

**MENG 3210 Experimental Measurements and Techniques**  
**Course Syllabus**

<b>Semester / Year</b>	<b>Fall 2024</b>
<b>Catalog Description</b>	This is an experiential learning course based on Laboratory experiments. It exposes the students to concepts of accuracy, uncertainty, and usefulness of measurements. Sensors for measuring physical phenomena such as: strain, force, displacement, acceleration, pressure, and temperature will be introduced. Data acquisition and signal processing techniques will also be applied to actual measurements. Student teams will design, analyze, and document an experimental procedure. All procedures will result in a professional quality laboratory report.
<b>Prerequisites</b>	A grade of "C" or a better grade is required in the following: ENGR 2302, PHYS 2326 and PHYS 2126.
<b>Section Number</b>	001, 001L, 002L
<b>Instructor Name</b>	Dr. Andrew Robbins
<b>Contact Information</b>	Office: RBN 3006 Email: arobbins@uttyler.edu
<b>Lecture Class Type / Instruction Mode / Location</b>	Type: Face-to-Face Instruction Mode: Lecture Location: RBN 4034
<b>Lecture Class Time</b>	M 10:10 - 11:05 AM
<b>Lab Class Type / Instruction Mode / Location</b>	Type: Face-to-Face Instruction Mode: Lab Location: RBN 1035
<b>Lab Class Time</b>	Sec 001L: M 2:00 - 4:45 PM Sec 002L: W 2:00 - 4:45 PM
<b>Office Hours</b>	Tuesdays 9-10, Thursdays 9-10, Friday 9-10, or by appointment
<b>No. of Credits</b>	2 (1 hour lecture, 3 hour lab per week)
<b>Required Textbook</b>	Introduction to Engineering Experimentation, Third Edition, A. J. Wheeler and A. R. Ganji, Prentice Hall, 2010, ISBN 0-13-174276-0

<p><b>Optional References</b></p>	<p>Recommended for LabVIEW: LabVIEW 2014 Student Edition, R. H. Bishop, Pearson, 20104, ISBN 0-13-401133-3. The LabView tutorial is available at <a href="https://learn.ni.com/learn/article/labview-tutorial">https://learn.ni.com/learn/article/labview-tutorial</a></p> <p>There is no required textbook for the lab, however, an equivalent of the price of a typical experimental textbook may be required as a contribution from each student for material needed to execute the assigned experiments and project.</p>								
<p><b>Additional Rules and Requirements</b></p>	<p>AI is permitted only for specific assignments or situations, and appropriate acknowledgment is required. Any assignment for which the use of AI is permitted will have instructions in the assignment instructions detailing the expectations regarding the use of AI on that assignment.</p>								
<p><b>Evaluation Method</b></p>	<table> <tr> <td>Quizzes</td> <td>15 %</td> </tr> <tr> <td>Exam</td> <td>30 %</td> </tr> <tr> <td>HW / Lab Assignments</td> <td>30 %</td> </tr> <tr> <td>Lab Project</td> <td>25 %</td> </tr> </table>	Quizzes	15 %	Exam	30 %	HW / Lab Assignments	30 %	Lab Project	25 %
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<p><b>Grading Policy / Scale</b></p>	<p>Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: &lt; 60</p>								
<p><b>Important Events / Dates</b></p>	<p>Census date: 9-9-2024 Exam date: 12-2-2024 Last date to withdraw from one or more 15-week courses: 11-4-2024 Final date: None</p>								
<p><b>Attendance / Makeup policy / other rules</b></p>	<p>Attendance is required. Only excused absences in accordance with university policy as written in the current catalog will be accepted.</p> <p>It is expected that you will coordinate anticipated excused absences 2 weeks in advance with your instructor, including a plan for makeup work. For unexpected excused absences, students are expected to provide documentation and coordinate makeup work within 2 business days of the end of the excused absence period.</p> <p>For more information refer to the university policy <a href="https://smartcatalogiq.com">University of Texas at Tyler - Class Attendance/Excused Absences (smartcatalogiq.com)</a></p>								

<p><b>Course Learning Objectives / ABET &amp; PEOs Relation</b></p>	<p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Select and use sensors and instrumentation to report engineering measurements, and to perform calculations using the corresponding governing equations. (SO6)</li> <li>2. Interpret and analyze data, obtained from Engineering Experimentation, using statistical methods and uncertainty analysis. (SO6)</li> <li>3. Design, perform, and report results of a mechanical engineering experiment. (SO5)</li> <li>4. Use software for data acquisition. (SO6)</li> <li>5. Write clear and well documented laboratory reports. (SO5)</li> </ol>
<p><b>Tentative Topics / Course Plans</b></p>	<ol style="list-style-type: none"> <li>1. Introduction to LabVIEW</li> <li>2. Introduction to Engineering measurements and techniques</li> <li>3. Statistical analysis and uncertainty</li> <li>4. Technical writing for lab reports</li> </ol>
<p><b>University Policies</b></p>	<p><a href="https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf">https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf</a></p>

**Course Schedule**

Week	Lecture Date	Lab (001) Date	Lab (002) Date	Lecture Topic	Lab Topic	Quiz in Lecture	Lab Assignment
1	08-26-24	08-26-24	08-28-24	Intro, Uncertainty	NONE	NO	NONE
2	09-02-24	09-02-24	09-04-24	LABOR DAY	NONE	NO	NONE
3	09-09-24	09-09-24	09-11-24	Measurement Systems	Report Writing, Project Intro	Yes	NONE
4	09-16-24	09-16-24	09-18-24	Statistics 1	Labview 1	Yes	Assignment 1
5	09-23-24	09-23-24	09-25-24	Statistics 2	Labview 2	Yes	Assignment 2
6	09-30-24	09-30-24	10-02-24	Signal Conditioning	Labview 3	Yes	Assignment 3
7	10-07-24	10-07-24	10-09-24	Pressure	Labview 4	Yes	Assignment 4
8	10-14-24	10-14-24	10-16-24	Temperature	Measurements and Uncertainty	Yes	Lab Report 1
9	10-21-24	10-21-24	10-23-24	Displacement	Digital Multimeter	Yes	Lab Report 2
10	10-28-24	10-28-24	10-30-24	Strain	Signal Conditioning	Yes	Lab Report 3
11	11-04-24	11-04-24	11-06-24	Velocity	Temperature	Yes	Lab Report 4
12	11-11-24	11-11-24	11-13-24	Acceleration	Displacement	Yes	Lab Report 5
13	11-18-24	11-18-24	11-20-24	Force	Design Project	Yes	Lab Report 6
14	11-25-24	11-25-24	11-27-24	THANKSGIVING	THANKSGIVING	NO	NONE
15	12-02-24	12-02-24	12-04-24	<b>EXAM</b>	Design Project Presentations	NO	NONE