

SYLLABUS & COURSE INFORMATION

MEC 317 – THERMAL SCIENCES AND FLUID MECHANICS LABORATORY

FALL 2020

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 12:00 – 2:00 PM (See blackboard for instruction) + Lab hours

Laboratory Teaching Assistant

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

Weekly schedule:

Lectures: Asynchronous lectures posted on Monday (see detailed schedule below)

Laboratory: In-person or remote lab session on Tuesday or Thursday 3:00 – 6:00 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. Due to the evolving situation related to the COVID-19 pandemic and the need to ensure physical/social distancing guidelines, only one student per group is permitted to enter laboratory premises to directly collect experimental data. A log book will be made available on blackboard for scheduling experiments and registering for laboratory access. While students are encouraged to physically attend laboratory sessions to familiarize themselves with instruments and enhance their learning experience, in-person attendance is not mandatory and data samples are available for each experiment. Grading is exclusively based on laboratory reports and is not contingent upon in-person or remote attendance of laboratory sessions. Students/groups who do not feel comfortable or cannot attend in-person lab sessions will be provided with data samples and reports will be graded based on identical rubrics as in-person labs. Therefore, students should not feel pressured nor need to provide justification for not physically attending laboratory sessions. Grading of laboratory reports is based on analysis, interpretation, and presentation of experimental data and does not include rubrics based on in-person or remote data collection. As the public health situation evolves, the course may switch to a full on-line class during the semester. Information will be provided on Blackboard.

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

Lab Reports

You must submit your previous lab report when you *arrive* at the lab for the next lab class.

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		/ 15 pts
Clarity	/ 5 pts	
Style	/ 5 pts	
Presentation	/ 5 pts	
Total		/ 100 pts

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 times 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 all reports

Grading scheme of each report writing section **and** individual writing requirement

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
8. Utilize the Code of Engineering Ethics to analyze case studies found in engineering and business involving ethical questions

Detailed Schedule for Thermal-Fluid Labs - Fall 2020

	Monday (Lecture) On-line	Tuesday (Lab) 3:00 – 6:00 pm 206 Heavy Engineering	Thursday (Lab) 3:00 – 6:00 pm 206 Heavy Engineering
Week 1	24-August Intro, Error analysis, Report writing, Groups	25-August No Lab	27-August No Lab
Week 2	31-August Overview of Exp. 1 – 5	1-September No Lab	3-September No Lab
Week 3	7-September Holiday (Labor Day)	8-September Exp. 1 – 5	10-September Exp. 1 – 5
Week 4	14-September No Lecture	15-September Exp. 1 – 5	17-September Exp. 1 – 5
Week 5	21-September No Lecture	22-September Exp. 1 – 5	24-September Exp. 1 – 5
Week 6	28- September No Lecture	29-September Exp. 1 – 5	1-October Exp. 1 – 5
Week 7	5-October No Lecture	6-October Exp. 1 – 5	8-October Exp. 1 – 5
Week 8	12-October Overview of Exp. 6 – 10	13-October No lab	15-October No lab
Week 9	19-October No Lecture	20-October Exp. 6 – 10	22-October Exp. 6 – 10
Week 10	26-October No Lecture	27-October Exp. 6 – 10	29-October Exp. 6 – 10
Week 11	2-November No Lecture	3-November Exp. 6 – 10	5-November Exp. 6 – 10
Week 12	9-November No Lecture	10-November Exp. 6 – 10	12-November Exp. 6 – 10
Week 13	16-November No Lecture	17-November Exp. 6 – 10	19-November Exp. 6 – 10
Week 14	23-November No Lecture	24-November No Lab	26-November Holiday (Thanksgiving)
Week 15	30-November No Lecture	1-December No Lab	3-December 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 Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, 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 Student Accessibility Support Center. For procedures and information go to the following web-site: <http://www.stonybrook.edu/ehs/fire/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 University 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.