

MENG 3211 – Thermal-Fluids Laboratory
Course Syllabus

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| Semester / Year | Spring 2023 |
| Catalog Description | Introduction to basic Thermal/Fluid sciences laboratory procedures and practices. Experimental topics to include fluid flow, heat exchanger basics, and basics of refrigeration. Student teams will design, analyze, and document an experimental procedure. All procedures will result in a professional quality laboratory report. |
| Prerequisites | Grade C or better in: <ul style="list-style-type: none"> - MENG 3210 (Experimental Measurement and Techniques Lab) - MENG 3401 (Thermodynamics) - MENG/CENG 3310 (Fluid Mechanics) - and co-requisite EENG 3308 |
| Section number | Lecture: MENG 3211.030 Lab: MENG 3211.030L, MENG 3211.031L, MENG 3211.032L |
| Instructor names | Ola Al-Shalash and Dr. M. A. Rafe Biswas |
| Contact info | Ola Al-Shalash: Office: Houston Engineering Center: HEC A212 Email: oyalshalash@uttyler.edu Dr. Rafe Biswas: Office: Houston Engineering Center: HEC A214 Email: mbiswas@uttyler.edu , Phone: 903 566 6115 |
| Class Type / Location | Lecture 030: Face-to-face / HEC A218 Lab 030L, 031L, 032L: Face-to-face / HEC B222 |
| Class Time | Attend the following lecture/lab based on myuttyler enrollment: MENG 3211.030: Monday 4:05 PM - 5:00 PM MENG 3211.030L: Wednesday 2:30 PM -5:15 PM MENG 3211.031L: Friday 2:00 PM - 4:45 PM MENG 3211.032L: Monday 5:05 PM -7:50 PM |
| Office Hours | Ola Al-Shalash: Fridays: 3:00 PM – 6:00 PM Via Zoom or by appointment Dr. Rafe Biswas: Wednesdays: 11:00 AM – 12:30 PM & 5:30 PM – 6:00 PM or by appointment |

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| | <ul style="list-style-type: none"> • Attendance will be taken and regularly checked using Canvas. Students who come to class after attendance is taken will be considered absent. • In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class. • Students will not be permitted to leave the classroom during lectures/labs except for extreme emergencies. • No email submission of assignments, HomeWorks, etc. All assignments MUST be submitted to Canvas for grading. • No makeups unless students provide a university accepted excused absence with proper documentation at the discretion of the instructor. • A student missing a laboratory activity by 10 minute or more (e.g. arrive at 2:10:01 pm instead of at 2:00:00 pm) will have zero in the laboratory assignment. • Questions involving knowledge covered in class (lecture/laboratory) will be answered if the student proves that they have tried to come up with the answer. Solution to homework and quizzes will not be given. However, students can work on the right solution by checking their work with the instructor. • Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements. • Any minor violation of the Student Behavior (see below) or the Lab Safety form (see Canvas) by a student as deemed by the instructor will result in a full letter grade reduction for each incident while any major violation(s), such as cheating and plagiarism, by a student as deemed by the instructor will result in automatic failing grade in the course. • The use of cellular phones during the class and lab is prohibited. • No food is allowed in the classroom or laboratories. |
| <p>Course Learning Objectives / ABET & PEOs relation</p> | <p>Expected Learning Outcomes By the end of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Apply fluid mechanics concepts for analysis of basic fluid mechanics experiments. 2. Apply heat transfer concepts for analysis of basic heat exchangers configurations. 3. Apply thermal system concepts for analysis of refrigeration and heat pump cycles, and psychrometrics processes. |

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| | <p>4. Design, perform, and report results of a mechanical engineering experiment.</p> <p>5. Write professional quality laboratory reports.</p> |
| Tentative Topics | <ul style="list-style-type: none"> • Fluid mechanics laboratory procedures and devices. • Basic heat exchanger operation. • Basic psychrometrics • Self-directed laboratory investigation. |
| University Policies | <p>https://www.utyler.edu/academic-affairs/files/syllabus_information_2021.pdf</p> |

Evaluation activities:

- **Exams:** there will be one exam during the semester. Late or no submission for the exam results in automatic grade of zero.
- **Quizzes:** quizzes will be pop quizzes that are assigned/ applied according to the topics covered in lectures and lab activities.
- **Assignments:** Assignment include but not limited to pre-lab draft reports, in-class activities, MathCad assignment and MATLAB homework. Most assignments need to be completed before each lab, in which the content may be covered.
- **Class Participation and Attendance:** Attendance is expected to lecture and mandatory to laboratory classes; taking notes and participating in discussions and class activities are required while in class.
- **Lab Reports:** For each laboratory activity, a report must be submitted for grading on Canvas. Instructions on lab report format/style and grading rubric will be given separately. In addition, each lab report should include an appendix section that shows a list that shows which team member worked on what parts of the lab and how many hours is spent (this applies to the project report as well). Peer Evaluation will have to be completed for couple selected lab reports if not all.
- **Project Report:** Each student, part of a group, will work on one project of a topic approved by the instructor. The default project will be given separately. Students working in groups must propose the concept, demonstrate the experiment, and show the results of the project and finally discuss them. Each student must also fill out a Peer Evaluation form for each report. Peer Evaluation will be used to help calculate the Peer/Instruction Evaluation grade that is added to the overall project grade and different from the group project report grade in case a concern is raised from one of the team members. Same method is used for lab report peer evaluation.

NOTE: Instructions on the written and oral report format/style, grading rubric and peer evaluation forms will be given separately on Canvas. Late submissions of assignments, lab reports (e.g. if due at 11:59:00 pm, then any time after such as 11:59:30 pm is late) will result in **20 % deduction per day** from the graded score.

Student attitude:

- Given this is a professional, educational setting you are expected to dress and behave appropriately. A positive, mature attitude/behavior is expected from the students in all classes (lectures and laboratories). Students disturbing directly or indirectly the class or other students will be asked to leave the classroom or laboratory with the consequences associated to an absence.
- Students are encouraged to utilize any tutoring services available if needed and come prepared to each week's class and lab. Each student is expected to work with the group in a professional manner. It is important to communicate clearly and professionally of any concerns or issues to the instructor or lab assistant, who will relay to the instructor if they cannot be resolved independently.
- Canvas should be the primary mode of contacting the instructor so check the Canvas announcements and discussion board to check for information about the course. In addition, university provided patriots email should be the official communication method and you should check your email regularly. Use the above email address or Canvas messaging if you want to email the instructor. Please use **MENG 3211- your section, your question or concern title** in the email subject line. Please allow the instructor at least one to two business days to respond to your email. Emails with improper language will not be answered. Emails with same concerns or questions from multiple students will be answered/covered during class time.

NOTE: The syllabus is subject to change during the semester as deemed necessary. Students will be notified for any major changes.

Tentative Course Schedule

| # | Week of | Lecture Activity | Lab Activity |
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| 1 | Jan. 9 | Syllabus Course Introduction Uncertainty Analysis | Lab A - Lab Safety |
| 2 | Jan. 16 | No Class | Lab B - MATLAB Tutorial Course |
| 3 | Jan. 23 | Major Losses in Pipes | Lab C - Uncertainty Analysis using MathCad or MATLAB Live Editor |
| 4 | Jan. 30 | Minor Losses in Pipes | Lab D - Project expectations and instructions |
| 5 | Feb. 6 | Flow Meters/Venturi Flow | Lab 1 - Losses in Pipes |
| 6 | Feb. 13 | Flow through an Orifice | Lab 2 - Venturi Flow |
| 7 | Feb. 20 | Psychrometrics/ Refrigeration and Heat Pump Cycles | Lab 3 - Flow through an orifice |
| 8 | Feb. 27 | Heat Exchangers I | Lab 4 - Psychrometrics |
| 9 | Mar. 6 | Heat Exchangers II | Lab 5 - Heat Exchangers I |
| 10 | Mar. 13 | Spring break – No Classes | |
| 11 | Mar. 20 | Heat Exchangers III | Lab 6 - Heat Exchangers II |
| 12 | Mar. 27 | Exam Review | Preliminary Project Report due |
| 13 | Apr. 3 | Exam | Work on Project |
| 14 | Apr. 10 | Supplemental topic | Work on Project |
| 15 | Apr. 17 | Supplemental topic | Work on Project |
| 16 | Apr. 24 | Final Exam Week – Final Project Report Due | |