MENG 4311 - Introduction to Mechatronics
Course Syllabus

Semester / Year	**Spring 2025**
Catalog Description	An introduction to Mechatronics' systems and their applications with coverage of the required skills to design innovative mechatronics systems. Topics include programming of microcontrollers, integration of electrical circuits and computers to control mechanical systems, measurements in mechatronics systems, and mechatronics systems applications such as robotics, medical devices, etc.
Prerequisites	MENG 3210, EENG 3308, and EENG 3301.
Section Number	050 (Tyler) 051 (HEC)
Instructor Name	Dr. Andrew Robbins
Contact Information	Office: RBN 3006 Email: arobbins@uttyler.edu
Lecture Class Type / Instruction Mode / Location	Section 050 Type: Face-to-Face Instruction Mode: Lecture Location: RBN 3038 Section 051 Type: Hybrid Instruction Mode: Lecture Location: HEC A217, ZOOM
Lecture Class Time	MW 5:00 PM - 6:20 PM
Office Hours	T 9:00-11:00 am TR 9:00-11:00 am In-person or ZOOM, additional times available by request
No. of Credits	3
Required Textbook	1. Elegoo UNO project SUper Starter Kit
Optional References	1. (free online) Wikibooks "Robotics" https://en.wikibooks.org/wiki/Robotics 2. (free online) Wikibooks "Electronics" https://en.wikibooks.org/wiki/Electronics

	3. (free online) Wikibooks "Embedded Systems" https://en.wikibooks.org/wiki/Embedded_Systems 4. (free online) Wikibooks General Engineering Introduction/Arduino and Motors https://en.wikibooks.org/wiki/General_Engineering_Introduction/Arduino_and_Motors 5. Practical Electronics for Inventors. 4th edition. 6. Visit: https://www.arduino.cc/ to download the open-source Arduino Software (IDE) 7. Visit www.tinkercad.com to perform a virtual simulation for Arduino board 4. Mechatronic, Electronic Control Systems in Mechanical and Electrical Engineering. W. Bolton, 7th Edition	
Additional Rules and Requirements	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.	
Evaluation Method	Quizzes Exams HW Individual Project Group Project	10 % 15 % 25 % 15 % 35%
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60	
Important Events / Dates	Census: 1-27-2025 Last to withdraw from 15-week courses: 3-31-2024 Final Date: 4-28-2025	
Attendance / Makeup policy / other rules	Attendance is required. Only excused absences in accordance with university policy as written in the current catalog will be accepted. 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. For more information refer to the university policy University of Texas at Tyler - Class Attendance/Excused Absences (smartcatalogiq.com)	

Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: 1. Describe the basic components of mechatronic systems. 2. Identify and select the appropriate electric circuits and components for a particular mechatronic system. 3. Demonstrate the use of a microcontroller to enable integration of circuitry, sensors, and actuators in a mechatronic system 4. Design and build a fully integrated mechatronic system to achieve specifically defined tasks. 5. Effectively communicate their engineering work in the form of professional technical documentation.
Tentative Topics / Course Plans	See schedule below
University Policies	https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf

Tentative Schedule

Date	Week	Unit	Topic
1-13-2025	1	Basic circuits and circuit analysis	Intro to and applications for mechatronics
1-15-2025	1		Passive components and circuits
1-20-2025			
1-22-2025	2		Circuit analysis review
1-27-2025	3	Active components and digital design	Active components and circuits, semiconductors
1-29-2025	3		Digital components and circuits
2-3-2025	4		Digital design and FPGAs
2-5-2025	4		Microcontrollers
2-10-2025	5	Intro to Arduino	Arduino programming 1
2-12-2025	5		Arduino programming 1
2-17-2025			
2-19-2025			
2-24-2025	6		Arduino programming 1
2-26-2025	6		Arduino programming 1
3-3-2025	7	**Midterm Exam**	**Midterm Exam**

Date	Week	Topic	Subject
3-5-2025	7	Motors and Actuators	Motors and other actuators
3-10-2025	8		Motor drivers
3-12-2025	8		Driving motors with a microcontroller
3-17-2025	9		Feedback and control
3-19-2025	9		Motor driving with Arduino
3-24-2025	10		How to size a motor
3-26-2025	10	Advanced Arduino programming	Advanced Arduino Programming
3-31-2025	11		Advanced Arduino Programming
4-2-2025	11	Applications	Mobile robots
4-7-2025	12		Mobile robots
4-9-2025	12		Internet of things
4-14-2025	13		Other applications
4-16-2025	13	Review	Review
4-21-2025	14	Presentations	Presentations
4-23-2025	14		Presentations
8-28 to 5-2	FINAL	**Final Exam**	**Final Exam**