MEC 502 Conduction and Radiation Heat Transfer

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Office Hours: Mondays 02-04 pm or by appointment
General Information's: check Brightspace

Course Description

Conduction and Radiation. Credit 3: The fundamental aspects of conduction and radiation are discussed. Emphasis is placed on the fundamental equations, solution techniques, and practical application. Additionally, the relationship between material presented in class with contemporary engineering problems and research will be discussed.

Course Prerequisites: Mass and Heat Transfer
Fluid Mechanics
Thermodynamics

Textbook

1. Heat Conduction, 5th edition by S. Kakac and Y. Yener, Taylor & Francis
2. Radiative Heat Transfer by M. F. Modest, Mcgraw-Hill (latest edition)

Class schedule

Lectures: Mondays at 06:30 pm – 09:20 pm; Frey Hall 216

Teaching Assistant: None

Grading and Class Policies

Final grade is determined based on your performance on the following areas:
Homework: 30%
Midterm 1: 35%
Midterm 2: 35%

Course Topics

Lecture 1: (08/26/2024)
course introduction, definitions, and basic concepts

Lecture: (09/02/2024)
Labor Day, Class Cancelled

Lecture 2: (09/09/2024)
Heat conduction equations and boundary conditions

Lecture 3: (09/16/2024)
Lumped analysis and scaling analysis

Lecture 4: (09/23/2024)
Separation of variables solutions

Lecture 5: (09/30/2024)
Laplace transform solution techniques

Lecture 6: (10/07/2024)
Numerical techniques

Lecture : (10/14/2024)
Fall break, Class cancelled

Lecture 7: (10/21/2024)
Continuation

Lecture 8: (10/28/2024)
Midterm 1

Lecture 9: (11/04/2024)
Radiation: Definitions, Basic Concepts

Lecture 10: (11/11/2024)
EM Equations and Radiative Properties

Lecture 11: (11/18/2024)
Exchange between Black Surfaces

Lecture 12: (11/25/2024)
Exchange between Gray Surfaces

Lecture 13: (12/02/2024)
Introduction to Participating Media and radiation in Participating Media
Radiation with conduction and Convection

Lecture 14:(12/09/2024)
Midterm 2

Course Policies:

1. Lecture notes will be posted on the Brightspace prior to class**.**
2. Brightspace will be used for posting lectures, making course announcements, grading, and communicating with the class.
3. Lectures are held on Mondays from 6:30 PM to 9:20 PM
4. No late homework (HW) is accepted and zero grade will be assigned. Each homework will consist of three to six problems. Homework must be submitted in class before lectures on the due dates. All procedures must be shown in homework's, projects, and tests.
5. The first homework page has to have heading; your name, identification number, course & HW number (MEC 502, HW-2, for example)
6. Submitted homework for grading has to be your own work. You have to **show all work or give related references**. No makeup tests will be given. If you do homework with someone else, you have to understand and stand behind the submitted work on your own. If it is determined that you are not familiar with the homework you may be responsible for

plagiarism and cheating, and therefore loose all credits for that homework and all other homeworks to follow.

Calculator Policy

"Effective Spring, 2008 only the following calculators will be permitted to be used on all midterm and final exams in the department of Mechanical Engineering. There will be no exceptions! This list of calculators is identical to that allowed for the National Council for Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) Exam that many of you will take in your senior year, as well as the professional Engineering (PE) exam that you may take several years now. The sooner you become comfortable on one of these calculators, the better.

NCEES Allowed calculators as of spring, 2008:

► Casio: All **fx-115** models. Any Casio calculator must contain fx-115 in its model name

► Hewlett Packard: The **HP 33s** and **HP 35s** models, but no others.

► Texas Instruments: All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name.

The NCEES policy on calculators can be found here:
http://www.ncees.org/exams/calculators/."Student Accessibility Support center Statement

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website:http://www.stonybrook.edu/ehs/fire/disabilities.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website athttp://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.