

ME 1042 Mechanical Measurements 2

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

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Note: when emailing the instructor or the teaching assistants, please

- Include the course number, your name and your student number in the subject field of your message;
- Use your university email account.

Lecture time/location: Tuesday 10:15–11:55 AM/ N 213

Laboratory location: SCUPI Building 204 Machinery & Fluid Lab

Laboratory times: Tuesday 1:50–3:30 PM

Tuesday 3:40–5:30 PM

Catalog Description & Objective:

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 learn typical mechanical systems, fluid systems and control systems, analyze experimental data and solve problems by applying knowledge of theory. Laboratory exposure is an important component in this course that will help prepare students for future laboratory setting environments.

Learning Outcomes :

At the completion of this course, students will be able to

- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Become familiar with advanced engineering laboratory tools and how engineering systems are tested.
- Gain a thorough understanding of the fundamentals of mechanical systems, control theory concepts, and principles of thermal and fluid sciences.
- Collaborate effectively as a team to plan tasks and achieve objectives.

Prerequisites:

ME 1041 Mechanical Measurements 1

Textbook:

Theory and Design for Mechanical Measurements, 7th Edition, Figliola and Beasley, Wiley, 2019.
Other resources will be released on BB platform.

Website: <https://pibb.scu.edu.cn/>

Topics Covered:

Topic 1: Solid Mechanics and Design

1. Geared Systems
2. Forced and Free Vibrations
3. Uniaxial Tension Test of Materials

Topic 2: Thermal & Fluid Labs

4. Fluid Mechanics
5. Bench-top Heat Exchangers
6. Radiation Heat Transfer

Topic 3: Control System

7. Programmable Logic Controllers (PLCs)
8. Fundamentals of Feedback Control
9. Robot Manipulator Control

Course Schedule:

Week	Lecture	Lab
1	Feb 25 Course Introduction	Feb 25 Lab Intro. and Safety
2	March 4 Gear Systems	March 4 Gear Systems
3	March 11 Forced and Free Vibrations	March 11 Forced and Free Vibrations
4	March 18 Uniaxial Tension Test	March 18 Uniaxial Tension Test W1
5	March 25 Present (Lab 1&2)+Course Review	March 25 Uniaxial Tension Test W2

6	April 1 Fluid Mechanics	April 1 No Lab Except Makeup
7	April 8 Bench-top Heat Exchangers	April 8 Fluid Mechanics
8	April 15 Radiation Heat Transfer	April 15 Bench-top Heat Exchangers
9	April 22 Present (Lab 4&5)+Course Review	April 22 Radiation Heat Transfer W1
10	April 29 Middle Exam	April 29 Radiation Heat Transfer W2
11	May 6 No class	May 6 No Lab Except Makeup
12	May 13 Programmable Logic Controllers	May 13 Programmable Logic Controllers
13	May 20 Fundamentals of Feedback Control	May 20 Fundamentals of Feedback Control
14	May 27 Robot Manipulator Control	May 27 No Lab Except Makeup
15	June 3 Present (7&8) +Course Review	June 3 Robot Manipulator Control
16	June 10 Present + Q & A	June 10 No Lab Except Makeup
17	June 17 Final Exam	June 17 Lab clean

Course Grading:

- Class attendance 10 %
- Lab report+presentation 40 %
- Midterm exam 30 %
- Final exam 20%

Grading Scale:

Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Percentage (%)	100~90	89~85	84~80	79~76	75~73	72~70	69~66	65~63	62~61	60	<60

Class Policies:

- On-time attendance at all class activities is expected. Student is responsible for any material that was covered, and any changes to the exam dates and homework assignments announced in class.
- In general, no late assignment or make up exams will not be accepted. If you have a serious conflict with an exam schedule, you must discuss it with the instructor. Failure to contact the instructor prior to the exam or assignment due date will result in **a zero** on that exam/assignment. Exams missed due to a serious illness or a family emergency (these must be documented) will be dealt with on a case-by-case basis according to the University Policy.
- **Students must attend all scheduled labs.** Absence from any lab project will result in a score of **zero** for that project. 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.**
- Late submission of a lab report within one week will result in an **20%** deduction of the total marks. Late submission of a lab report exceeding one week will result in a **50%** deduction of the total marks.
- 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.
- Any questions regarding the grading discrepancy should be brought up **within a week** after returning the homework, report or exam.
- 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.