

ME 395 Fall 2017: COURSE INFORMATION, ORGANIZATION & GRADING

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Prerequisites: ME 211, ME 235, ME 240

Co-requisites: ME 320, ME 382

Course Philosophy: The structure, content, and grading schemes in ME 395/495 classes have developed to meet the needs voiced in surveys of ME alumni. Respondents rated communication, teamwork, and engineering problem-solving as highly necessary skills. Thus, the goals of ME 395 are to

- expose students to a wide variety of experimental techniques in mechanical engineering,
- teach students how to deal with uncertainty in mechanical engineering,
- demonstrate and reinforce major concepts of mechanical engineering science,
- teach students effective written technical communication best practices, and
- ensure that students can complete laboratory tasks and generate comprehensive team reports.

To achieve these goals, students are given the opportunity to work on teams that perform experiments, analyze the measurements, and communicate the results and analysis clearly. These opportunities are supported by the use of technical scenarios that put the laboratory and communication task in an engineering context. In addition, faculty from the Technical Communications Program are fully included in both the instruction and grading of the course.

Please also consult the ABET description for ME 395, as published at <https://me-web2.engin.umich.edu/courses/abet/profile/printview?num=395>

Course Materials:

- All course-related materials are available on the CANVAS site under MECHENG 395 001 FA 2017, organized in Modules.
- There are no REQUIRED textbooks for ME395; however, it is assumed that you have access to the textbooks used for pre- and co-requisite courses.

Lectures: A one-and-one-half hour lecture will be given on Monday (1670 Beyster) and Friday (1571 GGB) from 1:30 to 3:00 PM during which Mechanical Engineering (ME) and Technical Communications (TC) topics will be presented and discussed. There may be graded in-class exercises or quizzes at both weekly lectures that may not be made up.

Laboratories: Three-hour laboratories will be performed in 2351 GGB as detailed in the UM course schedule. Each section will be led and supervised by an ME staff member or a Graduate Student Instructor (GSI).

All laboratory work will involve group efforts. Students will be grouped into teams of three or four members. New teams will be formed after the midterm laboratory. An approximate lab-section timeline follows:

- Report & information exchange, handouts (5 min.)
- Team assignments (0-5 min., only when needed)
- Initial team organization (5-10 min.)
- Explanation & demonstration of the experiment(s) (35-45 min.)
- Experiment(s) conducted (90-120 min.)
- Lab-end team meeting, worksheet completion, initial data reduction and/or teamwork (20-30 min.)

Office Hours: All course instructors and GSIs hold scheduled office hours and are available by appointment; please see the **ME395 F2017 Office Hours** list, located in Canvas.

Course Outline: The course will consist of 5 one-week, and 3 two-week laboratories, conducted in 2351 GGB. The *ME 395 Course Schedule F17* document on Canvas provides information on the topics and other logistical information.

Grading: Course grades in ME 395 are based on the content, quality, and communication effectiveness of eight written reports (six team and two individual reports), participation and safety (based in part on peer and section-leader evaluations), in-class exercises, and unannounced quizzes. The following percentages apply:

	Mechanical Engineering (ME)	Technical Communication (TC)
Labs 1, 2, 3, and 6	20%	—
Lab 4, the first individual report	5%	4%
Lab 5, the midterm laboratory	15%	4%
Lab 7, the second individual lab report (a score of 68% or below for either ME or TC will result in extra work and/or a course grade of incomplete)	5%	6%
Lab 8, the final laboratory	15%	6%
In-class/lab exercises, quizzes	5%	5%
Participation and safety	10%	—
Total	75%	25%

All students whose names appear on a report earn the same grade for that report.

Lab section leaders will grade the reports for labs 1-4, 6, and 7. The individual reports are also graded by Technical Communications instructors. The faculty instructors (ME and TC) will grade the reports for labs 5 and 8 for both technical and technical communication content.

Reports: Reports have strict page limits, as specified in the *Course Schedule* document. Reports must be uploaded to CANVAS according to the schedule before your respective lab section starts. The time stamp record of your upload will be checked. **The only file format that is accepted is .docx. Furthermore, you MUST** use the following naming convention:

For team reports: F17_LabXX_TeamZZ.docx
For individual reports: F17_LabXX_TeamZZ_last-name.docx

with the appropriate lab and team numbers. Team reports (all except labs 4 and 7) only have to be uploaded by one team member.

- Each report (team **and** individual report) must have a completed ME395 Lab Report Cover Sheet as the front page(s) of the report. If the Cover Sheet is incomplete or missing, your report will not be accepted.
- **Each TEAM must upload a single copy of the team-generated report to CANVAS. For Individual Labs 4 & 7, each STUDENT must upload a file.**

Document Resources:

- *Reports* outlines the philosophy and fundamental structure of ME 395 reports.
- *Lab Report Checklist* provides a comprehensive list of items required, things to be done, or points to be considered when writing the report.
- *ME395 Style Guide* provides information about formatting and layout of the reports for this course; compliance is mandatory for ME395 reports.

Individual Reports: All laboratory experiments and in-lab data reduction will be team efforts. However, each student will submit two individual reports (labs 4 and 7) based on team lab work but individual data reduction and plotting, results, and writing.

Peer Review: Lab 6, conducted in weeks 8 and 9 of the semester, will involve an in-laboratory peer review exercise during week 9. Complete lab 6 reports will be turned in at the beginning of week 9 for ME grading, and each student will bring three copies of their team's report to their lab section for the in-lab peer review exercise. Revised lab 6 reports will be turned in at the beginning of week 10 for ME grading. *The final lab 6 grades will be the average of the original and revised report grades.*

Gateway report: Modern engineering requires technical and technical communication skills. Thus, the second individual lab report (lab 7, week 10) will be used to measure skills in either area. Here, inadequate performance is defined as a grade of 68/100 or below on either the technical or written communication assessment. Any student with an inadequate grade on this assignment will be required to demonstrate adequate skills by revising the substandard report or completing a separate assignment (at the discretion of the course instructor) due before the end of the marking

period; otherwise, the student will receive a grade of “Incomplete” in ME 395[†]. Students must achieve a minimum of more than 68% on the report revision to pass the course; *however, the original report grade will be used when calculating the course grade.*

Participation and Safety: The lab section leader will evaluate each student in group laboratory activities and record laboratory-section attendance. Each student starts with a perfect *Participation and Safety* score. However, this score will be reduced by inattention to safety rules, irresponsible behavior, or lack of participation (such as late arrival to or early departure or absence from the appointed laboratory section, or incomplete participation in team roles). Any conduct deemed unsafe by the section leader or laboratory supervisor will reduce a student’s participation and safety grade, and may also result in expulsion from the class.

Failure to participate in any one aspect of this class, including lab safety and preparation of laboratory reports (as measured by peer evaluations, interviews with involved students, and observations by instructors) is cause to reduce this score. Repeated failure even in one area may potentially lead to loss of all participation and safety points.

Continuous Improvement: The delivery, organization, format, and materials for this course are under constant revision based on input from students, lab section leaders, and faculty. Constructive criticism of and suggestions for improving these materials and the course as a whole are always welcome. Students are encouraged to direct comments to any one of the faculty instructors.

Integrity of Data and Calculations: All raw data and calculations must be kept so that they can be inspected by the instructors if necessary. Additional information on how to keep a laboratory notebook and its purpose can be found in the *Laboratory Notebooks* document.

Honor Code and Laboratory Report Writing:

The following excerpt comes from the College of Engineering Honor Code:

The principles of the Honor Code apply to homework and laboratory assignments as well as to examinations. The instructor may prohibit collaboration among students on such assignments. The instructor is to make clear how much, if any, collaboration is permissible. The instructor may also require that the students write and sign the Honor Pledge on the homework and lab reports.

A deliberate attempt to present as one’s own work any material copied from another student, done jointly with another student, or copied from an unacknowledged source is a violation of the Honor Code.

[†]The University of Michigan College of Engineering Bulletin states specific policies concerning the grade of "Incomplete," or "I." To secure course credit after a course grade of "I," the required work must be completed by the end of the first term (not including spring-summer term) in which the student is enrolled after the term in which the "I" mark was recorded. **It is the student’s responsibility to remind the instructor to send a supplementary grade report form to the Office of the Registrar when the work is completed.** If the final grade is not reported by the last day of exams, the Registrar will automatically change the "I" to an "E."

It is a violation of the Honor Code for students to submit, as their own, work which is not the result of their own labor and thoughts. Work which includes material derived in any way from the efforts of another author, either by direct quotation or paraphrasing, should be fully and properly documented. The basic principle is to tell the reader enough to locate the quoted material in the original source.

With this in mind, it is NOT permissible for ME 395 students to do the following:

- Fabricate or falsify data.
- Consult previously prepared ME 395 reports.
- Use previously prepared ME 395 reports as templates for the currently required lab report (*e.g.*, filling in the blanks and changing the dates).
- Copy portions of old ME 395 reports.
- Falsify team member evaluation forms.
- Indulge in any form of plagiarism, including copying any figure or text directly without quotation marks and citations, and paraphrasing words or re-drawing figures without citations.

It is permissible to consult with current or former ME 395 students on technical issues *provided all such consultation(s) are acknowledged with reference citations in the report*. However, such consultation is not encouraged because it often leads to inaccuracies. Technical consultation with the section supervisor (on the ordinary labs) and with the faculty (on any lab) is strongly encouraged and need not be referenced in reports.

Suggestions for Success in ME 395:

1. Use GSI and faculty office hours.
2. Use the lab period for the first team meeting if the experiment does not take the entire time.
3. Share the workload as evenly as possible among team members. There is too much work in this class for one individual to handle.
4. Rotate responsibilities each lab so that each member experiences all aspects of data collection, analysis, and documentation.

ME395 Fall 2017 Course Schedule

	Date	Topic	Details, e.g. instructor, due date
Week 0	F 9/8	Course Information and Organization, Web Resources, and Safety; Memo Report Format; ME395 Template, Checklist and Style Guide	VS, KS KR, TB
Week 1	M 9/11	ME: Basic Measurements, Experimental Uncertainty, and Graph Basics TC: Using the Task Letter; Interpersonal Communication Styles	VS KR, TB
		Lab 1: Experiment and data collection; 5-page team report due in Week 2 at the beginning of lab	
	F 9/15	TC: Memo Format, Page 1 Detail ME: Lab 1 Feedback	TB TC Quiz 1 – Heading, Foreword & Summary opens
Week 2	M 9/18	ME: Frequency and Length Measurements TC: Writing the Lab Report: An Overview	KS KR TC Quiz 1 closes
		Lab 2: Experiment and data collection; 5-page team report due in Week 3	Lab 1 due: 5-page report due at the beginning of lab
	F 9/22	TC: ICE 1 Peer Review of Lab 1 Report, p. 1; Writing the Procedure ME: Lab 2 Feedback / Groups Report Out on Lab 1 / Uncertainty Example	KR TC Quiz 2 – Procedure
Week 3	M 9/25	ME: Tensile Testing TC: Findings, Conclusions and Recommendations; Documenting Sources	KS TB TC Quiz 2 closes TC Quiz 3 – Findings, Con. & Rec. opens
		Lab 3: Experiment and data collection; 5-page team report due in Week 4	Lab 2 due: 5-page report due at the beginning of lab
	F 9/29	TC: ICE 2 Peer Review of Procedure ME: Lab 3 Feedback / Groups Report Out on Lab 2 / Additional Tensile Testing Material	KR TC Quiz 3 closes
Week 4	M 10/2	ME: Failure Mechanisms of Metals TC: Creating Effective Graphics and Tables	KS TB TC Quiz 4 – Graphs and Tables opens
		Lab 4: Experiment and data collection; 5-page individual report due in Week 5	Lab 3 due: 5-page report due at the beginning of lab
	F 10/6	TC: Developing the argument; ICE 3 Peer Review of Lab 3, Findings ME: Lab 4 Feedback / Groups Report Out on Lab 3 / Additional Failure Mechanisms Material	KR, TB TC Quiz 4 – Graphs and Tables closes

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Week 5	10/9	ME: Thermodynamics of Cycles, Part 1	VS
		Lab 5 Week 1	Lab 4 due: 5-page Individual report
	10/13	TC: ICE 4 Peer Review of Lab 4 Report Graphics ME: Lab 5 Feedback / Groups Report Out on Lab 4 / Additional Thermodynamics	TB
Week 6	M 10/16	STUDY DAY – NO CLASS	
		NO LABS THIS WEEK	No report due this week.
	F 10/20	ME: Thermodynamics of Cycles, Part 2	
Week 7	M 10/23	ME: Vapor-Refrigeration Cycle Analysis	VS
		Lab 5 (Week 2): Experiment and data collection. 10-page team report due in Week 8	No report due this week.
	F 10/27	Peer Review Preparation	TB
Week 8	M 10/30	ME: Motor System Identification	KS
		Lab 6: Complete 5-page team report for peer review due in Week 9	Lab 5 due: 10-page team report
	F 11/3	ME: Groups Report Out on Lab 5	
Weeks 9	M 11/6	ME: Motor System Identification TC: Cohesion in Reports	KS TB
		Peer Review of Lab 6 due in Week 10	Lab 6 due: 3-4 paper copies required for Peer Review
	F 11/10	Ethics in Engineering in Presence of Uncertainty	TBD
Week 10	M 11/13	ME: Fluid Mechanics of Turbomachines; Scaling, Part 1	VS
		Lab 7: Individual 5-page report due in Week 11, one day early (Thanksgiving Recess dismissal is Wednesday, 5 PM)	Lab 6 (Revised) due.
	F 11/17	TC: Cohesion Workshop ME: Lab 7 Feedback / Groups Report Out on Lab 6 / Scaling, Part 2	TB
Week 11	M 11/20	ME & TC: Additional Office Hours	
	11/21-11/24	Thanksgiving, no class (Thanksgiving Recess dismissal is Wednesday, 5 PM)	Lab 7 due: Individual 5-page report due one day early.

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Week 12	M 11/27	ME: Lift and Drag, Dimensional Analysis	
		Lab 8 Week 1	No report due this week.
	F 12/1	ME: Lab 8 Feedback / Groups Report Out on Lab 7 / Lift and Drag, Part 2	
Week 13	M 12/4	ME: Wind Tunnel Testing, Scaling and Extrapolation	VS
		Lab 8 Week 2	No report due this week.
	F 12/8	Q&A: Final Report TC: Structure and Argument of the Final Report [KR & TB]	KR, TB
Week 14	M 12/11	Last class	Lab 8 due: 10-page team report