

Phone: +1.903.566.7003 Fax: +1.903.566.7148 Uttyler.edu/engineering

Semester / Year	emester / Year Fall 2025					
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, 003L					
Instructor Name	Dr. Andrew Robbins					
Contact Information	Office: RBN 3006 Email: arobbins@uttyler.edu					
Lecture Class Type / Instruction Mode / Location	Type: Face-to-Face Instruction Mode: Lecture Location: RBN 4034					
Lecture Class Time	M 10:10 - 11:10 AM					
Lab Class Type / Instruction Mode / Location	Type: Face-to-Face Instruction Mode: Lab Location: RBN 1035					
Lab Class Time	Sec 002L: M 2:00 - 4:45 PM Sec 001L: R 2:00 - 4:45 PM Sec 003L: F 10:00 - 12:45 PM					
Office Hours	Wednesdays 8:30-10:00am Thursdays 8:30-10:00am or by appointment					
No. of Credits	2 (1 hour lecture, 3 hour lab per week)					





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Required Textbook	NONE					
Optional References	T. G. Beckwith. Mechanical Measurements . 6th edition. Pearson Available to check out form the internet archive for free: https://archive.org/details/mechanicalmeasur0000beck_q2k3					
	R. S. Figliola. Theory and Design for Mechanical Measurements. 7th edition. Wiley. PDFs of the 5th edition are available online					
	J. P. Holman. Experimental Methods for Engineers. 8th edition. McGraw-Hill. Available to check out for free (8th international) from internet archive: https://archive.org/details/experimentalmeth0008holm					
	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.					
Additional Rules and Requirements	AI is permitted for use in lab reports for providing writing feedback and suggested edits. However, wholesale generation of content is NOT permitted.					
	It is NOT permitted to use AI for solving homework, quiz, or exam questions unless explicit written approval is given in the assignment instructions. However, it is permitted to ask AI chatbots general questions about how to solve certain types of problems if the chatbot is not providing the solution.					
	Any other 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.					
	Additional instructions regarding the use of AI tools will be provided in class. All instructions given in class are binding requirements to which every student will be held accountable.					
	Since the mechanical engineering program is intended to train students to be engineering professionals, it is expected that all work products (e.g. homework, lab reports, projects, presentations, etc.) submitted for class be of professional quality. Failure to submit professional quality work may result in grade reductions, regardless of whether any grading scheme or rubric for an assignment explicitly includes professionalism in the grade calculation.					





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]	HW/Quizzes 15 % Lab Assignments 15 % Individual Lab Report(s) 20 % Lab Project 15 %							
]	Individual Lab Report(s) 20 % Lab Project 15 %							
1	Lab Project 15 %							
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1 -	Midterm Lab Practical 15 %							
	Second Lab Practical 20 %							
	Written exam 15%							
	Practical exam 10%							
	Letter grades, scale:							
	A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60							
Important Events / Dates	Census date: September 8th							
	Midterm Lab Practical: October 20, 22, 23 (during your lab)							
	Second Lab Practical: December 1 (written, during lecture)							
Ι,	` ' '							
١,	December 1, 3, 4 (practical, during lab) Last date to withdraw from one or more 15-week courses:							
	11-3-2025							
	1							
1	https://www.uttyler.edu/academics/academic-calendar-25-26/							
Attendance /	Attendance is required. Only excused absences in accordance with							
	university policy as written in the current catalog will be accepted.							
other rules	man variety from your management of management							
	It is expected that you will coordinate anticipated excused absences 2							
l l	weeks in advance with your instructor, including a plan for makeup							
	work. For unexpected excused absences, students are expected to							
l l	provide documentation and coordinate makeup work within 2 business							
-	days of the end of the excused absence period.							
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1	For more information refer to the university policy University of Texas							
4	at Tyler - Class Attendance/Excused Absences (smartcatalogiq.com)							
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Course Learning	By the end of this course, students will be able to:							
Objectives / ABET &	1. Select and use sensors and instrumentation to report engineering							
PEOs Relation	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)							
	3. Write clear and well documented laboratory reports. (805)							
	4. Use software for data acquisition. (SO6)5. Write clear and well documented laboratory reports. (SO5)							



Department of Mechanical Engineering

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Tentative Topics / Course Plans	 Measurement systems and sources of error a. Systematic errors b. Random errors Statistical tests a. z-tests b. Paired and unpaired t-tests c. Chi squared tests Uncertainty propagation 1st and 2nd order dynamics in measuring systems Measurement techniques and sensors for: a. Length, displacement, and strain b. Velocity and Acceleration c. Temperature d. Mass and Mass properties e. Force and Strain Technical writing 	
University Policies	s://www.uttyler.edu/offices/academic-affairs/files/syllab nformation.pdf	



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Course Schedule

Week	Lecture	Lab (M)	Lab (R)	Lab (F)	Lecture	Lab Unit	Lab
1	8-25	8-25	8-28	8-29	Intro	Technical Writing	Technical Writing and Al
2	9-8	9-8	9-11	9-12	Statistics Review	Statistics	Statistics
3	9-15	9-15	9-18	9-19	Statistical Tests	Project	Project Preparation I
4	9-22	9-22	9-25	9-26	Confidence & Uncertainty	Manual Measurements	Length
5	9-29	9-29	10-2	10-3	Measurement Error		Pressure
6	10-6	10-6	10-9	10-10	Measurement Linearity		Mass Properties
7	10-13	10-13	10-16	10-17	1st Order Systems	Project	Project Preparation II
8	10-20	10-20	10-23	10-24	2nd Order Systems	Practical	Practical (lecture 1-6, lab1-5)
9	10-27	10-27	10-30	10-31	Temperature	Electronic Measurements	Temperature
10	11-3	11-3	11-6	11-7	Displacement and Strain		Wheatstone Bridge & Strain
11	11-10	11-10	11-13	11-14	Velocity & Acceleration		Velocity
12	11-17	11-17	11-20	11-21	Force & Pressure	Project	Project Presentations
13	12-1	12-1	12-4	12-5	Exam (comprehensive)	Practical	Practical (comprehensive)