

MEEN 3240.001**MEE Lab I****Spring 2022****Instructor:** Robert P Smith**Office:**

F102F / ZOOM

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Office Hours: Thursday 1:30 pm – 4:30 pm; Includes both physical and ZOOM options**Lecture Time/Location:** Friday 10:30 am - 11:20 am in F175**Lab Location:** F158**Lab Sessions:**

Group	Day	Time	Group	Day	Time
1	Monday	11:30 am - 12:20 pm	5	Wednesday	2:30 pm - 3:20 pm
2	Monday	12:30 pm - 1:20 pm	6	Wednesday	3:30 pm - 4:20 pm
3	Monday	1:30 pm - 2:20 pm	7	Wednesday	4:30 pm - 5:20 pm
4	Tuesday	11:30 am - 12:20 pm			

Required Course Material: Lab Manual & PPT Slides, which will be uploaded to Canvas for each lab**Reference Textbook:** Experimental Methods for Engineers, 8th ed (or 7th ed)
J. P. Holman (ISBN: 978-0-07-352930-1)**Course Description:**

Principles of experimentation. Measurement techniques and instruments. Statistical analysis of experimental data and error analysis. Presentation of data and report writing. Students perform a series of experiments in areas of mechanical engineering. The lab course covers the following topics:

- Category I: Basic knowledge in measurements and analysis
Category II: Thermodynamics and heat transfer
Category III: Fluid Mechanics
Category IV: Renewable Energy

Pre-requisites: MATH 3410; MEEN 2210; MEEN 2210, all with a grade of C or better.**Course Learning Outcomes (CLO):**

Upon successful completion of this course, students will be able to demonstrate:

- Ability to perform statistical error analysis of experimental data
- Understanding measurements of transport properties
- Understanding temperature measurements
- Ability to design and construct mechanical engineering experiments
- Understanding basic electrical measurement techniques
- Concepts of the First Law of Thermodynamics
- Ability to compile, present and report scientific data
- Ability to control thermal science experiments
- Concepts of Fluid Dynamics
- Concepts of Heat Transfer

ABET Student Learning Outcomes (SO):

- 1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
- 2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- 3) an ability to communicate effectively with a range of audiences
- 4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions on global, economic, environmental, and societal contexts

- 5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- 6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- 7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

MEEN 3240 Course Learning Outcomes	ABET EAC Student Outcomes						
	1	2	3	4	5	6	7
Demonstrate ability to perform statistical error analysis of experimental data.	X					X	X
Demonstrate understanding measurements of transport properties.	X					X	X
Demonstrate understanding temperature measurements.	X					X	X
Demonstrate ability to design and construct mechanical engineering experiments.	X	X	X		X	X	X
Demonstrate understanding of the First Law of Thermodynamics.	X					X	X
Demonstrate ability to compile, present and report scientific data.	X		X	X		X	X
Demonstrate ability to control thermal science experiments.	X	X	X		X	X	X
Demonstrate understanding of Heat Transfer principles.	X				X	X	X
Demonstrate understanding of Fluid Dynamics principles.	X				X	X	X

Grades:	Lab Reports (9)	50%	≥ 90%	A
	Lecture Attendance (10)	10%	80 – 89.9%	B
	Midterm 1	20%	70 – 79.9%	C
	Midterm 2	20%	60 – 69.9%	D
	Total	100%	< 60%	F

Reports: Physical copies of lab reports are not required. Lab reports need to be submitted on Canvas by a member of the group.

A template for the lab report in MS Word format is available on Canvas. [Download and use the template DIRECTLY.](#) Convert your report to PDF before submitting.

Due days for lab reports (Definition of “late” lab reports): if not otherwise stated, lab reports are due before your next scheduled lab session. For example, if you are in group 3, then your lab session is Monday from 1:30 – 2:20 pm. Your lab reports are due at 1:30 pm each Monday. Due dates and times displayed in Canvas are for the entire course, not specific groups. This is intended to give all groups an equal and fair amount of time. The exception to this is when data is provided to the entire course at one time. In that instance, all lab reports are due at the same time and will be announced in Canvas and during lecture.

Lecture attendance:

Lecture attendance is mandatory. Attendance checks via Canvas quiz will be conducted at random points during live and ZOOM lectures. There is a possibility that all lectures will move to a ZOOM only format at any point during the semester. If that is the case, attendance will still be checked and an announcement will be made.

Lab attendance:

Lab attendance is semi-mandatory. All students are expected to attend the first experiment but after, at least 3 members of each group are required to attend the lab session and conduct the experiment. Some labs will greatly benefit from more members attending in order to meet the time constraint. It is up to the group to determine how they wish to distribute this responsibility. A group picture in front of the lab equipment on the experiment day is required. This group picture should be labeled and included in the lab report. Compliance with COVID safety policies still applies during group photos. If at least 3 members of the group are not present to conduct the experiment (for ANY reason other than a valid university excused absence), then the entire lab report will automatically have 10 points deducted from it.

Teamwork:

Lab groups will be assigned based upon registered lab sections. Students will be distributed as evenly as possible. Each group should consist of 3 to 5 students. Once the group is formed, students will have to stay in the same group and may NOT change groups. By definition, a group must have more than one individual. Anyone unwilling or unable to work in a group with other individuals will receive an 'F' in MEEN 3240. **Reports submitted by individuals will not be graded.**

Peer Evaluation:

A peer evaluation will be performed for any individual experiment if any group member requests such a peer evaluation. Each group member will evaluate the lab performance and report contributions of other members in the same group anonymously by a scale of 0-100%. 100% means a good job on the assigned part of work while 0% means no contribution to the lab and the report. The **(average peer evaluation %)*(group experiment report score)** will be the score of that particular student for that particular lab report.

For example, a group receives an 88 on their lab report and an individual gets an average peer evaluation percentage of 50%, then that individual would receive a 44 for that lab report while the other members receive the normal 88.

Exams:

- Exams are open book/notes.
- There will be NO make-up exams. Exceptions: medical emergency (student and/or important ones), transportation/traffic emergency, religious holidays/duties, jury duty and military duty. Appropriate documentation must be submitted.

Disability Accommodations:

If you need academic accommodations for disability you must have documentation and register with the Office of Disability Access through the Division of Student Affairs. They will in-turn provide the instructor with a list of recommended assistance parameters.

Academic Dishonesty:

There is a zero-tolerance policy. Cheating of any kind will result in an automatic "F" in this course and the matter will be turned over to the appropriate student disciplinary committee.

Syllabus Changes:

The instructor reserves the right to make changes to the syllabus at any time in order to accommodate changing circumstances during the semester. Any changes will be announced and an updated syllabus will be made available on CANVAS.