

Course Announcement for Spring 2010

MAE 709 ADVANCED RADIATION HEAT TRANSFER

Instructor: Dr. Tiegang Fang

Time: TuTh 3:00-4:15

Location: Broughton 4221

Credit Hours: 3 units

Course Description: The course is divided into two parts. The first part provides an introduction to the basic theory of radiation and will include the following topics: 1) Blackbody radiation theory, 2) Material properties related to radiation heat transfer, 3) Configuration or view factors, 4) Heat transfer

between black or diffuse-gray surfaces, 5) Heat exchange between nondiffuse nongray surfaces, 6) Heat transfer involving radiation, conduction, and convection, 7) Radiation in participating medium, 8) Gas radiation in enclosures. The second part will address the application of radiation theory in optical diagnostic techniques. This will include an introduction of basic laser operation, flame pyrometry, laser induced fluorescence, laser induced incandescence, shadowgraph, etc. During the course, a project will be assigned. A report will be submitted based on the project and a presentation will be given by each student or group.

Grading: Grading will be based on HW assignments, midterm tests, and computer project.

Pre-requisites: Successful completion of graduate level heat transfer course(s) or authorized by instructor.

Textbook: Thermal Radiation Heat Transfer, by Robert Siegel and John R. Howell, 4th edition, published by Taylor & Francis, New York, 2002; ISBN: 1560328398

Please notice that this course will be open every two years in the spring semester. Further questions should be addressed to Dr. Tiegang Fang. Tel: (919) 515 5230
– E-mail: tfang2@ncsu.edu

