

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.)

Instructor: Dr. Dong Liang

Office: N-512

Email: dongliang@scupi.cn

Grade TA: Junce Pu

Email: 2135841858@qq.com

Office Hours: Tuesday 8:30-10:00AM

Wednesday 8:30-10:00AM

Lab Engineer: Willow Hu

Office: N-305

Email: willow.hu@scupi.cn

Lab Teaching Assistants:

Wu Biao 2023331570@qq.com

Zhe Chen 874298978@qq.com

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 214

Laboratory location: SCUPI Building 204 Machinery & Fluid Lab

Laboratory times: Wednesday 10:15–11:55 AM

2:00–3:40 PM

3:50–5:40 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	Sep 09 Course Introduction	Sep 09 Lab Intro. and Safety
2	Sep 16 Gear Systems	Sep 17 Gear Systems
3	Sep 23 Forced and Free Vibrations	Sep 24 Forced and Free Vibrations
4	Sep 28 Uniaxial Tension Test	Oct 1 No Lab
5	Sep 30 Present (Lab 1&2)+Course Review	Oct 11 Uniaxial Tension Test

6	Oct 14 Fluid Mechanics	Oct 15 No Lab Except Makeup
7	Oct 21 Bench-top Heat Exchangers	Oct 22 Fluid Mechanics
8	Oct 28 Present (Lab 3& 4+Course Review)	Oct 29 Bench-top Heat Exchangers
9	Nov 4 Middle Exam	Nov 5 No Lab Except Makeup
10	Nov 11 Radiation Heat Transfer	Nov 12 Radiation Heat Transfer
11	Nov 18 Present (Lab 5 & 6)+ Lab Tour	Nov 19 No Lab Except Makeup
12	Nov 25 Programmable Logic Controllers	Nov 26 Programmable Logic Controllers
13	Dec 2 Fundamentals of Feedback Control	Dec 3 Fundamentals of Feedback Control
14	Dec 9 Robot Manipulator Control	Dec 10 No Lab Except Makeup
15	Dec 16 Present (7&8) +Course Review	Dec 17 Robot Manipulator Control
16	Dec 23 Present 9+ Q&A	Dec 24 No Lab Except Makeup
17	Dec 30 Final Exam	Dec 31 Lab clean

Course Grading:

- Class attendance 10 %
- Lab report+presentation 40 %
- Midterm exam 25 %
- Final exam 25%

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.