

**Instructor:** Dr. Richard Zhang**Office:** Discovery Park F115V**Phone:** 940-565-2742**Email:** zihao.zhang@unt.edu**TA:** Athira (AthiraNairAyyappankutty@my.unt.edu)**Office Hours:** By appointment**Lecture Time/Location:** Friday 11:30AM-12:30 PM; Disc. Park D202 (**Section 003**)**Lab Location:** F158**Lab Sessions:** *Lab groups subject to change*

|             |          |                 |                  |
|-------------|----------|-----------------|------------------|
| Section 309 | Monday   | Lab Groups #1-3 | 12:00 PM-3:00 PM |
| Section 308 | Thursday | Lab Groups #4-6 | 9:30 AM-12:30 PM |
| Section 302 | Thursday | Lab Groups #7-9 | 5:30 PM-8:30 PM  |

**Required Course Material:** Lab manual and .ppt slides (download on Canvas)**Reference Textbook:** Experimental Methods for Engineers, 8<sup>th</sup> Ed  
J. P. Holman (ISBN: 978-0-07-352930-1)**Course Description:**

A continuation of MEEN 3240, MEE Lab I, covers principles of experimentation. Students perform a series of experiments in key areas of fluid mechanics and heat transfer. Experiments will cover flow velocity measurement, flow across a circular cylinder, drag force measurement and velocity boundary layers, thermal conductivity measurement, fin performance, transient heat conduction, natural and forced convection and radiation.

**Pre/co-requisites:** MEEN 3240, MEEN 3120; (Co-requisite) MEEN 3210

|                                |            |          |   |
|--------------------------------|------------|----------|---|
| <b>Grades:</b> Lab Reports (9) | 45%        | ≥ 90%    | A |
| Lab Attendance (9)             | 15%        | 80-89.9% | B |
| Midterm 1 (Labs 1-4)           | 20%        | 70-79.9% | C |
| <u>Midterm 2 (Labs 5-9)</u>    | <u>20%</u> | 60-69.9% | D |
| Total                          | 100%       | < 60%    | F |

**Lab Reports:** Physical paper copies of lab reports are required. Lab reports need to be submitted to the TA or instructor by a member of the report group. A template for the lab report in Word document format is available on Canvas. Download and use the template directly. *No virtual/online lab reports are accepted.*

**Due dates for lab reports:** Lab reports are due at your next scheduled lab group section. For example, if your lab group meets on Thursday from 10:30 – 11:30 am, your lab reports are due at 10:30 am each Thursday. In this case, a lab report turned in after Thursday at 10:31 am will be considered as late and will not be collected/graded. No late lab reports will be collected/graded/honored.

**Lecture attendance:** Lecture attendance is optional. Lecture hour is used for introductory material, review sessions, and midterm exams. Attendance for midterm exams are required.

**Lab attendance:** Lab attendance is mandatory. As method to take attendance, the TA will bring an attendance sheet with your names and groups. Sign in with your EUID (abc#####). Lab attendance will be incorporated in your lab report peer evaluation score.

**Teams/groups:** Each lab group consists of up to 6 students. Once the group roster is formed during the first week of lab, students stay in the group and cannot change lab groups for the semester. Within each lab group, each report group consists of up to 3 students. Report groups can change between reports, but only within the lab group members. A group must have more than one individual. Anyone unwilling or unable to work in a group will fail the course. The instructor reserves the right to move students between groups.

**Peer evaluations:** An online (Canvas) peer evaluation form will be performed for each experiment. Participation in peer evaluations is counted to each student's attendance count. Each student member will evaluate every other member of the report group anonymously by a scale of 0-4 across a variety of questions. A score of 4 means satisfactory performance on the assigned part of work while a score of 0 means no contribution. Peer evaluations open the week the corresponding report is due, and close on the last day of the semester. Scores from peers are weighted on each student's report grade after all reports are graded.

**Midterm exams:** There are **no make-up exams**, with the following exceptions: Documented and dated medical emergency, religious holidays, jury duty, military duty, collegiate athletics competition, and academic/professional conference travel. Documented evidence must be submitted to the instructor at least 7 days in advance of the exam.

- (1) Exams are closed book and closed notes with formula sheets.
- (2) Formula sheets can be maximum 5 pages on top of instructor's handouts.
- (3) The student is responsible for preparing their own formula sheet.
- (4) Formula sheets can include anything EXCEPT: Data or data analysis in lab report or experimental manual. Formula sheets must be turned in with the exam papers. Formula sheets are checked upon grading, and any student who fail to follow this rule will receive a 0 in the exam. Additional academic misconduct reporting to the department or university will follow.

**EXAM DATES: 11:30-12:30 Friday, Oct. 3, 2025 (Midterm 1)**  
**11:30-12:30 Friday, Nov. 14, 2025 (Midterm 2)**

**ABET 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 3242<br>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 |

**Disability Accommodations:** If you need academic accommodations for disability you must have document which verifies the disability and makes you eligible for accommodations, then you can schedule an appointment with the instructor to make appropriate arrangements.

**Academic Dishonesty:** There is a zero tolerance policy. Cheating of whatsoever 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.

**MEEN 3242 Fall 2025 Schedule**  
(Subject to change)

| <b>Week</b> | <b>Lecture</b>   | <b>Experiment</b> | <b>Report Due</b> |
|-------------|------------------|-------------------|-------------------|
| 8/18-8/22   | Syllabus/Safety  |                   |                   |
| 8/25-8/29   |                  | <b>1</b>          |                   |
| 9/2-9/5     | Data Analysis    |                   |                   |
| 9/8-9/12    |                  | <b>2</b>          | <b>1</b>          |
| 9/15-9/19   |                  | <b>3</b>          | <b>2</b>          |
| 9/22-9/26   | Review           | <b>4</b>          | <b>3</b>          |
| 9/29-10/3   | <b>Midterm 1</b> |                   | <b>4</b>          |
| 10/6-10/10  |                  | <b>5</b>          |                   |
| 10/13-10/17 |                  | <b>6</b>          | <b>5</b>          |
| 10/20-10/24 |                  | <b>7</b>          | <b>6</b>          |
| 10/27-10/31 |                  | <b>8</b>          | <b>7</b>          |
| 11/3-11/7   | Review           | <b>9</b>          | <b>8</b>          |
| 11/10-11/14 | <b>Midterm 2</b> |                   | <b>9</b>          |
| 11/17-11/21 |                  |                   |                   |
| 11/25-11-29 |                  |                   |                   |
| 12/2-12/6   |                  |                   |                   |