

**MENG 4311 – Introduction to Mechatronics**  
**Course Syllabus**

<b>Semester / Year</b>	Spring / 2026
<b>Catalog Description</b>	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.
<b>Prerequisites</b>	MENG 3210, EENG 3308, EENG 3301 (Corequisite)
<b>Section Number</b>	030
<b>Instructor Name</b>	Dr. Hussain Rizvi
<b>Contact Information</b>	Email: <a href="mailto:hrizvi@uttyler.edu">hrizvi@uttyler.edu</a> Office: HEC A206
<b>Class Type / Instruction Mode / Location</b>	Face-to-face HEC B210
<b>Class Time</b>	Tuesday/Thursday 3:30PM – 4:50PM
<b>Office Hours</b>	Mo 9:30-11:00 am, Tue 11:00 –12:30 pm, or by appointment outside of the regular office hours.
<b>No. of Credits</b>	3
<b>Required Textbook</b>	<a href="#">Elegoo UNO project SUper Starter Kit</a>
<b>Optional References</b>	<ol style="list-style-type: none"> <li>1. (free online) Wikibooks “Robotics” <a href="https://en.wikibooks.org/wiki/Robotics">https://en.wikibooks.org/wiki/Robotics</a></li> <li>2. (free online) Wikibooks “Electronics” <a href="https://en.wikibooks.org/wiki/Electronics">https://en.wikibooks.org/wiki/Electronics</a></li> <li>3. (free online) Wikibooks “Embedded Systems” <a href="https://en.wikibooks.org/wiki/Embedded_Systems">https://en.wikibooks.org/wiki/Embedded_Systems</a></li> <li>4. (free online) Wikibooks General Engineering Introduction/Arduino and Motors <a href="https://en.wikibooks.org/wiki/General_Engineering_Introduction/Arduino_and_Motors">https://en.wikibooks.org/wiki/General_Engineering_Introduction/Arduino_and_Motors</a></li> <li>5. Practical Electronics for Inventors. 4th edition.</li> <li>6. Visit: <a href="https://www.arduino.cc/">https://www.arduino.cc/</a> to download the open-source Arduino Software (IDE)</li> <li>7. Visit <a href="http://www.tinkercad.com">www.tinkercad.com</a> to perform a virtual simulation for Arduino board</li> <li>8. Mechatronic, Electronic Control Systems in Mechanical and Electrical Engineering. W. Bolton, 7th Edition</li> </ol>

<b>Additional Rules and Requirements</b>	<p>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.</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>
<b>Evaluation Method</b>	<p>Exam 1 15%          Exam 2 15%          Final Exam 20%          Individual Project 15%          Group Project 20%          HW 15%</p>
<b>Grading Policy / Scale</b>	<p>Letter grades, scale:          A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: &lt; 60</p>
<b>Important Events / Dates</b>	<p>Census date: 01/26/26 (Mo)          Last date to withdraw from one or more 15-week courses: 3/30/26          Final date: 4/30/26 (Th)</p>
<b>Attendance / Makeup policy / other rules</b>	<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="http://University of Texas at Tyler - Class Attendance/Excused Absences (smartcatalogiq.com)">University of Texas at Tyler - Class Attendance/Excused Absences (smartcatalogiq.com)</a></p>
<b>Course Learning Objectives / ABET &amp; PEOs Relation</b>	<p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the basic components of mechatronic systems.</li> <li>2. Identify and select the appropriate electric circuits and components for a particular mechatronic system.</li> <li>3. Demonstrate the use of a microcontroller to enable integration of circuitry, sensors, and actuators in a mechatronic system</li> <li>4. Design and build a fully integrated mechatronic system to achieve specifically defined tasks.</li> <li>5. Effectively communicate their engineering work in the form of professional technical documentation.</li> </ol>

Tentative Topics / Course Plans	Week (Dates)	Unit	Topic
1 (1/13,1/15)	Basic circuits and circuit analysis		Intro to and applications for mechatronics
			Passive components and circuits
			Circuit analysis review
			Circuit analysis review
2 (1/20,1/22)	Active components and digital design		Active components and circuits, semiconductors
			Digital components and circuits
			Digital design and FPGAs
			Microcontrollers
3 (1/27,1/29)	Intro to Arduino Programming		<b>Midterm Exam</b>
			Arduino programming 1
			Arduino programming 1
			Arduino programming 1
4 (2/3,2/5)	Motors and Actuators		Arduino programming 1
			Motors and other actuators
			Motor drivers
			Driving motors with a microcontroller
5 (2/10,2/12)	Advanced Arduino programming		<b>Spring Break</b>
			Feedback and control
			Motor driving with Arduino
			How to size a motor
6 (2/17,2/19)	Applications		<b>Midterm Exam</b>
			Mobile robots
			Mobile robots
			Internet of things
7 (2/24,2/26)	Review		Other applications
			Review
			Presentations
			Presentations
8 (3/3,3/5)	Presentations		<b>Final Exam</b>
			(Dr. Rizvi reserves the right to change schedule in course plan)
University Policies	<a href="https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information-rev122025.pdf">https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information-rev122025.pdf</a>		