The University of Texas at Tyler
Mechanical Engineering Bachelor of Science

MENG 3316 – Heat Transfer (Required)

Syllabus

Catalog Description:
Fundamentals and applications of conduction, convection, and radiation heat transfer. Analysis of steady-state and transient conduction employing analytical methods and numerical techniques. Simple theory of laminar and turbulent, free and forced convection and use of practical correlations. Basic thermal radiation concepts and applications.

Prerequisites: MENG 3301, MENG 3310

Credits: (3 hours lecture, 0 hours laboratory per week)


Additional Material: None

Course Coordinator: Dr. Fredericka Brown

Topics Covered:
Conductive heat transfer – one-dimensional and multi-dimensional; transient conductive heat transfer; convective heat transfer – external and internal; heat transfer enhancement; Radiative heat transfer.

Evaluation Methods:
1. Homework
2. Quizzes/Examinations
3. Reports
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives: By the end of this course students will be able to:
1. apply the conservation of energy to basic heat transfer analysis [2]
2. apply the heat conduction equation in one-dimensional and limited multi-dimensional situations [2]
3. use a computer numerical solution for the numerical analysis of heat transfer [1,4]
4. apply engineering analysis to unsteady heat conduction [2]
5. apply convective heat transfer correlations to external and internal flows [2]
6. apply radiative heat transfer analysis techniques to engineering situations [2]

Numbers in brackets refer to method(s) used to evaluate the course objective.
Relationship to Program Outcomes: This course supports the following Mechanical Engineering Program Outcomes, which state that our students will have:

1. apply science, mathematics, and modern engineering tools and techniques to identify, formulate, and solve engineering problems [1-6]

2. be able to design thermal/fluid, mechanical, and electro-mechanical components or systems, individually or on interdisciplinary teams, and effectively communicate those designs in both technical and non-technical forums

3. be able to collect, analyze, and interpret data from prescribed and self-designed experimental procedures and formally communicate the results

4. be able to apply a broad-based educational experience to understand the interaction of engineering solutions with contemporary business, economic, and social issues [4,5,6]

5. recognize that ethical behavior and continuous acquisition of knowledge are fundamental attributes of successful mechanical engineering professionals

6. pass the Fundamentals of Engineering Exam [1,2, 4-6]

Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

- Mathematics and Basic Sciences: hours
- Engineering Sciences and Design: 3 hours
- General Education Component: hours

Prepared By: Dr. Fredericka Brown Date: 01/13/2015