
MEC 502_CONDUCTION AND RADIATION HEAT TRANSFER

Fall 2019

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Lectures: Monday 4:00- 6:50PM at Harriman-115

Office Hours: Monday & Wednesday 11:00AM-12:30PM (HE 214)

Course Description: Fundamental aspects of heat conduction and radiation will be covered. Lectures will present basic laws and macroscopic equations for heat transfer as well as analytical solution techniques...

Credits: 3 Grading: A-F

Textbooks: Y. Yener and S. Kakac *Heat Conduction, 4th edition* (Taylor & Francis)
M.F. Modest *Radiative Heat Transfer, 3rd edition* (Academic Press)

Tentative Lecture Schedule

| Date | Topic |
|------------------------------|---|
| 08/26 | Introduction/General concepts of heat and energy |
| 09/9 | Basic Concepts (Yener_Ch. 1; Modest_Ch. 1) Heat Conduction Equations (Yener_Ch. 2) |
| 09/16 | 1-D, Steady-state Heat Conduction (Yener_Ch. 3) |
| 09/23 | 1-D, Steady-state Heat Conduction (Yener_Ch. 3) Scaling Analysis and Lumped Analysis (Yener_Ch. 6) |
| 9/30 | Characteristic values and functions (Yener_Ch. 4) |
| 10/7 | Solution techniques #1: Separation of variables (Yener_Ch. 5) |
| 10/21 | Solution techniques #2: Laplace Transforms (Yener_Ch. 8) |
| 10/28: 4PM-6:30PM | MIDTERM |
| 11/4 | Heat Radiation: Definitions/basic concepts (Modest_Ch. 1) |
| 11/11 | Radiative properties of real surfaces (Modest_Ch. 3) |
| 11/18 | Ideal (Blackbody) Surface Radiant Heat Exchange (Modest_Ch. 4) |
| 11/25 | Real (Gray) Surface Radiant Heat Exchange (Modest_Ch. 5) |
| 12/02 | The radiative transfer equation in participating media (Modest_Ch. 10) |
| 12/09 | Special topic: Salinity gradient energy, also referred to as "blue energy" |
| 12/11: 8:30PM-11:00PM | FINAL EXAM |

Grade:

| | |
|------------------------|-----|
| Midterm (Closed book): | 40% |
| Final (Open book): | 55% |

HW: 5% (I will collect the homework but will not return them back to you [keep a copy for yourself for each submission]. The solutions from Solution Manuel will be made available in due time; you'll get full credit as long as you turn in every home work.)

Americans with Disabilities Act: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 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.<http://studentaffairs.stonybrook.edu/dss/index.shtml>.

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