

# **MECH 3313 Thermo-fluid Lab**

## **Fall 2017**

**CRN:** Sec 001 – 12994,   **LAB HOURS:** Tuesday, 1:30 PM – 4:30 PM

**CRN:** Sec 004 – 19044,   **LAB HOURS:** Monday, 5:30 PM – 8:20 PM

**INSTRUCTOR:** Dr. Abul F. Ali

**E-MAIL:** afali@utep.edu

**OFFICE HOURS:** M, W: 9:00 AM – 11:00 AM

**OFFICE LOCATION:** A104

**OFFICE PHONE:** (915) 747-6778

### **COURSE INFORMATION**

This is a continuation of the Mechanical Engineering Lab series with practical measurement problems in thermos-fluid area.

### **LAB OBJECTIVES**

This course will provide the students with hands-on experience dealing with the practical aspects in thermal and fluid engineering experiments. After successful completion of the course, the students will have the ability to:

- Take the basic measurements of known parameters in thermal-fluid using various methods of measurements.
- Analyze collected data taking in to account the various sources of error and uncertainty in the measurement procedure and setup.
- Construct a professional lab report.

### **BLACKBOARD**

Blackboard is an important component of the overall course presentation. Students are strongly advised to be fully familiar with the features of Blackboard. Instructor will use Blackboard for generally communicating with students via “Announcements”. Grades of exams, quizzes, home works, etc. will also be posted in the Black Board.

### **GROUP WORK**

This course will consist of 2 types of main activities. 1) Term Paper work, and 2) Lab experiments. Both of these activities will be performed by the students divided in groups. It is expected that the number of students in each group will depend somewhere around 4 to 8 students.

### **TERM PAPER**

There is a total of 7 lab experiments. Each group will be responsible to complete a term paper on one of the given lab experiment title. This will require the group to:

- a) Make a basic research on the selected topic for his/her group,
- b) make a professional report and
- c) make a classroom presentation.

Each group will be given 2 weeks of time to do the term paper on the given topic. In this activity the groups are expected to collect information from various sources, compile the information, submit a report and then make the classroom presentation. A copy of the term paper from each group will be distributed to all groups. This information may be used by all other groups in the lab reports. As a basis, every group will be provided procedural information of the experiments to be performed in the lab.

Following the term paper writing, the presentations will start to take place. It is expected that there will be 3 to 4 presentations each week. This will allocate a maximum of 45 minutes to 1-hr for each presentation.

### **COMPOSITION OF TERM PAPER**

The term paper report should reflect the following items and the corresponding grade percentage for the project report is also shown in the table below.

	<b>Project Report Items</b>	<b>Marks</b>
1	Introduction	10%
2	Objectives	10%
3	Analysis of Theories involved	20%
4	Graphics	10%
5	Classroom Presentation	50%
	<b>Total</b>	<b>100%</b>

One report should be submitted by each group. Each student in the same group gets the same marks.

## LAB TOPICS

	Topic
1	Fluid Pumps: i. Study of a centrifugal pumping system with varying impeller blades ii. Study cavitation phenomenon
2.	Solar Collectors: i. Flat plate collector ii. Parabolic collector
3.	Wind Turbines: Performance study of a Wind turbine system.
4.	Wind Tunnel: Measurement of drag and lift of a aerodynamic body. Data logger will be used for the purpose of measurements.
5.	Energy Cycles: Performance study of a Rankine cycle steam turbine system.
6.	Energy Cycles: Performance study of a gas turbine Brayton cycle.

## LAB REPORTS

Each student must submit one report for each experiment performed, even though the experiments are performed in groups. There is no specific page limit for the report. But it should be clear and concise. This should include all necessary figures and tables with appropriate captions and a creative discussion of the results.

Reports shall contain:

- a) An introductory section describing the background and objectives of the experiment
- b) Any relevant theories
- c) Description: describe the experimental setup with appropriate sketches and list of tools and devices used in the experiment. Attach any relevant model number and specifications
- d) Procedure: describe the method used to perform the experiment, with particular mention of what was done and what data was collected
- e) Results: Displaying the results in tabular and graphical forms. Show at least one set of sample calculation
- f) Discussions: discuss the results obtained in the experiment and clearly identifying if the specific objective was achieved. Include possible sources of errors and uncertainties in the experiment.

- g) Conclusions: draw conclusions in relation to the results of the experiment with particular mention of any limitations that may have impacted your data collection and the results.
- h) Recommendations: mention what you think could be done to improve the data collection and get better results.

Each lab report will be evaluated based on the following scheme:

- 1. Experiment objective and description of setup : 10%
- 2. Theories involved : 10%
- 3. Procedure for data collection : 20%
- 4. Presentation of results including tables and graphs : 20%
- 5. Discussions, conclusions, and recommendations : 20%
- 6. Report Presentation : 10%
- 7. Attendance & participation : 10%

#### **OVERALL EVALUATION SCHEME**

The grade evaluation will consist of 2 main items:

- 1. Term Paper
- 2. Lab work

The grade distribution is,

- 1. Term Paper and presentation : 30%
- 2. Lab work and report : 70%

**Any missed lab work will be assigned zero mark. No exceptions.**

#### **TENTATIVE LETTER GRADE SCHEME**

- A: 91-100
- B: 81-90
- C: 65-80
- D: 50-64
- F:  $\leq$  49%

**This is a tentative scheme and may be adjusted if felt necessary by the instructor.**

**SCHOLASTIC DISHONESTY:** Students are encouraged to work together to discuss subject matter but all graded material must represent the student's individual work. Scholastic dishonesty is the attempt of any student to present the work of another as his/her own work, any work which he/she has not honestly performed, or attempting to pass any examination by improper means. Scholastic dishonesty is a serious offence and will not be tolerated. Appropriate University policies and procedures will be followed for suspected scholastic dishonesty.

#### **CLASS ATTENDANCE POLICY**

- Attendance is mandatory. Anyone with 5 or more absences will be dropped from the class. A drop for not attending will count in the State Allowed Six Drop Limit. If you are failing the class at the time of the drop you may also be given a WF designation. It is possible that a drop could adversely impact visa status for foreign students, financial aid and a number of other programs.
- Lab participation and asking questions are encouraged. Using cell phones, arriving late, and leaving early are not acceptable.
- As per UTEP rules, you may be asked to show a UTEP ID at any time during class.

#### **HARASSMENT POLICY**

The department has a zero tolerance for harassment behavior. In addition to the standard types of harassment, the department also treats the following behavior as harassment and the behavior will be reported to the proper authorities:

- Multiple and/or frequent emails and/or calls regarding the same subject. Once a decision has been made or a question answered, a student who continues to ask the same question will be warned by the recipient of the email/call. If the student continues, the behavior will be reported.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any behavior asking for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Behavior of remaining in an office after the occupant requests you to leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.

#### **ACCOMMODATIONS**

If you have a disability and need classroom accommodations, please contact the Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).