The University of Texas at El Paso
Aerospace and Mechanical Engineering

MECH 3103 – Mechatronics Lab

Course Syllabus

Spring 2025

COURSE INFORMATION

Meeting Times:	F 8:00 – 10:50 PM
Course Designation:	MECH 3103
CRN	24256
Credit Hours:	1
Lecture Hours:	1
Course Description:	This course is intended to learn how to use mechatronics concepts in real-life applications. By the end of this course students will be able to use microprocessor system techniques to create different projects including sensors and actuators.
Prerequisite(s):	None
Co-requisite(s):	None.
Room location:	Classroom 205

INSTRUCTORS INFORMATION

Ivan Renteria, PhD

Office:	**Eng. Build. A-246**
Office Hours:	Monday: 10-12 pm and Wednesday 10:12 pm or MS Team
Email:	iarenteria@utep.edu

HARDWARE

- eElego uno kit click here
- HM-10 click here
- ESP8266 click here

SOFTWARE

- Arduino IDE available at https://www.arduino.cc/en/software
- ThinkerCAD available at https://www.tinkercad.com/dashboard

COURSE CONTENT

Topic	Lecture Date	Due date
GPIO	January 24, 2025	January 31, 2025
PWM	January 31, 2025	February 7, 2025
ADC	February 7, 2025	February 21, 2025
UART / I2C	February 21, 2025	February 28, 2025
SPI / IR	February 28, 2025	March 7, 2025
EEPROM	March 7, 2025	March 21, 2025
RTOS and ISR	March 21, 2025	March 28, 2025
Internet of Things (IoT)	March 28, 2025	April 4, 2025
Artificial Intelligence (AI)	April 4, 2025	April 11, 2025
Final Project	April 11, 2025	May 2, 2025

GRADE DISTRIBUTION

Lab Assignments (70%) Final Project (30%)	100%	>= 90.00	A
		89.99 - 80	B
		79.99 - 70	C
		69.99 - 60	D
		<= 60	F

LAB ASSIGNMENTS

There will be nine lab assignments related to the topics covered. Every lab needs to be turned in one week after the lecture. Solution presented by the student must include a schematic of the hardware (10%), a high-level flowchart for the algorithm implemented (10%), a demonstration of the system working (40%) and a hardcopy well documented copy of the code (40%). Please see the demo section on blackboard to see example submissions.

ACADEMIC HONESTY

During exams you are not allowed to use any form of wifi enabled electronic device, including cell phones or other electronic communication devices or methods (wrist watches, earbuds, etc.). No wrist watch or other electronic device may be worn. Calculators and watches may be subject to inspection. You may be asked to temporarily remove glasses to allow for their inspection. You may not bring backpacks, hats, bulky coats or hoodies into the exam room. Lockers are not available at the exam site so plan and leave your belongings in a secure location. You may NOT sit them in a corner of the exam room. You must show your work for all problems. You must use the paper provided by the instructor. If no work is shown you may not receive credit. After the exam, the instructor may require you to explain how you solved a problem on the exam. If you refuse to or cannot explain your work you may be subject to disciplinary action. No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam or an F in the class. Other actions including suspension may also be pursued. No one will be allowed to leave the room during an exam. This includes restroom breaks. University approved recording devices may be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media. The instructor may create a record of your activity during the exam and may take photographs of your work during the exam. If you are suspected of scholastic dishonesty you may or may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and you

exam may not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes. If you arrive more than 15 minutes late to an exam, you will not be allowed to take the examination. There will be no makeup exams administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given. If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid. No food or drink may be brought into the examination room. Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam. No other IDs will be accepted. Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

CLASS ATTENDANCE POLICY

Attendance to on-line lecture sessions is optional. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs. As per UTEP rules, you may be asked to show a UTEP ID at any time during class. Anyone who is present and not registered in the class will be subject to disciplinary action unless the instructor gives prior approval.

EXCUSED ABSENCE FOR EXAMS

The UTEP catalog allows Exam Absence to be excused ONLY for University-Recognized Activities and very specific other situations. Medical absence is NOT allowed in the UTEP catalog. For consistency with the catalog, students will NOT be excused from exams due to illness.

HARASSMENT POLICY

The University (see Handbook of Operating Procedures 1.2.2.4) has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.

AMERICAN DISABILITIES ACT

If you feel you may have a disability that requires accommodations, contact the Center for Accommodations and Support Services (CASS) at 747-5148 or go to the Union East, Room 106.

Final Project

For the final project a team of three students will be working in one of the next proposed systems. Any other idea can be considered.

1. Automated hamburger maker
2. Smart house system
3. Water supplying machine
4. Smart car object detector
5. Garden assistant
6. Smart weighting machine
7. Automated pet feeder
8. Automated writing robot
9. Snake game
10. Fingerprint lock (camera needed)
11. Wireless controlled robotic arm
12. Multimeter (DC /AC voltage, current temperature, humidity, lumens)
13. Real time inertia measurement unit
14. Car GPS security system
15. Smart tesla coil system
16. Fluorescent box
17. Controlled steam engine
18. Sun light solar cell tracker (PID needed)
19. Piano tutor
20. Mini three-story elevator
21. Real Car Braking System

Every project will have its own system requirements which need to be discussed with Dr. Renteria. Any structure used shall be designed and 3D printed by the team. To print anything send the stl file to 3DLM@utep.edu