

MENG 3211 – Thermal-Fluids Laboratory

Semester / Year	Spring 2021
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	MENG 3210 (Experimental Measurement and Techniques Lab), MENG 3401 (Thermodynamics) and MENG/CENG 3310 (Fluid Mechanics).
Section number	030, 031, 030L, 031L, 032L
Instructor names	Ola Al-Shalash, and Dr. M. A. Rafe Biswas
Contact info	Ola Al-Shalash E-mail: oalshalash@uttyler.edu M. A. Rafe Biswas Office: Houston Engineering Center A214 E-mail: mbiswas@uttyler.edu Phone: (903) 566-6115
Class Type / Location	030: Hybrid (Face-to-face or Zoom synchronous) / HEC B210 031: Hybrid (Face-to-face or Zoom synchronous) / HEC C203 030L, 031L & 032L: Hybrid (Face-to-face or Zoom synchronous) / HEC B222
Class Time	030: Monday 8:00 AM – 8:55 AM 031: Tuesday 8:00 AM – 8:55 AM Attend the required lab meeting based on myuttyler enrollment: 030L: Wednesday 2:00 PM - 4:45 PM 031L: Friday 8:00 AM - 10:45 AM 032L: Friday 12:30PM - 3:15 pm
Office Hours	Ola Al-Shalash Office Hours: By appointment. M. A. Rafe Biswas Office Hours: Zoom meeting only: MTh 9:00 to 10:00 am, and TuW 3 to 4 pm or By appointment <i>via</i> Zoom (details posted on Canvas) Meeting ID: 939 967 967, Passcode: S2021
Credit Hours	2 (1 hour lecture and 3 hours laboratory per week).

Required Textbook	(T) Electronic textbook (supported by OER grant) provided by instructor on Canvas.
Optional References	Textbooks from Experimental Measurements and Techniques Lab, Fluid Mechanics, Thermodynamics and Heat Transfer courses In addition, (T) Morris, Alan S. Langari, Reza. (2012). Measurement and Instrumentation - Theory and Application. Elsevier. (https://app.knovel.com/hotlink/toc/id:kpMITA0001/measurement-instrumentation/measurement-instrumentation) (T) Design of Fluid Thermal Systems, 4th ed. (SI edition), by W.S. Janna, Cengage Learning, 2010
Additional requirements	Handouts and manuals posted on Canvas. Software available through virtual desktop – one.uttyler.edu and IT support.
Evaluation Method	Grading Exams 25% Laboratory Reports 30% Project Reports 20% Assignments 25%
Grading Policy / Scale	Letter grades Scale: A 90 – 100 B 80 – 89 C 70 – 79 D 60 – 69 F < 60 Grade appeal: grades can be appealed by sending a Canvas message in written or typed format and then meeting the instructor during office hours, but no later than a week after the grade has been posted. Moreover, students may appeal any grade reduction to the instructor if valid excuse with documentation is provided. Note: your final semester grade is based on the 10-point scale. No curving or scaling will be applied even if you receive borderline grade such as 79.99.
Important events / dates	Census date: Jan 25 Exam 1: March 1 Exam 2 (during Finals week): April 26 (Tentative)
Attendance / Makeup policy	1. Attendance is expected per university policy. Attendance of lectures and labs will be regularly checked using Canvas. 2. Make-up exams or assignments if approved by instructor will be administered during finals week. 3. No email submission of assignment(s). All assignments MUST be submitted to Canvas for grading. 4. Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements.

	<p>5. Any minor violation of the Student Behavior (see below) or the Lab Safety form (see Canvas) by a student as deemed by 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 instructor will result in automatic failing grading in the course.</p> <p>Additional policies amid COVID-19</p> <p><i>Lectures:</i></p> <ol style="list-style-type: none"> 1. Attendance lectures, either by face-to-face or live Zoom synchronous, will be checked randomly throughout the semester using Canvas quizzes or assignments. 2. Face-to-face: Students are recommended to attend one lecture per week based on their corresponding section. 3. Zoom Synchronous: Students who are NOT attending the face-to-face lectures are required to enter the live Zoom synchronous class. <p><i>Laboratories:</i></p> <ol style="list-style-type: none"> 1. Lab attendance is required either by face-to-face or live zoom, and each lab will have an attendance assignment or quiz on Canvas. 2. Face-to-face: Students will be entering the laboratory (HEC B222) in ONE group (max six students) setting with instructor/TA during the assigned lab hours. 3. Zoom Synchronous: Lab activities will be live on zoom for student participation. A student missing a laboratory activity will have zero in the corresponding laboratory assignment(s) and must complete a makeup assignment to avoid to receive a grade. An opportunity to make up assignments/exams /lab activities may be available to students with a university accepted excused absence with proper documentation at the discretion of the instructor.
<p>Course Learning Objectives / ABET & PEOs relation</p>	<p>Expected Learning Outcomes</p> <p>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. 4. Design, perform, and report results of a mechanical engineering experiment. 5. Write professional quality laboratory reports.
<p>Tentative Topics</p>	<ul style="list-style-type: none"> • Fluid mechanics laboratory procedures and devices. • Basic heat exchanger operation. • Basic psychrometrics and refrigeration/heat pump devices and operation. • Self-directed laboratory investigation.
<p>Other</p>	<p>Tentative course schedule:</p>

<u>Evaluation activities</u>		
Week of	Lecture Activity	Lab Activity
Jan 11	Course Introduction/Syllabus/ Uncertainty Analysis	No Lab
18	Major/Minor Losses in Pipes	Lab Introduction/Uncertainty Analysis using MathCad or MATLAB Live Editor
25	No Class	Lab 1 - Losses in Pipes
Feb 1	Flow Meters/Venturi Flow	Lab 2 - Venturi
8	Flow through an Orifice	Lab 3 - Flow through an orifice
15	Exam 1 Review	Project expectations and instructions
22	<u>Exam 1</u>	Work on Assignment/Project
Mar 1	Psychrometrics/ Refrigeration and Heat Pump Cycles	Preliminary Project Report due
8	No Class – Spring Break	No Class – Spring Break
15	Heat Exchangers I	Lab 4 – Psychrometrics
22	Heat Exchangers II	Lab 5 - Heat Exchangers I
29	Heat Exchangers III	Lab 6 - Heat Exchangers II
Apr 5	Supplemental topic	Lab 7 - Heat Exchangers III
12	Supplemental topic	Work on Assignment/Project
19	Exam 2 Review	Final Project Report due
26	<u>Exam 2</u> (No class)	No lab

	<ul style="list-style-type: none"> ➤ Exams: There will be two exams during the semester. Late or no submission for any exam results in automatic grade of zero. ➤ Assignments (Quiz, Class Participation and Conduct): upto 8 quizzes need to be completed before each lab, in which the content may be covered, and quiz questions will be answered if the student proves that has tried to come up with the answer. Solution to assignments might not be provided. However, students can work on the right solution by checking their work with the instructor. Attendance is expected to lecture and laboratory classes, including taking notes and participating in discussions are required while in class. Participation and joining a Group on Canvas are mandatory for completion grade. 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 and must work in a makeup assignment in order to avoid 0% on corresponding laboratory assignment(s). A pre-lab draft report is required to be submitted as part of quiz or participation assignment before the beginning of the intended laboratory class. ➤ Lab Reports: For each laboratory activity, a report <u>must be submitted</u> before the beginning of the following laboratory class for grading on Canvas. Total of 7 lab activities. Instructions on lab report format/style and grading rubric will be given separately, but they are part of the Syllabus. In addition, each lab report should include an appendix section that shows list that shows which team member worked on what parts of the lab and how many hours spent. Peer Evaluation will have to be completed for at least 2 selected lab reports. ➤ Project Reports: Each student, part of a group, will work on one design lab project of a topic approved by the instructor. The default project option will cover the topic of heat exchanger to determine optimal configuration for maximum heat transfer. Students working in groups must propose the concept, demonstrate the experiment, and show the results of the project. Total of 2-3 reports to be submitted as announced in class. Each student must also fill out a Peer Evaluation form for each report before the end of the semester to help calculate the Peer/Instruction Evaluation grade that is added to the overall project grade and different from the group project report grade. <p>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 including quizzes, lab and project 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 10% deduction per day (or 24 hours) from the graded score. All late assignments must be submitted on Canvas by last class day of the semester (Friday at 5 pm). After that time, all late assignments will result in automatic grade of zero.</p> <p><u>Student Behavior</u></p> <ul style="list-style-type: none"> ➤ Academic dishonesty, in the form of cheating, fabrication, falsification, multiple submissions, plagiarism, and complicity, will not be tolerated. Regulations about academic dishonesty are contained in <i>A Student Guide to Conduct and Discipline at UT Tyler</i>, which may be obtained from the Office of Student Affairs. ➤ The Student Conduct and Lab Safety Form available electronically should be used to follow guidelines and will be used to assess part of Assignment grade. ➤ The use of cellular phones during the class and lab is prohibited. ➤ No food or drink is allowed in the classroom or laboratories.
--	---

	<ul style="list-style-type: none"> ➤ Student attitude: Given this is a professional, educational setting you are expected to dress and behave appropriately including wearing full pants and closed-toed shoes. 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 instructors so check the Canvas announcements and discussion board to check for information about the course. In addition, university provided patriots email should be official communication mode for topics outside the class and you should check your email regularly. If you email us, please allow upto 24 hours to respond on weekdays and 48 hours on weekends. If you call us and we don't answer, then please leave a voicemail with your name and reason for calling so we can call or email back. Otherwise the phone call will not be responded to. <p>Important Covid-19 Information for Classrooms and Laboratories Students are required to wear face masks covering their nose and mouth, and follow social distancing guidelines, at all times in public settings (including classrooms and laboratories), as specified by the university procedures posted online. The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff. Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home and may join the class remotely. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.</p> <p>Recording of Class Sessions Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.</p> <p>NOTE: The syllabus is subject to change during the course of semester as deemed necessary.</p>
--	--

University, College, and Department Policies:

1. Modifications

The instructor reserves the right to change this syllabus partially or fully at any point in time. Sufficient time and notice will be provided to the class before the activation of the changes.

2. UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

3. Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, or material which has been submitted within a different course without explicit approval of the instructor, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

- i. “Cheating” includes, but is not limited to:
 - copying from another student’s test paper;
 - using, during a test, materials not authorized by the person giving the test;
 - failure to comply with instructions given by the person administering the test;
 - possession during a test of materials, or devices and instruments allowing access to materials, which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes” as well as cell phones, to name a few. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
 - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
 - collaborating with or seeking aid from another student or person during a test or other assignment without explicit authorization;
 - discussing the contents of an examination with another student who will take the examination;
 - divulging the contents of an examination, for the purpose of preserving questions for use by another, or removing material from the exam location, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
 - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
 - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
 - falsifying research data, laboratory reports, and/or other academic work offered for credit;
 - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
 - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
- ii. “Plagiarism” includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.
- iii. “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- iv. All written work that is submitted will be subject to review by plagiarism software.

- v. Penalty for any related infractions will be decided at the discretion of the instructor including, but not limited to, granting of a failing grade in part or the course or in the entire course.

4. Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

5. Important Covid-19 Information for Classrooms and Laboratories

Students are required to wear face masks covering their nose and mouth, and follow social distancing guidelines, at all times in public settings (including classrooms and laboratories), as specified by [Procedures for Fall 2020 Return to Normal Operations](#). The UT Tyler community of Patriots views adoption of these practices consistent with its [Honor Code](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home and may join the class remotely. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

6. Recording of Class Sessions

Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

7. Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

8. UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless

tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support.

For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

9. Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

10. State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

11. Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

The University of Texas at Tyler has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Like so many things this Fall, the need for accommodations

and the process for arranging them may be altered by the COVID-19 changes we are experiencing and the safety protocols currently in place. Students with disabilities who may need accommodation(s) in order to fully participate in this class are urged to contact the Student Accessibility and Resources Office (SAR) as soon as possible, to explore what arrangements need to be made to ensure access. During the Fall 2020 semester, SAR will be conducting all appointments via ZOOM. If you have a disability, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student Application. For more information, please visit the SAR webpage at <http://www.utttyler.edu/disabilityservices> or call 903.566.7079.

12. Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

13. Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

14. Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

15. Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

16. UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@utttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@utttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.

UT Tyler Counseling Center (903.566.7254)