



MENG 3210 – Experimental Measurements and Techniques
Course Syllabus

Semester / Year	Fall 2023
Catalog Description	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.
Prerequisites	A grade of “C” or a better grade is required in the following: ENGR 2302, PHYS 2326 and PHYS 2126.
Section Number	001, 001L, 002L
Instructor Name	Section 1 and 002L Dr. Chung-Hyun Goh Section 001L Dr. Nelson Fumo
Contact Information	Dr. Chung-Hyun Goh: Office: RBN 3007, Email: cgoh@uttyler.edu , Phone: (903) 566-6125 Dr. Nelson Fumo: Office: RBN 3009, Email: nfumo@uttyler.edu , Phone: (903) 565-5588
Lecture Class Type / Instruction Mode / Location	Type: Face-to-Face Instruction Mode: Lecture Location: RBN 3038
Lecture Class Time	M 11:15 AM – 12:15 PM
Lab Class Type / Instruction Mode / Location	Type: Face-to-Face Instruction Mode: Lab Location: RBN 1035
Lab Class Time	Sec 001L: M 2:00 PM - 4:45 PM Sec 002L: W 2:00 PM - 4:45 PM
Office Hours	Dr. Chung-Hyun Goh – M/Tu/Tr 10:00 AM – 11:00 AM or by appointment Dr. Nelson Fumo - M/W 11:00 AM – noon, W 2:00 PM – 3:00 PM or by appointment
No. of Credits	2 (1 hour lecture and 3 hours laboratory per week)
Required Textbook	Introduction to Engineering Experimentation, Third Edition, A. J. Wheeler and A. R. Ganji, Prentice Hall, 2010, ISBN 0-13-174276-0.
Optional References	Recommended for LabVIEW: LabVIEW 2014 Student Edition, R. H. Bishop, Pearson, 20104, ISBN 0-13-401133-3. The LabView tutorial is available at



	<p>https://learn.ni.com/learn/article/labview-tutorial</p> <p>Recommended for Experiments: None. A handbook will be provided electronically. However, an equivalent of the price of a typical experimental textbook maybe required as a contribution from each student for material needed to execute the assigned experiments and project.</p>								
Additional Rules and Requirements	<p>Attendance is required. No makeup.</p>								
Evaluation Method	<table> <tr> <td>Quizzes</td> <td>25 %</td> </tr> <tr> <td>Mid-term Exam</td> <td>25 %</td> </tr> <tr> <td>HW / Lab Assignments</td> <td>30 %</td> </tr> <tr> <td>Lab Project</td> <td>20 %</td> </tr> </table>	Quizzes	25 %	Mid-term Exam	25 %	HW / Lab Assignments	30 %	Lab Project	20 %
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Grading Policy / Scale	<p>Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60</p>								
Important Events / Dates	<p>Census date: 09/01/2023 Third drop for non-payment: 09/13/2023 Exam date: 11/27/2023 Last date to withdraw from one or more 15-week courses: 10/30/2023 2023 Career Success Conference: 10/19/2023 Final date: TBD</p>								
Attendance / Makeup policy / other rules	<p>Attendance is required. No makeup exams will be authorized without providing an official document showing that your absence is in line with university rules.</p>								
Course Learning Objectives / ABET & PEOs Relation	<p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Select and use sensors and instrumentation to report engineering measurements, and to perform calculations using the corresponding governing equations. (SO6) 2. Interpret and analyze data, obtained from Engineering Experimentation, using statistical methods and uncertainty analysis. (SO6) 3. Design, perform, and report results of a mechanical engineering experiment. (SO5) 4. Use software for data acquisition. (SO6) 5. Write clear and well documented laboratory reports. (SO5) 								
Tentative Topics / Course Plans	<ol style="list-style-type: none"> 1. Introduction to LabVIEW 2. Introduction to Engineering measurements and techniques 3. Statistical analysis and uncertainty 4. Technical writing for lab reports 								
University Policies	<p>https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf</p>								



Lecture Class Schedule				
Week	Day		Topic(s)	Quiz
1	M	8/21	Course Introduction / Significant Digits	-
2	M	8/28	Measurement Systems	-
3	M	9/04	No Class (Labor Day holiday)	
4	M	9/11	Statistical Analysis #1 – PDFs and CLT	-
5	M	9/18	Quiz #1	Y
6	M	9/25	Statistical Analysis #2 - Uncertainty	-
7	M	10/02	Signal Conditioning	-
8	M	10/09	Quiz #2	Y
9	M	10/16	Measuring Pressure and Temperature	-
10	M	10/23	Measuring Displacement and Strain	-
11	M	10/30	Quiz #3	Y
12	M	11/06	Measuring Velocity, Acceleration, & Force	-
13	M	11/13	Quiz #4	Y
14	M	11/20	No Class (Thanksgiving holidays)	
15	M	11/27	Exam	

Lab Class Schedule						
Week	Day		Original Topic(s)	Replacement Topic(s)	Teaching Mode	HW/Report
1	M	8/21	No lab (MATLAB onramp certificate)	-	-	-
	W	8/23				
2	M	8/28	Report Writing – Project Assignment	-	Face-to-Face (In Lab)	-
	W	8/30				
3	M	9/04	No lab (Labor Day)	-	-	-
	W	9/06				
4	M	9/11	LabVIEW - Fundamentals	-	Face-to-Face (In Lab)	HW1
	W	9/13				
5	M	9/18	LabVIEW - Programming	-	Face-to-Face (In Lab)	HW2
	W	9/20				
6	M	9/25	LabVIEW – DAQ & Signal Processing	-	Face-to-Face (In Lab)	HW3
	W	9/27				
7	M	10/02	LabVIEW - Practicing	-	Face-to-Face (In Lab)	HW4
	W	10/04				
8	M	10/09	Lab #1: Basic Measurements and Uncertainty	TBD	Face-to-Face (In Lab)	Lab Report (Individual)
	W	10/11				
9	M	10/16	Lab #2: How to Use a Digital Multimeter	TBD	Face-to-Face (In Lab)	Lab Report (Individual)
	W	10/18				
10	M	10/23	Lab #3: Signal Conditioning	TBD	Face-to-Face (In Lab)	Lab Report
	W	10/25				
11	M	10/30	Lab #4: Temperature Measurements	TBD	Face-to-Face (In Lab)	Lab Report
	W	11/01				
12	M	11/06	Lab #5: Displacement Measurements	TBD	Face-to-Face (In Lab)	Lab Report
	W	11/08				
13	M	11/13	Student Design Lab Project Discussion	-	Face-to-Face (In Lab)	-
	W	11/15				
14	M	11/20	Thanksgiving Holidays - No Labs			
	W	11/22				
15	M	11/27	Student Design Lab Project – Presentations on 11/27 (or 11/29)			Final Report (Duc: 12/1)
	W	11/29				