MAE 101C
Heat Transfer (4 units)

Class/Laboratory Schedule: four hours of lecture, eight hours of outside preparation.
12 hours/week total

Course Coordinator(s): Zahra Sadeghizadeh, Renkun Chen

Textbooks/Materials:

1. Basic Heat Transfer, A.F. Mills & C.F.M. Coimbra, (3rd Edition)

Catalog Description: Extension of fluid mechanics in MAE 101A–B to viscous, heat-conducting flows. Application of the energy conservation equation to heat transfer in ducts and external boundary layers. Heat conduction and radiation transfer. Heat transfer coefficients in forced and free convection. Design applications.

Prerequisites: MAE 101A or CENG 101A, MAE 101B, and MAE 105

Course Type: Required

Course Objectives and Performance Criteria

1. Understanding the Principles of Heat Transfer
    - Demonstrate an understanding of conductive, convective, and radiative heat transfer.
    - Recognize applications in which heat transfer plays a role.

2. Apply Analytical Methods to Heat Transfer Problems
    - Analyze steady and transient heat conduction.
    - Calculate heat transfer by forced and natural convection.
    - Determine heat transfer by radiation.

3. Develop Heat Exchanger Analysis and Design Skills
    - Analyze the performance of heat exchangers.
    - Design heat exchangers for various engineering applications.

Course Topics:

1. Introduction to concepts of heat transfer
2. Electrical analogies for conduction, convection and radiation
3. Steady heat conduction
4. Transient heat conduction
5. Fundamentals of convection
6. Natural convection
7. Internal forced convection
8. External forced convection
9. Heat exchangers
10. Radiation
11. Phase change in heat transfer

Last Updated: March 2025