Syllabus

VM395: Mechanical Engineering Laboratory I

- Lectures: Tue, Thu 10:00–11:40, Long Bin Room 310F
- Lab Sections: Mon, 12:20–15:00, Tue, 18:20–21:00, Long Bin Room 310D

This syllabus is subject to change at the teaching team's discretion, based on class progress and needs.

Teaching Team

- Engineering: Kwee-Yan TEH, Long Bin Room 437C, tehk@sjtu.edu.cn
  Office hours: Mon, 15:30–16:30, Wed 16:00–17:00, or by appointment
- Technical Communication: Andrew YANG, Long Bin Room 407A, andrew.yang@sjtu.edu.cn
  Office hours: Thursdays 10:30-12:30, or by appointment
- Lab Teaching Assistants:
  HUA Yihe, huayihe-nmji@sjtu.edu.cn
  LIANG Xiao, liangxiao010@sjtu.edu.cn
- Technical Communication Teaching Assistant:
  HOU Linzao, houlinzao@sjtu.edu.cn (mailto:houlinzao@sjtu.edu.cn) . Office hours: Monday 20:00-22:00, location: Long Bin Building Discussion Room 326I

Course Description and Objectives

This is the first of two required Mechanical Engineering Lab courses that offer hands-on lab experience on the basics of mechanical engineering experimentation. The learning objectives for Vm395 include

1. Developing lab skills and competencies needed by professionals in mechanical engineering
   - Students will be aware of standard procedures and safe conduct in a laboratory
   - Students will gain hands-on experience in using basic measuring equipment for mechanical, thermal and fluid systems
   - Students will acquire, process, and reduce experimental data into clear and informative figures
   - Students will estimate the uncertainty of an experimental result due to measurement errors
2. Developing skill in communicating technical information orally and in writing
   - Students will build on the skills developed in previous courses in communicating technical ideas in oral presentations and written reports
   - Students will be able to complete a full-length lab report according to AIAA standards and formats
   - Students will also complete an interactive, carefully organized, and timed lab presentation.
3. Acquiring skills in working with others as a member of a lab team
   - Students will develop team-building skills to work more effectively as a team member to accomplish a common team goal

The IDEA course evaluation in the Joint Institute will assess the teaching effectiveness in this course based on student progress towards these learning objectives.

More about IDEA

The IDEA Student Ratings of Instruction is an anonymous online survey administered externally by the non-profit IDEA Center (http://www.ideaedu.org/Services/Services-to-Improve-Teaching-and-Learning/Student-Ratings-of-Instruction) . The survey is typically set for the last two weeks of the term, although more details will be forthcoming. Your prompt, thoughtful, and honest feedback through this survey is crucial for us to identify aspects of course instruction that are effective and areas for improvement.

Course Pre/Co-Requisites

Physics (Vp240/Vp260 and Vp241), solid mechanics (Vm211), dynamics (Vm240), thermodynamics (Vm235); preceded or accompanied by fluid mechanics (Vm320) and materials (Vm382). You are expected to have access to the textbooks and materials from these pre/co-requisite courses.

Additional Reference Texts

A. J. Wheeler and A. R. Ganji, 2004. *Introduction to Engineering Experimentation*, 2nd ed. (international ed.). Pearson Prentice Hall, NJ (ISBN: 978-013-124685-0).

R. S. Figliola and D. E. Beasley, 2011. *Theory and Design for Mechanical Measurements*, 5th ed. (international student ver.). Wiley (ISBN: 978-0-470-64618-2).

- These textbooks are available from the SJTU Main Library.
- They are not required texts.

Canvas Course Management System

Canvas (https://umjicanvas.com/) hosts the electronic versions of all Vm395 course materials, including lecture notes from the instructors, as well as documents submitted from each student and lab team. The instructors and teaching assistants may also use Canvas to make announcements and convey urgent messages to the entire class. Therefore, you are recommended to check Canvas on a daily basis.

Course Policies

Grading

Engineering Component 60%

- Lab Assignments: Thermistor 6%, Op-Amp 6%, Thermocouple 7%, Strain Gauges 10%, Microstructures 4%, Drag 8%
- Final Project 10%
- In-Class, In-Lab, and On-line (Canvas Discussion) Participation 9%

Technical Communication Component 40%

- Elements of the Lab Report: Abstract 2%, Equipment & Procedure 5%, Results & Tables & Graphs 5%, Discussion 4%, Introduction & Conclusion 5%
- Full-Length Lab Report: Drag 8%
- Final Project Presentation 5%
- Participation: 3% before mid-term, 3% after

Technical Communication grades will be submitted as letter grades, which will then be converted to numerical grades according to Canvas (ie: B- = 83, etc.). No partial numerical grades will be given, with the exception of “F,” which may range from 60 to 0.

Late Penalties: Your grade for the assignments will drop by 1/3 of a letter grade for each day that they are late, including weekends. In other words, a paper that would otherwise receive an A, if handed in one day late, would drop to an A- (and so on). Late assignments do not receive comments or suggestions. Assignments will *not be accepted* for marking one week after the due date. Extensions for assignments will only be given in exceptional circumstances, such as personal illness or family emergency, *with proper documentation* from a medical or other relevant authority.

Submit your work electronically (lab write-up, report, TC assignments, presentation slides, etc.) via Canvas. It is *your own* responsibility to ensure your work has been properly submitted. Please use the following file naming convention:
VM395_FA2018_Lab#_LastnameXXXX.docx or .pptx (XXXX = last four digits of your student ID)

Assignments must have your student IDs; we will not accept any assignment without one. All students whose names appear on the same document earn the same team grade for that team assignment. *All students whose names appear on the same document are also subject to the same sanctions if Honor Code violations are found and proven.*

Attendance and participation in each Technical Communication class is MANDATORY for all students. Failure to attend class will affect your grade. Students who miss over 1/3 of the Technical Communication classes cannot pass the course. Please check the posted Course Schedule carefully for all Engineering and TC classes. In other words, **students who miss four of their TC classes without excuse will fail Vm395.** Please do not miss class!

To quote the Joint Institute policy on attendance and absences (from the 2016 Undergraduate Student Handbook, Section 5.6.4):

- "An advance request for leave of absence is required if the student cannot attend the class due to illness or other reasons. Absence without approval will be regarded as skipping classes."
- "A note that a student visited a medical facility is not sufficient excuse for missing an assignment... The note must specifically indicate that the student was incapable of completing an assignment ... due to medical problems and that this condition was sudden enough that it was impractical to contact the instructor in advance."
- "A written request for leave of absence is required. Absence for illness should be supported by a hospital/doctor’s certificate."

In-Class Assignments, Presentations, and Participation

In-class exercises on both the engineering and technical communication aspects of the course may be assigned periodically throughout the semester. These assignments are designed to reinforce the student's knowledge of the materials covered in class and to promote class attendance, discussion, and participation. Under normal circumstances, *if you are absent in the class when the exercises are assigned, you will NOT be able to make up for them.*

In-class, *voluntary participation* is particularly important. We will be noting, by name, those who show especially rigorous and assertive intellectual curiosity, as well as those with a lackadaisical or disruptive attitude in class.

For instance, your participation as an audience member will be graded during the end-of-term final project presentations. The purpose of these presentations is not only to showcase each teams lab results, but also to generate discussion over each teams experimental and analysis methods and procedures — a common practice in research and in industry — as well as critique on the presentation itself. To receive credit as an audience, you must actively give comments and ask questions to the presenters during or after their presentation. We will be on the lookout for audience members who are actively listening and for students who are not paying attention.

Lab Participation

1. *Lab participation in each lab section is MANDATORY for all students.* Lab attendance will be taken at the beginning of each lab section. If your request of absence is approved by the instructor, it is then your responsibility to inform the teaching assistants and make suitable arrangements with your teammates and classmates to attend another regularly-scheduled lab section. Failure to do so will earn you a failing grade for the course.
2. The course grade will reflect individual lab participation and lab safety awareness. A student's grade may be reduced due to (a) *lack of participation* (such as late arrival to, or early departure, or absence from the lab section, or not contributing to the team), or (b) *inattention to safety rules*. Any conduct in contradiction to the lab safety rules or deemed "unsafe" by a lab technician or teaching assistant will reduce a student's participation and safety grade, and may result in expulsion from the class.
3. *Plan your work and work your plan.* Use your lab time wisely — plan ahead, before arriving at the lab, on what you are going to do during that lab section. Remember *the Six P's: Proper Prior Planning Prevents Poor Performance.*

Lab Conduct and Safety Rules

1. Each lab section lasts two to three hours. Students are free to leave early, but only upon completing the experiments. However, it is strongly advised that they stay for the remainder of the lab period to analyze the results, write them up, and plan the next steps. All analyses that are not completed in lab must be completed outside of the lab period.
2. Data files generated during the lab section must be saved and copied onto the students' personal computers for further analyses and for backup. *The data files may be deleted from the lab computers at the end of each lab section.*
3. *No eating or drinking is allowed in the laboratory.* Students are free to leave at any time to take short breaks (restrooms, drinks, etc.).
4. No phone calls are allowed in the laboratory while the lab section is underway. If you have to answer a call on your mobile phone, please do so outside the lab.
5. *The laboratory workspace must be cleaned and restored to the same conditions as when the lab section began.*
6. Students must always be careful when operating lab equipment. Excessive force should never be applied. Please ask the teaching assistant or lab technician for assistance if unsure about the equipment or operating procedure, to avoid equipment damage as well as possible personal injury.
7. Eye protection must be worn at all times around any moving machinery. Safety goggles are available for use in the lab. Please check with the instructor, teaching assistant, or lab technician for assistance.
8. Care must be exercised when plugging in and using electrical equipment.