SAMPLE SYLLABUS

ME 253 Thermal Radiation Spring 2011

Instructor:
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http://www.me.berkeley.edu/ltl/ltl.html

Class Schedule: Tu Th 9:30 – 11, 179 Stanley
Office Hours: M, Tu 1:30-3 pm, or by appointment (send e-mail).

Textbook: J.R. Howell, R. Siegel and M.P. Menguc, *Thermal Radiation Heat Transfer*, 5th ed., CRC Press, 2010.

References: M.F. Modest, *Radiative Heat Transfer*, McGraw Hill, 1993.
M.Q. Brewster, *Thermal Radiative Transfer and Properties*, John Wiley, 1992.
M. Born, and E. Wolf, *Principles of Optics*, 7th Ed., Pergamon, 2000.

Description: The course examines basic radiative properties of materials, and mechanisms of radiative transfer. Presents theory and methods of solution of radiative transfer problems in participating and nonparticipating media and the interaction of thermal radiation with other modes of heat transfer.

Course Content:

The Nature of Thermal Radiation (1 week).
Radiative Properties and Simple Transfer (1 week).
Prediction of Radiative Properties with Classical Electromagnetic Theory (1 week).
Radiative Interchange (2 weeks)
Configuration factors - Radiative exchange between various types of surfaces (black, diffuse - gray, specular, nondiffuse, nongray).
Radiation in Absorbing - Emitting and Scattering Media (8 weeks).
Microscopic Basis for Gas Radiation -Radiative Properties of Particles -Equations of Transfer - Formulation and Approximations - Approximate Solutions - Gas Radiation in Enclosures (Mean Beam Lengths)
Combined Modes of Transfer (1 week).

Homework: Weekly assignments, due in class on Thursdays

Exams: Two Midterms (March 1, April 12) and one final (May 11)

Grading: Midterms 25 % (each), Final 35 %, Homework 15%