

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: Wednesday 8:15– 9:55 AM/ N 213

Laboratory location: SCUPI Building 204 Machinery & Fluid Lab

Laboratory times: Wednesday 10:15–11:45 AM 12:30–2:00 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

Lab tour

[DIC+Heat transfer+Dobot system](#)

Topic 3: Control System

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

Course Schedule:

Week	Lecture	Lab
1	Mar 11 Course Introduction	Mar 11 Lab Intro. and Safety
2	Mar 18 Gear Systems	Mar 18 Gear Systems
3	Mar 25 Forced and Free Vibrations	Mar 25 Forced and Free Vibrations
4	Apr 1 Uniaxial Tension Test	Apr 1 No Lab
5	Apr 8 Present (Lab 1&2)+Course Review	Apr 8 Uniaxial Tension Test

6	Apr 15 No class	Apr 15 No Lab
7	Apr 22 Fluid Mechanics	Apr 22 Fluid Mechanics
8	Apr 29 Bench-top Heat Exchangers	Apr 29 Bench-top Heat Exchangers
9	May 6 Radiation Heat Transfer	May 6 No Lab
10	May 13 Present (Lab 4&5)+Review	May 13 Radiation Heat Transfer
11	May 20 Lab Tour	May 20 No Lab
12	May 27 Programmable Logic Controllers	May 27 Programmable Logic Controllers
13	Jun 3 Fundamentals of Feedback Control	Jun 3 Fundamentals of Feedback Control
14	Jun 10 Robot Manipulator Control	Jun 10 No Lab
15	Jun 17 Present (7&8) +Review	Jun 17 Robot Manipulator Control
16	Jun 24 Q&A	Jun 24 No Lab
17	Jul 01 Final Exam	Jul 31 Lab clean

Course Grading:

- Class attendance+Class Performance 10 %
- Lab report+presentation 40 %
- Final exam 50%

Note: 3-student group for studio, lab reports and project submission, every group member receive the same score. Groups will present lab reports in turns (marked in syllabus).

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.**