Department of Mechanical and Mechatronics

College of Engineering

Salahaddin University – Hawler

Subject: Heat Transfer

Course Book –Third Year

Lecturer's name: Azhar Kareem Mohammed

Academic Year: 2019 -2020

Course Book

1. Course name	**Heat Transfer**
2. Lecturer in charge	**Azhar Kareem Mohammed**
3. Department/ College	**Mechanical and Mechatronics Eng. Dept. College of Engineering**
4. Contact	**e-mail :- azhar.mohammed@su.edu.krd Tel:**
5. Time (hr. / week)	**Theory: 4 hr and Practical: 2hr**
6. Office hours	**4 hours in days**

7. Course overview:

This course covers fundamentals of heat transfer and applications to practical Problems in energy conversion and conservation. Emphasis will be on developing a physical and analytical understanding of conductive, convective, and radiative heat transfer, as well as heat transfer with phase change. Students will develop an ability to apply governing principles and physical intuition to solve problems.

8. Course Objective:

After studying this course the student will be learned:

- *Ability to demonstrate general knowledge of heat transfer [conduction,convection, radiation].*
- *Ability to formulate and solve steady and unsteady problems in one or more dimensions in different geometries with or without generation.*
- *Ability to construct simple models that capture the salient features of heat transfer problems.*
- *Ability to design heat and mass transfer processes and equipment.*

9. Student's Obligation

- Regular attendance is required according to the university rules.
- The use of mobile phone during the class is prohibited.
- Only the students who are officially enrolled can attend the class, guests and children are not admitted.
- Daily participation and conducting assignments are required.

10. Forms of Teaching

Different forms of teaching will be used to reach the objectives of the course

1. Power point for main parts (head titles, definitions, objectives, figures, design, tables and charts …etc) each subject.
2. White board will be used for presenting mathematical equations and solving examples.

For the student to achieve a level of excellence in this subject, the following points should be given utmost consideration:

1. Class attendance on regular basis for the purpose of learning.
2. Active participation in class discussions
3. Reviewing the lecture notes and topics on weekly basis, noting the ambiguous points, if any, and requesting clarification during instructor office hours
4. Visiting the library on regular basis and checking the Internet for other approaches or simplifications of topics and ideas
5. Giving adequate and sufficient priority to preparing for weekly, monthly and final tests.

11. Assessment Scheme

Breakdown of overall assessment and examination

Examination(deg.)		
Semester 1	**30**	
	10	**(Quiz ,assignment and activities)**
Total	**40**	
Final examination	**60**	
Total	**100**	

12. Course Reading List and References:

Textbook:-

- J.P.Holman, ***Heat Transfer***, Tenth Edition, McGraw-Hill (2010).

References:-

- Yunus, A. C.., ***Heat and Mass Transfer***, McGraw-Hill.
- F.P.Incropera , **Fundamentals of Heat and Mass Transfer** ,Seven Edition.
- C.P.Kothandaraman **Fundamentals of Heat and Mass Transfer, Third edition.**

13. Course Reading List:

14 Weeks: From the 01 October 2019 to 24 December 2019

Weeks No.	Syllabus	Date
1	Modes of Heat Transfer (Conduction, Convection, Radiation),Thermal Conductivity	
2	Steady-State Conduction - One Dimension (The plane wall (One material, Composite wall), Radial systems (Cylindrical, Spherical))	
3	The Overall Heat Transfer Coefficient	
3	Critical Thickness of Insulation	
4	Heat Source Systems (Plane Wall with Heat Sources, Radial Systemswith Heat Sources [Solid Cylinder with Heat Source, Hollow Cylinder with Heat Source]	
5	Conduction-Convection Systems, Extended Surface – Fins (Fin Effectiveness, Fin	

	Performance, Corrected Length (Lc)), Fin Types, Fin Heat Exchanger Design	
5	Thermal Contact Resistance	
6	Unsteady State Conduction, Types of boundary conditions	
6	Lumped Heat Capacity System, Applicability of Lumped Heat Capacity System	
7	Transit Heat Flow in a Semi-infinite Solid (Constant wall temperature,Constant heat flux), Convection Boundary Conditions	
7	Heisler,s Charts	
8	Principles of Convection (Viscous Flow, Flow in Pipes)	
9	Laminar Boundary Layer on a Flat Plate	
9	The thermal Boundary Layer , Heat Transfer Coefficient, The Relation Between Fluid Friction and Heat Transfer	
10	Turbulent Boundary Layer Heat Transfer, Turbulent Heat Transfer Based on Fluid-Friction Analogy, Turbulent Boundary Layer Thickness	
11	Heat Transfer In Laminar Tube Flow, The Bulk Temperature	
11	Empirical and Practical Relations for Forced-Convection Heat Transfer	
12	Flow Across Cylinder and Spheres	
13	Flow Across Tube Banks	
14	Free Convection heat transfer	