SYLLABUS FOR HEAT TRANSFER
MAE 3314-Spring 2007

COURSE DESCRIPTION: Heat Transfer (3-0) 3 hours credit – The fundamental laws of heat and mass transfer, including steady and unsteady conduction, convection, and radiation. Prerequisites: MATH 3319, MAE 2314, MAE 3311, and EE 3320.

TEXTBOOK: *Fundamentals of Heat and Mass Transfer,* 6th edition, by Incropera & DeWitt, latest edition, John Wiley & Sons, New York.

COURSE OBJECTIVES: The objective is to covey the fundamental knowledge needed when designing heat transfer devices to students. These devices include industrial heat exchange facilities, heat sinks, boilers, etc. Therefore, a basic knowledge of conduction, convection and radiation is emphasized.

COURSE CONTENT

Hour	SUBJECT	CHAPTER & SECTION	HOMEWORK
1	Introduction	1	1.2, 1.4, 1.21, 1.25
2	Introduction to Conduction	2	2.1, 2.2, 2.3, 2.4, 2.6, 2.18, 2.20, 2.27
3	Plane Wall	3.1-3.2	3.1, 3.4, 3.11, 3.13, 3.14
4	Radial Systems	3.3	3.31, 3.33, 3.35, 3.37
5	Conduction with Thermal Energy Generation	3.4	3.65, 3.76, 3.77
6	Fins	3.5	3.106, 3.107, 3.108, 3.117
7	Two-dimensional Steady-State Conduction	4.1-4.3	4.4, 4.15, 4.10, 4.16
8	Finite Difference Equation	4.4	4.36, 4.37, 4.47, 4.42, 4.51
9	Transient Conduction	5.1-5.3	5.5, 5.16, 5.17
10	Transient Conduction	5.4-5.7	5.22, 5.24, 5.27
11	Multidimensional Effects	5.8	5.34, 5.48, 5.57, 5.69
12	Finite Difference	5.9	5.94, 5.106, 5.113
13	EXAM NO. 1		
14	Introduction to Convection	6.1-6.3	6.4, 6.5, 6.7, 6.8
15	Convection Transfer Equation	6.4	6.2
16	Approximations, Special Conditions, and Boundary Layer Similarity	6.5-6.6	6.14,
17	Convection: continued	6.7-6.9	6.20, 6.21, 6.22
18	External Flow: Laminar	7.1	7.1, 7.2,
19	External Flow: Turbulent	7.2-7.3	7.6, 7.12, 7.13, 7.15
20	Cross Flow	7.4-7.8	7.41, 7.42, 7.43
21	Internal Flow	8.1-8.3	8.1, 8.3, 8.6
22	Convection Correlation	8.4-8.9	8.18, 8.25, 8.26, 8.32, 8.45
23	Free Convection	9.1-9.4	9.5, 9.7, 9.9
24	Effect of Turbulence and Empirical Correlation	9.5-9.7	9.27, 9.36, 9.59

25	Introduction to Boiling	10.1-10.4	-- -- -- -- --
26	Introduction to Heat Exchangers	11	11.14, 11.21
27	EXAM NO. 2		
28	Introduction to Radiation	12.1-12.2	-- -- -- --
29	Planck's Equation	12.3-12.4	12.8, 12.9, 12.10, 12.16, 12.18
30	Properties	12.5	12.29, 12.30, 12.31, 12.34
31	Kirchhoff's Law and Gray Surfaces	12.6-12.8	12.64, 12.66
32	Radiation Exchange Between Black Bodies	13.1-13.2	13.1, 13.2, 13.9, 13.10, 13.11, 13.39
33	Radiation Exchange Between Nonblackbodies	13.3-13.4	13.62, 13.70, 13.74, 13.79, 13.81, 13.107, 13.108

The underlined problems will be graded. They will be collected on Tuesday immediately after the topic designated by the section number (third column) is discussed in the class.

Final Exam: See UTA Schedule
Final Grade: First Examination (20%), Second Examination (20%), Final (40%), Homework (10%), Project (10%).

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