كلية الهندسة

# ME324 Heat Transfer (Required Course)

**Code and Name:** ME324 Heat Transfer
**Credit Hours:** 3 (Lecture: 3, Tutorial: 1)

**Textbook:**
- Heat and Mass Transfer, Yunus A. Cengel, and Afshin J. Ghajar, 4th Edition, McGraw Hill Higher Education, Inc., 2011.

**Other References:**
- Fundamentals of Heat and Mass Transfer, Frank P. Incopera, David P. Dewitt, Theodore L. Bergman, and Adrienne S. Lavine, 6th Edition, John Wiley & Sons, Inc., 2007.

**Course Description:**
Heat transfer by conduction, convection and radiation. Numerical analysis of steady and unsteady conduction. Natural and forced convection. Heat exchangers. Heat transfer laboratory.

**Pre-requisites:** ME222 Fluid Mechanics.
**Co-requisites:** None

**Course Learning Outcomes:**
With relation to ABET Student Outcomes (SOs: 1-7)

1. Understand convection heat transfer which is due to the movement of fluid over surface (1)
2. Describe energy conservation methods and heat storage. (1, 2)
3. Describe how the properties of materials affects their processes (2)
4. Explain steady state and transient conduction heat transfer. (1)
5. Solve heat transfer problems using standard procedures and calculations (1)
6. Develop ability to use the engineering equation solver EES software to solve the engineering problems. (1)
7. Recognize and communicate confidently in oral, written, graphical and visual forms of solutions. (1, 2, 3, 6)
8. Demonstrate modes of heat transfer (1)
9. Compute enhancement of heat transfer by using fin. (1, 2)
10. Formulate, analyze and solve heat conduction problem (1, 2, 6)
11. Classify type of heat exchangers and carryout thermal analysis for both design and performance problems. (1, 2, 6)

**Topics to be covered:**
- Introduction and basic concepts in heat transfer
- Heat conduction equation
- Steady and transient heat conduction
- Numerical methods in heat conduction
- Fundamentals of convection
- External forced convection
- Internal forced convection
- Heat exchangers
- Fundamental of Radiation
- Review of course.

**Grading Policy:**
The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.