

SYLLABUS & COURSE INFORMATION

MEC 317 – THERMAL SCIENCES AND FLUID MECHANICS LABORATORY

SPRING 2022

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: Tuesday 12:00 – 1:00 PM and Thursday 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 & Thursday 1:15 – 4:05 PM, Heavy Eng. 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 written report in PDF format for each experiment. Students are also encouraged to submit one or two lab reports in the form of a pre-recorded 10-min video presentation in mp4 format instead of written reports. All documents are to be uploaded on Blackboard

Text Book: PDF files of laboratory instruction manuals 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)

Grading Rubrics

Written 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. Similar to written reports, video reports should include all sections, from abstract to conclusion as shown in the grading scheme.

Grading scheme of all reports	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	
	Presentation			/ 15 pts
	Clarity	/ 5 pts		
Style	/ 5 pts			
Format	/ 5 pts			
Total		/ 100 pts		

Presentation points		Unsatisfactory 1	Developing 2	Satisfactory 3	Exemplary 4	Outstanding 5
Clarity		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	Written report	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
	Video report	Does not engage audience, uses inappropriate language, unprofessional demeanor. Lacks time management skills.	Lacked coherence. Engages some audience members with appropriate language. Exhibits poor time management .	Somewhat coherent and engages audience with language and demeanor mostly appropriate and professional. Exhibits some time management skills.	Mostly coherent. Engages audience with appropriate language and professional demeanor. Exhibits good time management	Coherent presentation. Engages audience with appropriate language, professional demeanor. Exhibits excellent time management
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 presentation (written or video)

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 communication style, organization, and clarity in drafting or presenting a technical report.

How We Will Communicate: 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.

Technical Requirements: This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard can be accessed at <https://blackboard.stonybrook.edu>

Detailed Schedule for Thermal-Fluid Labs - Spring 2022

	Monday (Lecture) Online	Tuesday (Lab) 1:15 – 4:05 pm 206 HE	Thursday (Lab) 1:15 – 4:05 pm 206 HE
Week 1	24- January Video Lectures on Intro/Group, Error analysis & Report writing	25- January No lab	27- January No lab
Week 2	31 - January Video lectures for Exp. 1 – 5	1 - February No Lab	3 - February No Lab
Week 3	7 - February No Lecture	8 - February Exp. 1 – 5	10 - February Exp. 1 – 5
Week 4	14 - February No Lecture	15 - February Exp. 1 – 5	17 - February Exp. 1 – 5
Week 5	21 - February No Lecture	22 - February Exp. 1 – 5	24 - February Exp. 1 – 5
Week 6	28 - February No Lecture	1 - March Exp. 1 – 5	3 - March Exp. 1 – 5
Week 7	7 - March Video lectures for Exp. 6 – 10	8 - March Exp. 1 – 5	10 - March Exp. 1 – 5
Week 8	14 - March No Lecture (Spring break)	15 - March No Lab (Spring break)	17 - March No Lab (Spring break)
Week 9	21 - March No Lecture	22 - March Exp. 6 – 10	24 - March Exp. 6 – 10
Week 10	28 - March No Lecture	29 - March Exp. 6 – 10	31 - March Exp. 6 – 10
Week 11	4 - April No Lecture	5 - April Exp. 6 – 10	7 - April Exp. 6 – 10
Week 12	11 - April No Lecture	12 - April Exp. 6 – 10	14 - April Exp. 6 – 10
Week 13	18 - April No Lecture	19 - April Exp. 6 – 10	21 - April Exp. 6 – 10
Week 14	25 - April No Lecture	26 - April No Lab	28 - April No Lab
Week 15	2 - May No Lecture	3 - May No Lab	5 - May 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. Until/unless the [latest COVID guidance](#) is explicitly amended by SBU, during Spring 2022 "disruptive behavior" will include refusal to wear a mask during classes. For the latest COVID guidance, please refer to: <https://www.stonybrook.edu/commcms/strongertogether/latest.php>

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.