Sample Syllabus

ME 315
Spring 2019
Heat Transfer Laboratory

Class Schedule: Section 1 – Tuesday 11:15AM-2:15PM, 221 Reber
Section 2 – Thursday 11:15AM-2:15PM, 221 Reber
Section 3 – Tuesday 2:30PM-5:30PM, 221 Reber

Text: Fundamentals of Heat and Mass Transfer by Bergman, Lavine, Incropera, and DeWitt (any edition)

Course Website: (see Canvas)

Prerequisite: ME 320; at least concurrent ME 345, ME 410

Course Leader: Prof. Steve Lynch (splynch@psu.edu)
331 Reber Building
Office Hours: Th 4PM-5:30PM, or by appointment

TA: Greg Bicknell (gub72@psu.edu)
221 Reber Building
Office Hours: T, Th 10:45-11:15AM, or by appointment

ME 315 Course Philosophy

The course consists of six experiments. Each experiment is spread over a period of two weeks. In the first week, the theory pertaining to the experiment is studied in the 'prelab.' The actual experiment is conducted the following week. The experiments include:

- Time Dependent Heat Conduction (Experiment #2)
- Natural Convection from a Vertical Flat Plate (Experiment #4)
- Pool Boiling in a Saturated Liquid (Experiment #5)
- Analysis of Enhanced Concentric Tube and Cross Flow Heat Exchangers (Experiment #7)
- Forced Convection from a Circular Cylinder Subjected to Cross Flow (Experiment #8)
- Radiation Heat Transfer in Vacuum from a Hot Cylinder (Experiment #9)

ME 315 Course Objectives

This course is designed to provide seniors in Mechanical Engineering an opportunity to learn how to perform basic measurements of heat transfer and perform uncertainty analyses. It also serves as a method for applying and reinforcing some of the material covered in the classroom. At the end of course, students will be able to:

1. Analyze thermal and fluid systems.
2. Understand basic thermal and fluid measurement techniques.
3. Work effectively in teams.
4. Prepare and present clear and concisely written lab reports.

General Notes

- You must have a MNE Labs account to log onto the computers in the heat transfer laboratory. See here to apply for an account: http://www.mne.psu.edu/mnelabs/. Mr. Chris Hirsch in 201D

Reber can help you if this does not work

- Bring a USB drive to each lab period.
- Students will work in groups of 3 and will submit a group lab report. Each student is expected to contribute to the report, and the entire group will receive the same grade.
- A participation grade worth 5% of your overall grade will be assessed by the instructor and/or TA at the end of the semester, based on your attendance, interaction with your group, and participation in the laboratory exercises.
- A peer grade worth 8% of your overall grade will be assessed by your lab group members at the end of the semester. Each student will evaluate his or her own performance, as well as that of the other team members in an anonymous manner, and the result will be factored into your final grade.

Reports: The six lab reports will be used to compute the report portion of your final grade (85% of the overall grade). Each lab report is divided into the following sections:

- *Abstract* (10%): Brief summary of the objective of the lab, the results of the lab and their validity.
- *Theoretical Development* (30%): The part completed in the prelab.
- *Outline* (5%): Outline the data collection procedure performed during the lab.
- *Data* (25%): Include data obtained during the experiment and a **complete** sample calculation (with steps) for each type of calculation performed in the data reduction. For experiments with long data tables, only include a page's worth of the table in this section, and place the rest in an appendix of the report. If the table is longer than 3 pages, only print the first 3 pages.
- *Results* (15%): In the form of graphs, tables, etc. as required.
- *Discussion* (10%): Use the points suggested at the end of the experiment to organize your discussion. We want to see your interpretation of the data and your understanding of concepts.
- *Neatness* (5%): The report should be neat and legible. The text of the reports is to be prepared using word processing software. The sample calculations may be handwritten, but the entire data reduction (i.e., data placed in the graphs and tables) must be performed with data processing software, such as Matlab or a spreadsheet such as Excel.

Group lab reports are due in lab one week after the laboratory session in which the experiments were completed. The penalty for late submission of a lab is 10 points per day unless permission for late submission is obtained in advance from the TA for a valid excuse. If you are unable to attend a lab for any reason (interview, etc.), please get permission from the TA and reschedule the lab **before** you miss the class. Failure to do so will result in a grade of zero being assigned for the work that was to be completed during the lab period. The last lab will not be accepted after 5 PM on the last day of class.

Grade distribution:

Component	Percentage	Schedule
Required labs (6): prelabs and reports	87% (14.5% each)	Reports due one week after end of lab experiment session
Lab participation	5%	End of course, evaluated by TA and/or instructor
Peer evaluation	8%	Due online in Canvas by 5PM on Friday Apr. 26 (last day of semester classes)
Total	**100%**	

Grading Scale
A = 93% and above
A- = 90-93%
B+ = 87%-90%
B = 83-87%
B- 80%-83%
C+ 77%-80%
C = 70%-77%
D = 60%-70%
F = below 60%

Academic Integrity: Careful consideration of each problem, even if by trial and error, develops your ability to solve the real-world problems facing you upon graduation. You should work together on the lab assignments and share the analysis, data collection, and report generation tasks. It is highly recommended that you rotate your roles so you can spread the effort uniformly. It is expected that your entire group will act with integrity in collecting, analyzing, and presenting data; falsified data is unacceptable and copying from other groups or prior experiments is not allowed. You will be expected to act in accordance with the academic integrity standards set by the University and the College of Engineering. For more information, please refer to the academic integrity policy available on the web at https://www.engr.psu.edu/faculty-staff/academic-integrity.aspx.

Schedule

Week	Section 1 and 3		Section 2		Items Due
	Date	Topic	Date	Topic	
1	8-Jan	Introduction	10-Jan	Introduction	
2	15-Jan	Prelab Session 1	17-Jan	Prelab Session 1	Graphing exercise
3	22-Jan	Lab Session 1	24-Jan	Lab Session 1	
4	29-Jan	Prelab Session 2	31-Jan	Prelab Session 2	Session #1 report
5	5-Feb	Lab Session 2	7-Feb	Lab Session 2	
6	12-Feb	Prelab Session 3	14-Feb	Prelab Session 3	Session #2 report
7	19-Feb	Lab Session 3	21-Feb	Lab Session 3	
8	26-Feb	Prelab Session 4	28-Feb	Prelab Session 4	Session #3 report
	5-Mar	Spring Break	7-Mar	Spring Break	
9	12-Mar	Lab Session 4	14-Mar	Lab Session 4	
10	19-Mar	Prelab Session 5	21-Mar	Prelab Session 5	Session #4 report
11	26-Mar	Lab Session 5	28-Mar	Lab Session 5	
12	2-Apr	Prelab Session 6	4-Apr	Prelab Session 6	Session #5 report
13	9-Apr	Lab Session 6	11-Apr	Lab Session 6	
14	16-Apr	Make-Up	18-Apr	Make-Up	Session #6 report
15	23-Apr	No Class	25-Apr	No Class	Peer evaluation

Lab Assignment

Week	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
1	Introduction, graphing exercise					
2 & 3	Exp 2	Exp 4	Exp 5	Exp 7	Exp 8	Exp 9
4 & 5	Exp 4	Exp 5	Exp 7	Exp 8	Exp 9	Exp 2
6 & 7	Exp 5	Exp 7	Exp 8	Exp 9	Exp 2	Exp 4
8 & 9	Exp 7	Exp 8	Exp 9	Exp 2	Exp 4	Exp 5
10 & 11	Exp 8	Exp 9	Exp 2	Exp 4	Exp 5	Exp 7
12 & 13	Exp 9	Exp 2	Exp 4	Exp 5	Exp 7	Exp 8

Students with Disabilities: If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/. In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines).

Counseling & Psychological Services (CAPS): CAPS can help students resolve personal concerns that may interfere with their academic progress, social development, and satisfaction at Penn State. You can contact CAPS by calling the Main CAPS number/Appointment Scheduling: 814-863-0395 (Please call between the hours of 8am and 5pm, Monday-Friday to schedule an appointment) or visit us at our office location, 5th Floor Student Health Center.