



Syllabus for ME237-01: Radiative Heat Transfer

Spring 2019

Instructor: James Palko

Designation:	ME 237
Catalog Description:	Thermal radiation fundamentals; radiative properties of opaque surfaces; radiative exchange between opaque surfaces; radiative transfer equation; radiative properties of gases and particles; radiative exchange in participating media.
Text Books and Other Required Materials:	M. F. Modest, Radiative Heat Transfer, 3rd ed., Academic Press, 2013.
Course Objectives/ Student Learning Outcomes:	<p>This course will explore the basic principles of heat transfer by radiation and its application.</p> <p>Upon successful completion, students will be able to:</p> <ul style="list-style-type: none">- Explain basic concepts of thermal radiation including the nature of thermal radiation and its interactions with matter- Describe the radiative properties of opaque surfaces- Explain and calculate the transport of thermal radiation between opaque surfaces- Describe the properties of participating media relevant to radiative heat transfer- Explain and calculate the transport of thermal radiation in participating media- Apply principles of radiative heat transfer to real world problems
Program Learning Outcomes:	
Prerequisites by Topic:	Graduate standing. Knowledge in the undergraduate physics sequence and knowledge in undergraduate thermodynamics and heat transfer as well as experience with numerical methods and computational approaches to engineering problems recommended.
Course Policies:	<p>1. In general, please try to maximize the opportunity to learn in lecture for yourself and your fellow students. Please avoid activities that may distract those around you. 2. Please silence all electronic devices and refrain from using them for anything except lecture related activities during class. 3. Unless otherwise noted, assignments will be due at the beginning of class on the due date. 4. Unless otherwise arranged, there will be no make-ups for missed exams or quizzes.</p>
Academic Dishonesty Statement:	<p>a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.</p> <p>b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for</p>

Designation:	ME 237 violation of this Policy can also be extended to include failure of the course and University disciplinary action. c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.
Disability Statement:	Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.
Topics:	Some of the key topics covered in the course will include: <ul style="list-style-type: none"> - Nature of thermal radiation - Radiation from an ideal absorber/emitter - Description of spectral and directional dependence of radiation fields - Radiative properties of opaque surfaces - Radiative exchange between opaque surfaces - The radiative transfer equation - Radiative properties of gases and particles - Radiative exchange in participating media and methods for solution of the radiative transfer equation
Class/laboratory Schedule:	2.5 hours of lecture per week; Lecture Tue. and Thu. 12:00-1:15pm Glacier Point Hall Rm 125
Midterm/Final Exam Schedule:	Midterm exam: March 14th 12:00-1:15pm Glacier Point Hall Rm 125 (TENTATIVE) Final exam: May 16th 8:00-11:00am Glacier Point Hall Rm 125
Course Calendar:	1/22/2019 - Instruction begins 3/14/2019 - Midterm exam (TENTATIVE) 3/26/2019 - No class, spring break 3/28/2019 - No class, spring break 5/9/2019 - Last day of class 5/16/2019 - Final exam
Professional Component:	Radiative heat transfer is an essential physical process key to much engineering practice and also foundational to many sciences.
Assessment/Grading Policy:	Evaluated components of the course will be tentatively weighted as follows: <p>Homework: 10% Midterm Exam: 30% Final Exam: 40% Project: 20%</p> <p>We may choose to modify this grading scheme based on interests of the class in terms of projects</p>
Coordinator:	James Palko
Contact Information:	James Palko Office: SE2 281

Designation:

ME 237

Email: jpalko@ucmerced.edu

Office Hours:

SE2 281 Tue 4-5p; Wed 9-10a;

I also encourage you to arrange office hours by appointment. Try to arrange appointments well in advance, as it may be difficult to accommodate them on short notice.