

University of Arkansas
Mechanical Engineering Department
MEEG 5473 - Radiation Heat Transfer - Online
Course materials on [Blackboard](#)

Instructor - Rick J. Couvillion, PhD, PE, ME208, 479-575-4155, 479-575-6982 fax
ric@uark.edu, [webpage](#)

Text - Michael Modest, *Radiative Heat Transfer*, 3rd Ed., Academic Press, 2013. 2nd Ed. (2003) is acceptable.

References

- Siegel and Howell, *Thermal Radiation Heat Transfer*, 4th Ed., Taylor and Francis, 2002.
- Sparrow and Cess, *Radiation Heat Transfer*, Hemisphere, 1978.
- Hottel and Sarofim, *Radiative Transfer*, McGraw-Hill, 1967.
- Edwards, *Radiation Heat Transfer Notes*, Hemisphere, 1981.

Lectures - Recorded lectures are accessed in the 'Echo360 Recordings' folder on Blackboard. On average, 3 lectures per week will be covered. There are lecture notes for each recorded lecture that can be downloaded via the 'Lecture Notes and Schedule' link on Blackboard. Course content and schedule shown below.

Drills - There will typically be one or two online drills each week using Blackboard Collaborate. Instructions for signing on to a Collaborate drill session are available in the 'Downloads' folder on Blackboard. Drills will focus on questions about the lectures and the homework.

Communications - UA emails for all class members will be provided to encourage collaboration. If the class finds discussion groups useful, they will be set up on blackboard.

Grade Basis - Homework/Programs - 10%, Three Exams - 90%

Homework - Homework assignments 01 - 02 must be submitted before Exam 01 will be given. Assignments 03 - 05 must be submitted before Exam 02. Homework 06 - 07 and the project must be submitted before Exam 03.

Academic Honesty - Academic honesty is expected, and dishonesty as described in the [UA academic integrity policy](#) will be penalized. Penalties will range from getting zero on a homework, quiz, project, or exam to failure of the course and/or report to the College of Engineering Academic Integrity Monitor. However, these penalties will pale in comparison to the instructor knowing that you are a person who cannot be trusted. If a potential employer asks, the instructor will be obligated to express his concerns about your integrity.

MEEG 5473 - Radiation Heat Transfer Schedule and Lectures - Online			
Lecture Notes	Topic	Text - Modest 2nd Ed	Text - Modest 3rd Ed
Lecture 01	Introduction	1.1-1.3, 1.5-1.7	1.1-1.3, 1.5-1.7
Lecture 02	Blackbody Emission, Band Emission	1.4	1.4
Lecture 03	Emissivity	3.1-3.2	3.1-3.2
Lecture 04	Irradiation, Absorptivity	3.2	3.2
Lecture 05	Hemispherical Total Absorptivity	3.2	3.2
Lecture 06	Bi-directional Reflectivity	3.2	3.2
Lecture 07	Electromagnetic Theory - Introduction, Metals	3.3 - 3.4	3.3 - 3.4
Lecture 08	Electromagnetic Theory - Dielectrics	3.4 - 3.6	3.4 - 3.6
Exam 01 - Lectures 01 - 08			
Lecture 09	View Factors	4.1 - 4.3, 4.6	4.1 - 4.3, 4.6
Lecture 10	View Factor Integration	4.4	4.4
Lecture 11	View Factor Short Cuts	4.7 - 4.9	4.7 - 4.9
Lecture 12	Exchange Among Black and Diffuse Gray Surfaces	5.1 - 5.3	5.1 - 5.3
Lecture 13	Network Analogy	5.4	5.4 - 5.5
Lecture 14	Exchange Using Balance Equations	5.1 - 5.3	5.1 - 5.3
Lecture 15	Differential Exchange	5.1 - 5.3, 5.5	5.1 - 5.3, 5.6
Lecture 16	Specular Surfaces View Factors	6.1 - 6.2	6.1 - 6.2
Lecture 17	Exchange in Enclosures with Specular Surfaces	6.3 - 6.4	6.3 - 6.4
Exam 02 - Lectures 09 - 17			
Lecture 18	Gas Radiation - Introduction	9.1 - 9.4	10.1 - 10.3
Lecture 19	Equation of Transfer	9.5	10.4
Lecture 20	Special Cases, Heat Flux	9.6 - 9.9	10.5 - 10.8
Lecture 21	Energy Conservation, Energy Generation	9.10	10.9
Lecture 22	Solutions for Plane Gray Layer	13.1 - 13.3	14.1 - 14.3
Lecture 23	Gas Radiation Properties - Intro, Line Radiation	10.1 - 10.4	11.1 - 11.4
Lecture 24	Spectral Models	10.5	11.7
Lecture 25	Narrow Band Models	10.6	11.8
Lecture 26	Wide Band Models	10.8	11.10
Lecture 27	Emissivity and Absorptivity	10.9	11.11
Exam 03 - Lectures 18 - 27			