ChE 321 - Heat Transfer

Code and Name: ChE 321, Heat Transfer
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Fundamentals of Mass and Heat Transfer, Incropera F. P., Dewitt D. P., Bergman T. L., Lavine A. S., 7th edition, John Wiley and Sons, 2014

Other References:
- Heat and Mass Transfer, Hans Dieter Baehr, Karl Stephan, 2nd edition, Springer-Verlag, Berlin, Heidelberg, 2006

Course Description:

Fundamentals of heat transfer. Theory of heat transfer and solution methods for heat transfer problems. Introduction to the concept of heat transfer; introduction to conduction; one-dimensional steady-state conduction; two-dimensional steady-state conduction; transient conduction; introduction to convection: external flow and internal flow; free convection; boiling and condensation; heat exchangers design; radiation heat transfer.

Pre-requisites: ChE 223 Fluid Mechanics, ChE 213 Introduction of Chemical Engineering II, GE 205 Electrical Engineering Principles

Co-requisites: None

Course Learning Outcomes:

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

1. Apply laws of conservation of mass & energy to thermal systems in solving heat transfer problems (1)
2. Outline the needed information, physical properties and equations to solve heat transfer problems (1)
3. Calculate the values of heat transfer coefficient, and heat rate, in different types of heat transfer problems (1)
4. Calculate the values of temperature profile, thermal resistance in different types of heat transfer problems (1)
5. Analyze heat exchanger design problems (2)

Topics to be covered:

- Introduction to heat transfer
- Heat Conduction Theory and Thermal Properties
- One dimension Steady State Conduction
- Two dimension Steady State Conduction
- Transient conduction
- External flow
- Internal Forced Convection
- Heat Exchangers

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.