeks)	
12			
13	Chapter 8	Internal forced convection (1 Week)	
14			Quiz
15			Final

Recommended Sources

Textbook: Yunus A. Çengel, Heat Transfer, A Practical Approach, Mc Graw Hill, 2003

Supplementary Material (s): Fundamentals of Heat and Mass Transfer, F. P. Incropera, D. P. DeWitt

Assessment

Project/ Assignments	10%	
Midterm Exam (Written)	40%	
Quiz (Written)	10%	
Final Exam (Written)	40%	
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	3	45
Labs and Tutorials	-	-	-
Assignments	1	4	4
Project/Presentation/Report Writing	1	5	5
E-learning Activities	-	-	-
Quizzes	1	10	10
Midterm Examination	1	18	18
Final Examination	1	22	22
Self Study	14	2	28
Total Workload			132
Total Workload/30 (h)			4.4
ECTS Credit of the Course			4