MENG 4311 - Introduction to Mechatronics
Course Syllabus

Semester / Year	**Spring 2026**
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)
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 3041
Lecture Class Time	MW 11:15 AM - 12:35 PM
Office Hours	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 for specific assignments, and appropriate acknowledgment and citation 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. In general, an appendix to the assignment should include a description of the AI tool used and a complete history of the prompts and responses used to generate the work. Since the mechanical engineering program is designed to prepare students for professional practice, all submitted work (e.g., homework, lab reports, projects, presentations) is expected to meet professional standards. Work that does not reflect professional quality may be subject to grade reductions, even if professionalism is not explicitly listed in the grading rubric.	
Evaluation Method	Exam 1 Exam 2 Final Exam HW Individual Project Group Project	15 % 15 % 20 % 15 % 15 % 20 %
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60	
Important Events / Dates	1/26/2026 (Mo): Census Date. 3/30/2026 (Mo): Last day to withdraw from one or more classes. 4/27-30: Final Exam. exact date TBD	
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-rev122025.pdf

Tentative Schedule

Date	Week	Unit	Topic
1-12-2026	1	1: Basic circuits and circuit analysis	Intro to and applications for mechatronics
1-14-2026	1		Passive components and circuits
1-19-2026			
1-21-2026	2		Circuit analysis review
1-26-2026	3	2: Active components and digital design	Diodes
1-28-2026	3		Transistors
2-2-2026	4		Digital Circuits, digital design, and Microcontrollers
2-4-2026	4		Digital Circuits, digital design, and Microcontrollers
2-9-2026	5	**Exam 1**	**Exam 1**
2-11-2026	5	3: Intro to Arduino	Arduino programming, C language
2-16-2026	6		Arduino programming, digital and analog IO
2-18-2026	6		Arduino programming, continued
2-23-2026	7		Arduino programming, analog signal filtering
2-25-2026	7	4: Motors and Actuators	Actuators, DC motors
3-2-2026	8		BLDC motors, Servomotors
3-4-2026	8		Stepper motors
3-9-2026			
3-11-2026			
3-16-2026	9		Feedback and control
3-18-2026	9		Motor driving with Arduino
3-23-2026	10		How to size a motor
3-25-2026	10	**Exam 2**	**Exam 2**
3-30-2026	11	5: Advanced Arduino programming	Multitasking
4-1-2026	11		Finite State Machines
4-6-2026	12		Inter-device Communication with Arduino (I2C/SPI)
4-8-2026	12	BONUS	Project Work
4-13-2026	13		Project Work
4-15-2026	13	Exam Review	Exam Review
4-20-2026	14	Presentations	Presentations
4-22-2026	14		Presentations
4-27 to 4-30	FINAL	**Final Exam**	**Final Exam**