MECHANICAL ENGINEERING

706

Fall Term 2019 **Professor R. L. Judd**

Advanced Heat Transfer

Wednesday Mornings

8:30 am - 11:30 am

JHE 219

September 11 - December 4

Course Outline

Topic	Lecture	Description
Conduction Theory	1	Formulation of General Laws
	2	Formulation of Particular Laws
	3	Formulation/Solution Techniques
	4	Formulation/Solution Techniques
Convection Theory	5	Forced Convection Boundary Layers
	6	Forced Convection Heat Transfer
	7	Natural Convection Heat Transfer
	8	Separated Flow Heat Transfer
Radiation Theory	9	Radiation Fundamentals
	10	Enclosure Analysis
	11	Gaseous Radiation
Synthesis/Analysis	12	Heat Transfer Modelling
	13	System Analysis

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Course Philosophy

Mechanical Engineering 706 is a graduate level half course which attempts to broaden the students' knowledge of heat transfer. The material presented is essentially the same material presented at the undergraduate level with emphasis on the approach to problem solving rather than on specific solutions. In this regard, the students are expected to master the various methods of formulating heat transfer problems and to develop their understanding of the underlying physical phenomena so that reasonable mathematical models can be derived. Mathematical solution techniques are not stressed in this course but it is expected that the students will have an adequate understanding of the methods of solving ordinary differential equations.

Grade Assignment

A number of problems will be assigned on a weekly basis. Although the students are permitted to discuss the problems among themselves, each student must turn in his own solution. Extensions will not be granted if the problem cannot be turned in when it is due because the discussion of the solution in class will be unduly delayed. The total grade for problem assignments represents one third of the grade awarded for the course. A take home final examination has been scheduled for the twenty four day period December 5 - December 31 inclusive. This examination will be comprised of four or five heat transfer problems which will be graded more on the originality and appropriateness of problem formulation than on the actual problem solution. The final examination grade represents two thirds of the grade awarded for the course. It is expected that the examination solutions will represent the individual effort of the students who turned them in.