

SYLLABUS & COURSE INFORMATION

MEC 317 – THERMAL SCIENCES AND FLUID MECHANICS LABORATORY

FALL 2021

Description

Hands-on experience in fluid mechanics, heat transfer, and thermodynamics. Introduction to a variety of sensors and instruments commonly used in mechanical engineering with focus on temperature, pressure, and flow velocity measurements. Student groups perform a series of experiments with emphasis on the understanding of fundamental principles as well as familiarity with modern experimentation. Lectures provide background information and theories of experimentation. Not to be taken in the same semester as MEC 316. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

Prerequisites: MEC major; PHY 134; U3 or U4 standing

Co-requisites: MEC 220; MEC 300; MEC 301; MEC 364; AMS 361 or MAT 303

Instructors

- Thomas Cubaud (thomas.cubaud@stonybrook.edu)
Office hours: Monday 2:30 – 3:30 PM and Tuesday 12:00 – 1:00 PM, Room 218 Heavy Eng.

Laboratory Teaching Assistant

- Thai Dinh (thai.dinh@stonybrook.edu)
Office hours: Lab hours

Weekly schedule:

Lectures: Asynchronous video lectures are posted on Blackboard

Laboratory session: Tuesday 1:15 – 4:05 PM, Heavy Engineering 206

Credit earned: 2 credits

Grading: Your semester letter grade will be based upon your performance in the following category:
10 laboratory reports – 100 %

Students form groups of three or four individuals to perform all labs. The group collectively submits a single report for each experiment.

Text Book: PDF files of laboratory instruction manual and lectures will be provided.

Lab Reports

You must submit your lab report one week after it is conducted. A detailed schedule will be provided for each group.

Penalty for Late Submission of Reports

10 points (10%) deducted from final score for *each* day late. No exceptions will be made.

Report Content

1. Title Page (experiment title, <i>all</i> names, date)	7. Results
2. Abstract	8. Discussion
3. Introduction	9. Error Analysis
4. List of Equipment	10. Conclusions
5. Theory (includes drawings and descriptions)	11. References (if you have them)
6. Experimental Procedures	12. Appendices (handwritten and spreadsheet calculations)

Reports must be typed with a 12 pt font and **double-spaced**. Handmade drawings of experimental setup are permitted. Graphs of data may be done by hand but it is strongly recommended to use a computer equipped with software such as Excel.

Grading Rubrics

Abstract		/ 5 pts
Introduction		/ 5 pts
List of Equipment		/ 5 pts
Theory		/ 10 pts
Experimental Procedure		/ 10 pts
Results		/ 15 pts
Discussion		/ 15 pts
Error Analysis		/ 15 pts
Conclusions		/ 5 pts
Writing		
Clarity		/ 5 pts
Style		/ 5 pts
Presentation		/ 5 pts
Total		/ 100 pts

Grading scheme of all reports

Writing points	Unsatisfactory 1	Developing 2	Satisfactory 3	Exemplary 4	Outstanding 5
Clarity and organization	Little evidence of attention to organization, ideas do not flow within paragraphs and in the document as a whole	Some attention to organization evident with either paragraph, sections, or in the overall document	Organization of thoughts does not detract from the clarity of the work, sequence of ideas could be improved	Organization of ideas is well conceived and adds to the clarity of the work	Displays logically rigorous and engaging organization of thoughts, insightful scientific reasoning
Style and grammar	Generally limited or inappropriate vocabulary, regular and repeated grammatical errors	Often limited and at time inappropriate vocabulary, regular grammatical errors with examples of the correct forms	Generally effective use of vocabulary, avoids use of slang, grammatical error limited to likely typographical error	Uses effective and engaging language and word choices, consistently follows the rules of standard English	Uses specific terminology, combines practical and elegant word choices
Presentation and format	Document is poorly formatted, equations poorly typeset, tables and figures have no captions, text is not aligned, text/headings poorly paginated	Some attention to aesthetics is evident, but many aspects of acceptable presentation is missing	Clear attention to aesthetics, there is an apparent understanding that presentation style can enhance the clarity of the work	A clear effort is made to use presentation format to draw the reader's attention to important aspects of the work for enhancement of clarity	Adapts figures and tables to foster understanding of information, professional formatting of text and equations

Grading scheme of each report writing section

Course Learning Objectives

1. Demonstrate the ability to collect data from thermocouple, RTD, thermistor, mass flow meter, pitot tube manometer, pressure sensors, and digital image processing
2. Learn how to work in a team and meet deadlines
3. Assess quantitatively experimental accuracy and dominant sources of uncertainties
4. Learn how to compare experimental data with theoretical predictions
5. Refinement of a student's writing style, organization, and clarity in drafting a technical report.
6. Elimination of common writing mistakes as the use of slang, inconstant or improper use of tense, use of fragments or run-on sentences, unnecessary repetition of words or ideas, and not writing from the perspective of the reader.
7. Knowledge of proper report formatting and ability to use modern typesetting, graphing, and analysis software to create a manuscript of professional appearance

How We Will Communicate:

Course-related questions should be posted in the General Questions Forum in the course Discussion board. For personal/private issues, my preferred method of contact is via email listed at the top of this syllabus. If you use Blackboard's Email Tool, it will automatically include your full name, course name and section when you send me an email. I strive to respond to your emails as soon as possible, but please allow between 24-48 hours for a reply. Your Stony Brook University email must be used for all University related communications. You must have an active Stony Brook University e-mail account and access to the Internet. *All instructor correspondence will be sent to your SBU e-mail account.* Please plan on checking your SBU email account regularly for course related messages. To log in to Stony Brook Google Mail, go to <http://www.stonybrook.edu/mycloud> and sign in with your NetID and password.

Technical Requirements:

This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard course site can be accessed at <https://blackboard.stonybrook.edu> If you are unsure of your NetID, visit <https://it.stonybrook.edu/help/kb/finding-your-netid-and-password> for more information. You are responsible for having a reliable computer and Internet connection throughout the term. It is recommended to use Microsoft Office for writing laboratory reports. Graphs can be generated with Excel.

Detailed Schedule for Thermal-Fluid Labs - Fall 2021

	Monday (Lecture) Online	Tuesday (Lab) 3:00 – 6:00 pm Online group sessions
Week 1	23-August Video Lectures on Intro/Group, Error analysis & Report writing	24- August No lab
Week 2	30-August Video lectures for Exp. 1 – 5	31- August No Lab
Week 3	6-September No Lecture (Labor Day)	7-September Exp. 1 – 5
Week 4	13-September No Lecture	14-September Exp. 1 – 5
Week 5	20-September No Lecture	21-September Exp. 1 – 5
Week 6	27-September No Lecture	28-September Exp. 1 – 5
Week 7	4-October Video lectures for Exp. 6 – 10	5-October Exp. 1 – 5
Week 8	11-October No Lecture (Fall break)	12-October No Lab (Fall break)
Week 9	18-October No Lecture	19-October Exp. 6 – 10
Week 10	25-October No Lecture	26-October Exp. 6 – 10
Week 11	1-November No Lecture	2-November Exp. 6 – 10
Week 12	8-November No Lecture	9-November Exp. 6 – 10
Week 13	15-November No Lecture	16-November Exp. 6 – 10
Week 14	22-November No Lecture	23-November No Lab
Week 15	29-November No Lecture	30-November No Lab

STONY BROOK UNIVERSITY SYLLABUS STATEMENT:

Student Accessibility Support Center Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website <https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities> and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Equivalent Opportunity/Religious Absences:

Some students may be unable to attend classes on certain days because of religious beliefs. Section 224-a of the New York State Education Law provides that:

1. No person shall be expelled from or be refused admission as a student to an institution of higher education for the reason that he or she is unable, because of his or her religious beliefs, to register or attend classes or to participate in any examination, study, or work requirements on a particular day or days.
2. Any student in an institution of higher education who is unable, because of his or her religious beliefs, to attend classes on a particular day or days shall, because of such absence on the particular day or days, be excused from any examination or any study or work requirements.
3. It shall be the responsibility of the faculty and of the administrative officials of each institution of higher education to make available to each student who is absent from school, because of his or her religious beliefs, an equivalent opportunity to register for classes or make up any examination, study, or work requirements which he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the institution for making available to the said student such equivalent opportunity.
4. If registration, classes, examinations, study, or work requirements are held on Friday after 4:00 p.m. or on Saturday, similar or makeup classes, examinations, study, or work requirements, or opportunity to register shall be made available on other days, where it is possible and practicable to do so. No special fees shall be charged to the student for these classes, examinations, study, or work requirements, or registration held on other days.
5. In effectuating the provisions of this section, it shall be the duty of the faculty and of the administrative officials of each institution of higher education to exercise the fullest measure of good faith. No adverse or prejudicial effects shall result to any student because of his or her availing himself or herself of the provisions of this section.
6. Any student who is aggrieved by the alleged failure of any faculty or administrative officials to comply in good faith with the provisions of this section shall be entitled to maintain an action or proceeding in the supreme court of the county in which such institution of higher education is located for the enforcement of his or her rights under this section.
7. It shall be the responsibility of the administrative officials of each institution of higher education to give written notice to students of their rights under this section, informing them that each student who is absent from school, because of his or her religious beliefs, must be given an equivalent opportunity to register for classes or make up any examination, study, or work requirements which he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the institution for making available to such student such equivalent opportunity.
8. As used in this section, the term "institution of higher education" shall mean any institution of higher education, recognized and approved by the Regents of the University of the State of New York, which provides a course of study leading to the granting of a post-secondary degree or diploma. Such term shall not include any institution which is operated, supervised, or controlled by a church or by a religious or denominational organization whose educational programs are principally designed for the purpose of training ministers or other religious functionaries or for the purpose of propagating religious doctrines. As used in this section, the term "religious belief" shall mean beliefs associated with any corporation organized and operated exclusively for religious purposes, which is not disqualified for tax exemption under section 501 of the United States code.