

## ME 1041 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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**Instructor:** Qi (Michael) Lu, Ph.D.  
**Office:** Zone 4-218  
**Email:** [qi.lu@scupi.cn](mailto:qi.lu@scupi.cn)

**Lab Engineer:** Senbao Lin  
**Office:** Zone 3-321B  
**Email:** [senbao.lin@scupi.cn](mailto:senbao.lin@scupi.cn)

**Grading Teaching Assistant:**  
Hongping Li ([adolhong@163.com](mailto:adolhong@163.com))

**Lab Teaching Assistants:**  
Zhen Shu ([2286630964@qq.com](mailto:2286630964@qq.com))  
Guanbo Chen ([chenguanbo007@qq.com](mailto:chenguanbo007@qq.com))

**Office hours:** Friday 10:00 AM - 11:30 AM  
12:30 PM - 2:00 PM

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Note: when emailing the instructor, lab engineer 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:** Thu 10:15 - 11:55 AM/Online or Zone 3-105

**Laboratory location:** Zone 3-113/116

**Laboratory times:** Mon 10:00 AM– 11:30 AM (Group 1)  
Mon 1:30 PM – 3:00 PM (Group 2)  
Mon 3:30 PM – 5:00 PM (Group 3)  
Thu 8:30 AM– 10:00 AM (Group 4)  
Thu 1:30 PM – 3:00 PM (Group 5)  
Thu 3:30 PM – 5:00 PM (Group 6)

### 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

### Course Objective:

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

- 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.

**Prerequisites:**

ME 1041 Mechanical Measurements 1

**Textbook:**

Theory and Design for Mechanical Measurements, 6th Edition, Figliola and Beasley, Wiley, 2015.

**Website:** <https://learn.scupi.cn/>

**Topics Covered:**

For the following four topics, you will need to choose **two out of four**. Topic 1 or topic 2 must be included.

**Topic 1: Control System Labs**

Fundamentals of Feedback Control

PD Control of Unstable Systems

Automated Level Control using Programmable Logic Controllers (PLCs)

**Topic 2: Thermal & Fluid Labs**

Fluid Mechanics

Radiation Heat Transfer

Bench-top Heat Exchangers

**Topic 3: Solid Mechanics**

Uniaxial Tension Test of Materials

Heat Treatment of Materials

**Topic 4: Theory of Machines**

Geared Systems

Forced and Free Vibrations

**Course Schedule:**

Week	Lecture	Lab
2	September 10 Course Introduction	September 10 Lab Introduction and Safety
3	September 17 Forced and Free Vibrations	September 17, 21 Lab 1
4	September 24 Forced and Free Vibrations	September 24, 28 Lab 1
5	October 1 No Lecture	October 1, 5 No Lab
6	October 8 No Lecture	October 8, 12 No Lab
7	October 15 PLC Tank	October 15, 19 Lab 2
8	October 22 Control Theory	October 22, 26 Lab 3
9	October 29 Unstable Systems	October 29, November 2 Lab 4
10	<b>November 5 Midterm Exam</b>	
11	November 12 Gear Systems	November 12, 16 Lab 5
12	November 19 Fracture Mechanics	November 19, 23 Lab 6
13	November 26 Heat Treatment	November 26, 30 Lab 7
14	December 3 Heat Treatment	December 3, 7 Lab 7
15	December 10 Heat Exchangers	December 10, 14 Lab 8
16	December 17 Radiation	December 17, 21 Lab 9
17	December 24 Radiation	December 24, 28 Lab 9
18	December 31 Fluid Mechanics	December 31, January 4 Lab 10
19	<b>January 7 Final Exam</b>	

### Course Gradings:

- Pre-lab assignments 10 %
- Lab reports 45 %
- Note: individual submission**
- Lab notebook 10 %
- Note: signature from the lab engineer is required**
- Midterm exam 15 %
- 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 and **take the exam early**. 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.
- Any questions regarding the grading discrepancy should be brought up within a week of returning the homework 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.

### 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.