SYLLABUS & COURSE INFORMATION

MEC 317 - MECHANICAL ENGINEERING LABORATORY II

SPRING 2018

Description

Hands-on experience in solid and fluid mechanics, heat transfer, and thermodynamics. Emphasis is on the understanding of fundamental principles as well as familiarity with modern experimentation. Lectures at the beginning of the course provide background information and theories of experimentation. Student groups perform five experiments each in solid mechanics and in thermal/fluid science. Report writing is an integral part of the course, with focus on design of experiment, interpretation and presentation of data, error analysis, and conclusions.

Instructors

Solid section: Mr. Ta-Yung Hsu (ta-yung.hsu@stonybrook.edu)
Fluid/Thermal section: Prof. Thomas Cubaud (thomas.cubaud@stonybrook.edu)

Teaching Assistants

T.A. Office hours = Lab. hours.
Solid section: Shaoyu Hou (shaoyu.hou@stonybrook.edu)
Fluid/Thermal section: Sean Hardick (sean.hardick@stonybrook.edu)

Preparation Lectures for Experiments,

All students

Course overview: Monday, Jan. 22 (1:00 – 1:50 PM, Engineering 143)
Topics: Basics of measurement & writing lab reports, group formation

Groups 1 – 20

Group 1 – 10: Solid section, Tues., Jan. 30 (1:30 – 4:30 PM, Heavy Engineering 206)
Group 11 – 20: Solid section, Thurs., Feb. 1 (1:30 – 4:30 PM, Heavy Engineering 206)
Group 1 – 20: Thermal/Fluid section, Mon., March 19 (1:00 – 1:50 PM, Engineering 143)

Groups 21 – 40

Group 21 – 40: Thermal/Fluid section, Mon., Jan. 29 (1:00 – 1:50 PM, Engineering 143)
Group 21 – 30: Solid section, Tues., March 20 (1:30 – 4:30 PM, Heavy Engineering 206)
Group 31 – 40: Solid section, Thurs., March 22 (1:30 – 4:30 PM, Heavy Engineering 206)

Laboratory Location and Time, Tuesday or Thursday 1:30 – 4:30 PM

Thermal/Fluid section: Heavy Engineering 206
Solid section: Heavy Engineering 206 (upstairs)

Grading Policy

The final grade will be determined from:
Ten (10) lab reports: total 100 % (minimum of 2 reports per student as first author[1])
Lab reports will be graded out of a maximum of 100 points each.

Laboratory fee:

A laboratory fee of $100 is required

[1] Students will form groups of three or four individuals to perform all labs. The group will collectively submit a single report for each experiment. Each student must write at least two reports as a **first author** (one for the S*olid* section and one for the *Fluid*/*Thermal* section). **All lab partners will receive the same grade for the course.**

First period: Groups 1 – 20: Solid Labs (Group 1 – 10: Tues., Groups 11 – 20: Thurs.)
Groups 21 – 40: Fluid/Thermal Labs (Group 21 – 30: Tues., Groups 31 – 40: Thurs.)

Tues. Groups	Thurs. Groups
2/06	2/08
2/13	2/15
2/20	2/22
2/27	3/01
3/06	3/08

(Spring Break: 3/12 – 3/16)

Second period: Groups 1 – 20: Fluid/Thermal Labs (Group 1 – 10: Tues., Groups 11 – 20: Thurs.)
Groups 21 – 40: Solid Labs (Group 21 – 30: Tues., Groups 31 – 40: Thurs.)

Tues. Groups	Thurs. Groups
3/27	3/29
4/03	4/05
4/10	4/12
4/17	4/19
4/24	4/26

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, *all* names, date due)
2. Abstract
3. Introduction
4. List of Equipment
5. Theory (includes drawings and descriptions)
6. Experimental Procedures
7. Results (includes calculation of experimental results; figures, graphs and tables must be labeled with a number and a caption; units, and all numerical quantities must be included)
8. Discussion (trends in the results, comparison with theoretical predictions)
9. Error Analysis
10. Conclusions
11. References (if you have them)
12. Appendices (handwritten calculations, spreadsheet calculations, and other data)
13. Prelab sheets from *all* members

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).

Course Learning Objectives

1. Demonstrate the ability to collect data from thermocouples, pressure sensors, pitot tube manometer, timer, moiré fringes, polariscope, fatigue testing machine, buckling machine, dynamic strain sensing, shear modulus tester, digital image recording.
2. Learn how to compare experimental data with theoretical predictions.
3. Learn how to work in a team and meet deadlines
4. Develop technical writing skills
5. Assess quantitatively experimental accuracy and dominant sources of uncertainties.

Text Book

A commercial textbook is not used for this course. Rather, we will provide you with two lab manuals, one for solids, and one for thermal systems, the cost of which is included in the lab fee. You will be given both books within the first two weeks of class. The beginning of the thermal/fluid lab manual has a section on effective report writing, error analysis, and other items to make life a bit easier when writing lab reports. Additional books for reference are listed below.

Reference Books

- *Measurement System, Application and Design, 3rd Ed.*, by Ernest O. Debelin, McGraw-Hill,1983.
- *Mechanics of Solids. An Introduction*, by T.J. Lardner and R. R. Archer, McGraw-Hill, 1994.
- *Experimental Stress Analysis, 2nd Ed.*, by J.W. Dally and W. F. Riley, McGraw-Hill, 1978.
- *The Dynamical Behavior of Structures, 2nd Ed.*, by G. B. Warburton, Pergammon Press, 1976.
- *Theory and Design for Mechanical Measurements*, by R. S. Figliola and D. E. Beasley, John Wiley, 1991.

All reference books above are reserved in the engineering library.

STONY BROOK UNIVERSITY SYLLABUS STATEMENT:

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or http://studentaffairs.stonybrook.edu/dss/.
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 Disability Support Services. For procedures and information go to the following website: http://www.sunysb.edu/ehs/fire/disabilities.shtml

STUDENT CONDUCT:

Stony Brook University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, and/or inhibits students' ability to learn.

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 are 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/uaa/academicjudiciary/

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 Judicial Affairs 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.