ME 3720 Introduction to Fluid and Thermal Engineering (Elective for non-ME majors)

Catalog Description: ME 3720 Introduction to Fluid and Thermal Engineering (3-0-3)
Prerequisites: CHEM 1310 General Chemistry, PHYS 2211, and MATH 2403
Theory and application, but no exhaustive treatment of fluid mechanics, thermodynamics, and heat transfer in analysis and design of fluid and thermal energy systems.

Textbook: M. J. Moran, H. N. Shapiro, B. R. Munson, and D. P. DeWitt, *Introduction to Thermal Systems Engineering – Thermodynamics, Fluid Mechanics, and Heat Transfer*, (ISBN 0-471-20490-0), John Wiley & Sons, 2003.

Topics Covered:

1. Introduction and basic principles including mechanics and fluid statics
2. Thermodynamic concepts and principles
3. Thermodynamic and transport properties
4. Energy and entropy analysis
5. Control volume analysis
6. Continuum analysis
7. Internal and external flows and convection principles
8. Conduction, thermal resistance, and transient analysis
9. Forced convection and basics of thermal radiation

Course Outcomes:

Outcome 1: Achieve an understanding of the scientific principles of fluid mechanics, thermodynamics, and heat transfer.

1.1 Students will demonstrate an understanding of the principles of fluid mechanics, thermodynamics, and heat transfer.

Outcome 2: Apply basic fluid mechanic, thermodynamic, and heat transfer principles and techniques, including the use of empirical data and property tables, to the analysis of representative fluid and thermal energy components and systems.

2.1 Students will demonstrate an ability to apply the principles of fluid mechanics, thermodynamics, and heat transfer and to use empirical data and property tables in the analysis of typical fluid and thermal energy components and systems.

Outcome 3: Apply basic fluid mechanic, thermodynamic, and heat transfer principles and techniques, including the use of empirical data and property tables, to the design analysis of auxiliary fluid and thermal energy components and systems representative of the systems encountered in the practice of electrical, electronic, industrial, and related disciplines of engineering.

3.1 Students will practice the application of the principles and techniques of fluid mechanics, thermodynamics, and heat transfer and the use of empirical data and property tables in the design analysis of typical auxiliary fluid and thermal energy components and systems encountered in relevant engineering disciplines.

Correlation between Course Outcomes and Program Educational Outcomes:

ME 3720												
	Mechanical Engineering Program Educational Outcomes											
Course Outcomes	a	b	c	d	e	f	g	h	i	j	k	l
Course Outcome 1.1	x							x		x		
Course Outcome 2.1	x	x			x			x			x	x
Course Outcome 3.1	x		x		x						x	

Prepared By: Zhuomin Zhang