MAE 3314 section 2: HEAT TRANSFER
Spring 2016

Instructor: Jeff Luttrell (**jeffrey.luttrell@uta.edu**)
Office Room **323-G**, Phone **817-734-7584**
Office Hours: **TTh 1:30p-3:30p, class time 3:30-4:50p**
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Class Information:
Location: Nedderman Hall Room 229
Webpage (Blackboard) TBD

Course Description:
The fundamental laws of heat and mass transfer, including steady and unsteady state conduction, convection, and radiation. Applications of heat transfer to thermal systems design are included. Required course. **Prerequisites** - MAE 3360, MAE 2314, MAE 3310.

Learning Outcomes
An ability to apply knowledge of math, science, and engineering
An ability to design a system, component, or process to meet desired needs
An ability to identify, formulate, and solve engineering problems
Recognition of the need for and an ability to engage in life-long learning
An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Textbook:
Fundamentals of Heat and Mass Transfer, 7th edition by Bergman, Levine, Incropera, and DeWitt (John Wiley & Sons, New York).

Assignments, Examinations, and Grading:

	Number	% for Each	% of Final Grade		Recorded letter grades will be per the following scale	
Homework	10	2	20		A	90% or higher
Quizzes	5	3	15		B	80% or higher but less than 90%
Tests	3	12	36		C	70% or higher but less than 80%
Projects	2	7	14		D	60% or higher but less than 70%
Final Exam	1	15	15		F	less than 60%

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels.

Project 1 will be a 2-dimensional finite difference conduction analysis. Project 2 will be a heat exchanger design and analysis

Homework and Projects are due in the class, no later than 3:40pm on the due date. Quizzes will be announced at least 5 days in advance. There is no make-up of missed Quizzes, Tests, or the Final Exam. For tests, a calculator is required (no laptops, tablets, or phones).

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I allow students to attend at their own discretion, but attendance is strongly encouraged.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the **Office for Students with Disabilities (OSD).** Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:
The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.
Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit* www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is out the door to the left to the end of the hall and left again to the exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php

Course Schedule

Week	Date	Subject	Textbook	Homework (Due)
1	01-19	Intro to heat transfer & conduction	1.1 - 1.6	
	01-21	Heat equation, BC's	2.1 - 2.3	#1 (1/26)
2	**01-26**	BC's & Initial Conditions	2.4	
	01-28	1D steady conduction: plane wall	3.1	#2 (2/4)
3	02-02	Thermal resistance	3.2	
	02-04	1D steady conduction: radial	3.3 - 3.5	
4	02-09	**Test #1**		
	02-11	Fins	3.6	#3 (2/18)
5	02-16	2D conduction and FDM	4.1 - 4.4	**Project 1 (3/3)**
	02-18	2D conduction and FDM	4.5	
6	02-23	Transient conduction: Lumped method	5.1 - 5.3	#4 (3/1)
	02-25	Transient conduction: Spatial effect	5.4 - 5.10	
7	**03-01**	Intro to convection	6.1 - 6.3	#5 (3/8)
	03-03	Boundary layer equation	6.4 - 6.5	
8	**03-08**	Boundary layer similarity & analogies	6.6 - 6.7	
	03-10	**Test #2**		
9	03-15	***Spring Break***		
	03-17	***Spring Break***		
10	03-22	External flow: flat plate	7.1 - 7.3	#6 (3/29)
	03-24	External flow: cross flow	7.4 - 7.7	
11	**03-29**	Internal Flow	8.1 - 8.3	#7 (4/5)
	03-31	Internal flow, boiling & condensing	8.4 - 8.7, 10	
12	**04-05**	Heat exchangers	11.1 - 11.3	**Project 2 (4/26)**
	04-07	Heat exchangers	11.4 - 11.6	
13	04-12	**Test #3**		
	04-14	Intro to radiation, blackbody radiation	12.1 - 12.3	#8 (4/19)
14	**04-19**	Planck's equation, Kirchoff's law	12.4 - 12.9	
	04-21	View factors	13.1 - 13..3	#9 (4/28)
15	**04-26**	Radiation exchange	13.1 - 13.3	
	04-28	Free convection	9.1 - 9.9	#10 (5/3)
16	**05-03**	Free convection	9.1 - 9.9	
	05-05	Combined effects	13.4	
Final	05-10	No class		
	05-12	**Final Exam 2-4:30pm**	Comprehensive	

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. - Jeff Luttrell