



MENG 4311 - Introduction to Mechatronics

Course Syllabus

Semester / Year	Spring / 2023
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	001, 040
Instructor Name	Dr. Muath Salim
Contact Information	Email: msalim@uttyler.edu Office: RBN 3011
Class Type / Instruction Mode / Location	Face-to-face / RBN 3038 & HEC B210
Class Time	Mon & Wed, 4:05 pm - 5:30 pm
Office Hours	Mon, Wed, & Thu. 12 pm – 1 pm
No. of Credits	3 credits
Required Textbook	1. ELEGOO UNO Project Super Starter Kit with Tutorial and UNO R3 Compatible with Arduino IDE 2. M. Jouaneh, Fundamentals of Mechatronics. Cengage Learning, 2012.
Optional References	1. Arduino Programming: The Ultimate Intermediate Guide To Learn Arduino Programming Step By Step, by Ryan Turner 2. Visit: https://www.arduino.cc/ to download the open-source Arduino Software (IDE) 3. Visit www.tinkercad.com to perform a virtual simulation for Arduino board Mechatronic, Electronic Control Systems in Mechanical and Electrical Engineering. W. Bolton, 7th Edition
Additional Rules and Requirements	Students are expected to use their own individual laptops or compatible electronic devices. No computers will be provided by the department.
Evaluation Method	<ul style="list-style-type: none"> • Homework assignments 30% • Individual Project 20% • Group Project 40% • Quizzes 10%
Grading Policy / Scale	Letter Grades, Scale: A: 90 - 100, B: 80 – 89, C: 70-79, D: 60 – 69, F: <60
Important Events / Dates	<ul style="list-style-type: none"> • Census date: Jan 23rd, 2023



	<ul style="list-style-type: none"> • Project 1 due date: Feb 17th, 2023 • Last date to withdraw from one or more 15-week courses: March 23rd, 2023 • Project 2 Presentation: Week13 classes • Project 2 files submission: April 20th, 2023,
Attendance / Makeup policy / other rules	Regular attendance is imperative if you want to do well in this course. Therefore, Regular attendance is required. In case you have to miss a class, it is your responsibility to keep up with the classwork and be informed of all announcements made in the class on homework, tests, etc. No makeup
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. Students will be able to describe the basic components of mechatronic systems. 2. Students will be able to identify and select the appropriate electric circuits and components for a particular mechatronic system. 3. Students will be able to demonstrate the use of a microcontroller to enable integration of circuitry, sensors, and actuators in a mechatronic system 4. Students will be able to design and build a fully integrated mechatronic system to achieve specifically defined tasks. 5. Students will be able to effectively communicate their engineering work in the form of professional technical documentation.
Tentative Topics / Course Plans	See table below
University Policies	https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf



Table 1: List of Tentative Topics

Week	Topic
1	<ul style="list-style-type: none">• Introducing mechatronics (Chapter 1)
2	<ul style="list-style-type: none">• Sensors and signal conditioning (Chapter 7)
3	<ul style="list-style-type: none">• Digital signals and Digital logic (Chapter 3)
4	<ul style="list-style-type: none">• Arduino Board Programming (Chapter 4) +Lecture Notes
5	<ul style="list-style-type: none">• Project 1 discussion
6	<ul style="list-style-type: none">• Electrical actuation systems (Chapter 8)• Power electronics in mechatronic systems
7	<ul style="list-style-type: none">• Measurement Systems in Mechatronics (Chapter 5 and MATLAB))
8	<ul style="list-style-type: none">• Arduino Board Programming (Advanced applications) (Chapter 6)
9	<ul style="list-style-type: none">• Project 2 discussion (Chapters 9&10 and MATLAB)
10	<ul style="list-style-type: none">• Mechatronics Applications in Mechanical Engineering (Lecture Notes)
11	<ul style="list-style-type: none">• Internet of Things (IoT) (Lecture Notes)
12	<ul style="list-style-type: none">• Mobile robots (Lecture Notes)
13	<ul style="list-style-type: none">• Final Projects Presentations
14	<ul style="list-style-type: none">• Mechatronics in Industry (Lecture Notes)• Mechatronics Applications for Thermal systems (Lecture Notes)
15	<ul style="list-style-type: none">• No Final Exam