SYLLABUS
EENG/MENG 3123: MEASUREMENTS AND INSTRUMENTATIONS
(Required Course - Summer 2026)

COURSE INSTRUCTOR
Dr. Yuyao Wang (yuyao.wang@msutexas.edu)

LAB INSTRUCTOR
Dr. Yuyao Wang (yuyao.wang@msutexas.edu)

COURSE & LAB SCHEDULE

Days	*Time*	*Location*
Monday	08:00 am – 09:50 am	MY 136
Tuesday	08:00 am – 09:50 am	MY 136
Wednesday	08:00 am – 09:50 am	MY 136
Thursday	08:00 am – 09:50 am	MY 136
Monday*	10:10 am – 12:10 pm	MY 116
Wednesday *	10:10 am – 12:10 pm	MY 116

**Lab sessions are indicated with an asterisk.*

OFFICE HOURS

Days	*Time*	*Location*
Monday		
Tuesday	10:00 am – 12:10 pm	MA 111
Tuesday	02:30 pm – 03:30 pm	MA 111
Thursday	10:00 am – 12:10 pm	MA 111
Friday		

MSU CATALOG DESCRIPTION
Fundamentals of measurement systems, standards, treatment of data, statistics, uncertainty analysis, data acquisition, transducers, strain, force, acceleration, pressure, temperature, and fluid flow, Companion lab. Student will need to learn how to use data acquisition system and process the data as required.

COURSE PRE-REQUISITES
MENG 2204 Electronics, and MATH 3433 or concurrent enrollment therein.

OTHER PREREQUISITES
Basic computer skills, MS Excel, hand calculator

TEXTBOOK
Experimental Methods for Engineers. J. P. Holman. Seventh Edition

SUPPLEMENTAL MATERIAL
Additional material will be distributed in the form of handouts if any.

LIST OF TOPICS COVERED

• Characteristics of Instruments	• Stress and Strain Measurements
• Calibrations	• Mass, Force, and Torque Measurement
• Measurement Uncertainty	• Displacement and Acceleration
• A/D Conversion and Data Acquisition	• Rotational Motion Transducers
• Signal Processing and Digital Filters	• Pressure Measurement
• Temperature Measurements	

Additional material may be covered as time permits.

SPECIFIC GOALS OF INSTRUCTION

Table 1: A detailed list of course objectives matched with the ABET outcomes (1-7).

	ABET OUTCOMES*						
COURSE OBJECTIVES	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Understand the characteristics of instruments (HW, Lab, Exam)	**X**					**X**	**X**
Understand the basics of instrument calibration (Lab)	**X**					**X**	**X**
Ability to analyze the uncertainty of measurements (HW, Exam)	**X**					**X**	**X**
Understand the basics of binary numbers and Analog to Digital conversion (HW, Exam)	**X**					**X**	**X**
Ability to identify a data acquisition device base on the need of resolution and sampling frequency (HW, Exam)	**X**					**X**	**X**
Understand Nyquist frequency and aliasing phenomenon (HW, Lab, Project, Exam)	**X**					**X**	**X**
Ability to perform data analysis using MATLAB (HW, Lab, Project, Exam)	**X**				**X**	**X**	**X**
Ability to perform frequency analysis and design digital filters (HW, Lab, Project, Exam)	**X**				**X**	**X**	**X**
Understand the basics of temperature measurement (Lab)	**X**					**X**	**X**
Understand the basics of Stress and Strain Measurements (HW, Lab, Exam)	**X**					**X**	**X**
Understand the basics of force and torque measurement (HW, Lab, Exam)	**X**					**X**	**X**
Understand the basics of displacement and acceleration measurement (Lab, Exam)	**X**					**X**	**X**
Understand the basics of rotational motion measurement (Lab, Exam)	**X**					**X**	**X**
Understand the basics of pressure measurement (Lab)	**X**					**X**	**X**

*__Table 2:__ Detailed descriptions of the ABET outcomes (1-7) listed in Table 1.

ABET Outcome	**DESCRIPTION**
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2	an ability to apply engineering design to produce solutions that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3	an ability to communicate effectively with a range of audiences.
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

COURSE ORGANIZATION AND STUDENT PERFORMANCES ASSESSMENT

- Lecture Format
  This course consists of four 110-minutes sessions per week. The class will be spent mostly explaining and discussing concepts, and solving relevant case problems. Lectures will not be used to communicate the entire textbook course content and thus, students will have to study a set of course paragraphs specified by the instructor on their own to further their understanding. Student participation in class discussions is highly recommended and rewarded.

- Attendance
  Attendance is required for each student. Absences of more than five lectures without proofs of legitimate excuses will result in a failing grade. **For each absence without proofs of acceptable excuses there will be 1 point off from Attendance & Class performance.**

- Student Attitude
  Once class starts, the use of cell phones, reading of newspapers, conducting private discussions, using the computer (unless requested by the instructor), working on anything that is not directly related to the course, and making derogatory remarks about your classmates or instructor will not be accepted and may result in your dismissal from the class. **Each time you are caught will result in 1 point off from Attendance & Class performance. Total grade for Attendance & Class performance is 10 points at beginning and it could become negative.**

- Homework
  Homework will be assigned from a set of chosen chapters. It will be turned in each week, unless specified by the instructor. **Homework must be turned in at the beginning of class. Once class starts, late homework will be graded 80% of the full grade. If you arrived late, you homework will also be counted as late.**

- Exams
  There will be two regular exams plus one comprehensive exam at the end of the semester. Exam will be close book, no cheat sheet is allowed. Each exam is based on the course materials developed between two consecutive exams, except for the final which is comprehensive. Students are expected to take the exam on the scheduled date and time it is given. However, if for some acceptable reason the student is not able to do so, then he must inform the instructor in advance in writing. The instructor will then decide whether he will be allowed to take a makeup exam, depending on the validity of his excuse. There is only one chance of makeup exam no matter what.

- Evaluation Method
  Your performance will be tested regularly throughout the semester by in-class quizzes and homework assignments. There will be two exams, including one midterm exam and one final exam.

- Midterm Progress Report
  In order to help students keep track of their progress, a Midterm Progress Report will be provided for each at-risk student through WebWorld. The grades reported will not be relected on the students' transcript; nor will they be calculated in the cumulative GPA. However, at-risk students should put more effort and seek out tutoring.

- Course Grade

Midterm	20%
Final	30%
Quiz & Homework	20%
Lab	25%
Attendance & Class performance	5%

GENERAL GUIDELINES

- Plan on spending at least 3 hours outside of class to study the material and to work on homework assignments, and lab experiments. Do not wait until the last day to start working on your assignment, or prepare for the exam.
- Read the course material before coming to class.
- Utilize the office hours throughout the semester to seek explanations from the instructor.
- In engineering, neatness is a must, not a luxury. Be advised that you will be penalized for lack of neatness.
- You are encouraged to study in group.

CONFLICT RESOLUTION

a. The student should contact the instructor face to face or via e-mail if there is an issue with the course or the instructor. The faculty and the student will discuss this face to face or via email. Hopefully, a resolution is reached on the issue.

b. The student should notify the faculty via email again if the issue still did not get resolved after the first encounter or communication.

c. The student can then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss this issue. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully, a resolution is reached on the issue after this.

d. The student should notify the Chair via email if the issue still did not get resolved.

e. The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, she will forward the case to the Grade Appeals Committee if necessary.

GENERAL EDUCATION STATEMENT

Students in this course must demonstrate their competency in oral and written communication through written project tasks assignments. They must also demonstrate their ability to use the English language.

ACADEMIC INTEGRITY POLICY

Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior. Any form of plagiarism will not be accepted, and will be heavily reprimanded.

DISABILITY SUPPORT SERVICES

Students registered with Disability Support Services should have a letter verifying their disability and the appropriate accommodations.

DISCLAIMER STATEMENT

Information contained in this syllabus, other than grading, late assignments, and attendance policies, may be subject to change with advance notice, as deemed appropriate by the instructor.