**MECHANICAL ENGINEERING PROGRAM**

**ABET COURSE SYLLABUS**

**ME 314: Introduction to Heat Transfer (3 credits): Required**

**Course Description (2008-2010 Catalog):**

Engineering applications of heat transfer. Conduction, convection, and radiation. Introduction to heat exchangers.

**Prerequisite Course:** PHYS 181, 181L or PHYS 182, 182L, MATH 431

**Prerequisite by Topic:**

- Physics
- Differential equations

**Textbook:** Introduction to Heat Transfer, Fifth Edition by Incropera et al., J. Wiley.

**Other Reference Material:** N/A

**Course Coordinator:** Robert Boehm, Professor

**Course Objectives:**

(a) Introduction to conduction analysis with emphasis on numerical approaches
(b) Understand the way to calculate convective heat transfer using correlations
(c) Learn both the LMTD and effectiveness-NTU methods of heat exchanger analysis
(d) Introduce thermal radiation exchange ideas with an emphasis on the diffuse/gray model

**Relationship of Course to Mechanical Engineering Program Educational Outcomes:**

| Goal1: Provide mechanical engineering graduates with technical capabilities. | | | | | Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills. | | | | Goal 3: Instilling a sense of responsibility as a professional member of society. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.a** | **1.b** | **1.c** | **1.d** | **1.e** | **2.a** | **2.b** | **2.c** | **2.d** | **3.a** | **3.b** | **3.c** | **3.d** |
| **H** | **L** | **L** | **L** | **H** | | | | | | | | |

**( L)ow (M)edium (H)igh**

**Topics Covered:**

1. 1-D steady state, lumped capacitance transient, and numerical steady state and transient conduction analyses
2. Implications of the boundary concept and major emphasis on finding the heat transfer coefficient from empirical correlations
3. Analysis of heat exchangers using both the LMTD and effectiveness-NTU approaches
4. Introduction to thermal radiation property evaluations and heat transfer analysis using the diffuse-gray model.

**Laboratory Projects:** None

**Assessment of Student Progress toward Course Objectives**

Two or three (varies) midterm exams, quizzes (varies), homework and final exam.

**Class/Laboratory Schedule:** MW 10:00-11:15 AM (Spring Semester)

**Contribution of Course for meeting Professional Component:**

| | | |
|---|---|---|
| (a) | Mathematics and basic sciences: | 0 credits |
| (b) | Engineering Topics (Design/Science): | 3 credits |
| (c) | General Education: | 0 credits |
| (d) | Others: | 0 credits |

**Prepared By:** **Date:**

Robert Boehm October 12, 2009