

ME 1042: Mechanical Measurements 2

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class)

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Office Hours: M & T 12:30pm – 2:30pm

Course TAs:

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Course Grader; EMAIL:

Lecture Times:

Thursdays 6:00pm – 7:40pm, Room 4-202

Laboratory Times

Mondays and Tuesdays 10:00am – 12:00pm, 1:30pm – 3:30pm, 3:50pm – 4:50pm, Room 3-113

Catalog Description: 3 Credits; this course is the second in a sequence of courses that pertain to engineering laboratory measurements. This course aims to advance the understanding of measurement systems and analyzing experimental data. Students will test laboratory scaled mechanical engineering systems and apply fundamental knowledge from mechanical engineering topics to analyze and rate those systems. Laboratory exposure is an important component in this course that will help prepare students for future laboratory setting environments.

Prereq: ME 1041

Course Objectives:

- Develop an understanding of a laboratory environment and safe practice techniques.
- Learn how to organize experimental procedure and operate laboratory equipment.
- Become familiar with advanced engineering laboratory tools and how engineering systems are tested.
- Learn how to effectively analyze data sets and apply statistical techniques (i.e. Uncertainty Analysis and Variance).
- Design and implement an experimental approach for hypothesis testing.

Required Text:

Theory and Design for Mechanical Measurements, Figliola and Beasley, 6th edition, Wiley

Course Outline:**Part 1: Dynamics and Controls Labs**

Forced and Free Vibrations

Automated Level Control using PLCs

Fundamentals of Feedback Control

Part 2: Mechanics of Materials Labs

Geared Systems

Fatigue and Failure

Material Hardness Testing

Part 3: Thermal Fluids Labs

Bench-top Heat Exchangers

Radiation Heat Transfer

Course Grading and Exams:

Pre-Lab Assignments	10%
Lab Reports	50%
Lab Notebook	10%
Final Exam	30%

Grading Scale: The standard SCU grading scale will be used to determine final course grades. An additional curve may be applied, as determined by the overall final grade distribution of the class. Posted letter grades (A, A-, B+, B-, etc.) will be determined at the instructor's discretion.

Class Policies: Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Exams will emphasize treatment of material covered in lectures. In general, no late assignments will be accepted or makeup exams given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend an exam or meet a due date, you must contact the instructor prior to the exam or due date. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor prior to the exam or assignment due date will result in a zero on that exam/assignment.)

Laboratory Policies: Students must attend all scheduled labs. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend a laboratory, you must contact the instructor prior to the lab session in order to reschedule. While in the laboratory, all safety guidelines and procedures must be followed. Failure to comply with safe laboratory practices will result in removal from the course.

Academic Integrity Policy: “Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation in oral or written form. Such violations will be dealt with severely, in accordance with University policy. Plagiarism means representing someone else’s idea or writing as if it were your own. If you use someone else’s ideas or writing, be sure the source is clearly designated.” It is expected that students adhere to the academic integrity policy that is presented in the Student’s Honor Code of Conduct / Student Handbook.

Course Schedule:

Week 1	September 2 nd /3 rd No-Lab	September 5 th Course Introduction and Lab Safety
Week 2	September 9 th /10 th Lab Safety	September 12 th Forced and Free Vibrations
Week 3	September 16 th /17 th Lab 1 Part 1	September 19 th Forced and Free Vibrations
Week 4	September 23 rd /24 th Lab 1 Part 2	September 26 th PLC Systems
Week 5	September 30 th /October 1 st No-Lab	October 3 rd No-Class
Week 6	October 7 th /8 th Lab 2	October 10 th Control Theory
Week 7	October 14 th /15 th Lab 3 Part 1	October 17 th Feedback Control
Week 8	October 21 st /22 nd Lab 3 Part 2	October 24 th Unsteady Systems
Week 9	October 28 th /29 th No-Lab	October 31 st Gear Systems
Week 10	November 4 th /5 th Lab 4	November 7 th Fracture Mechanics

Week 11	November 11 th /12 th Lab 5	November 14 th Fracture Mechanics
Week 12	November 18 th /19 th No-Lab	November 21 st Hardness Testing
Week 13	November 25 th /26 th Lab 6	November 28 th Heat Exchangers
Week 14	December 2 nd /3 rd Lab 7	December 5 th Heat Exchangers
Week 15	December 9 th /10 th No-Lab	December 12 th Radiation
Week 16	December 16 th /17 th Lab 8	December 19 th Radiation
Week 17	December 23 rd /24 th No-Lab	December 26 th Final Exam Review
Week 18/19	December 30 th /31 st No-Lab	January 2 nd Final Exam