



Course Title	Mechatronics MECH 4346 (Sec-1), CRN: 12351 (Fall-2022): Credit: 3
Instructor	Dr. Arifur R. Khan (arkhan@utep.edu), Associate Professor, ME Office hours (A-317): 10:30 pm-11:30 am; and MS Team Link:
TA	TBD
Class schedule	Classroom building, C205, MW 9:00-10:20 pm, (Aug. 22-Dec. 01, 2022)
Course Prerequisite	MECH 3345 with a C or better.
Course Description	Mechatronics requires knowledge of Sensors, Actuators, Circuits, Microcontrollers and Programming to build and run a machine for a specific purpose. This type of understanding and experiences are appropriate for the students of Electrical, Mechanical, Control, Industrial, Computer, System, Spacecraft, and Aerospace Engineering, etc.
Course Objective	This course educates students to be confident in mechanical systems with sensors and actuators powered by electrical and electronic systems controlled by computers (microprocessor) run by programming codes. At the end of this course, the typical student will understand how a machine works under different conditions for different purpose and will be able to design, implement and build Mechatronics system. This course will also improve the ability to identify, analyze and solve engineering problems using basic science and engineering knowledge, human intuition, and instinct.
Course Topics	<ul style="list-style-type: none"> • Introduction of Mechatronics • Electrical/Electronic Components, IC Chips for Mechatronics System • Sensors • Electric Actuators • Programmable Logic Controllers (Arduino/LabVIEW/MATLAB Based) • Hands on Projects (will be assigned in the class for each group) • Arduino/MATLAB/LabVIEW Programming (Project related)
Reference	<ol style="list-style-type: none"> 1. Mechatronics with Experiments by Sabri Cetinkunt (Second Edition), published by Willy (EBook is available in the UTEP Library) 2. Mechatronics with Measurement System, David G. Alciatore and Michael B. Hstand, Mac Graw Hill (pdf version available online) 3. Additional Reference materials (notes, projects, web links, etc.) may be handed out in class, also available in Blackboard.
Software in class	iClicker (Attendance, quiz, etc.), MATLAB, Arduino, LabVIEW
Student's assessment	<ol style="list-style-type: none"> 1. Class Performance: 20% [Attendance and Class quiz through iClicker] 2. Midterm-1: 20% 3. Midterm-2: 20% Final exam will replace the worst midterm. 4. Final Exam: 20% 5. Project 40% (4/5 student team) [Project progress: 4, Final presentation: 16, Final report (word. pdf.):15, YouTube video: 5] 6. Final exam (Online, Bb) is optional. It will replace the worst midterm. 7. Grace point: 1% if it improves the current grade to the next better level.
Students grading	A= $\geq 90\%$; B= $< 90\%$ and $\geq 80\%$; C= $< 80\%$ and $\geq 70\%$; D= $< 70\%$ and $\geq 60\%$; F= $< 60\%$ (UTEP Standard)
Tools in Class/Lab	<ol style="list-style-type: none"> 1. Scientific calculator, Laptop, Pad, e-book, can be used as problem solving tools in class. 2. Project accessories (Arduino, components, etc.)

Necessary ITEMS for the Fall 2022 semester

Institution:
The University of Texas at El Paso

Course Discipline:
Engineering

Course Name:
Mechatronics-1

Start Date: 8/22/2022  **End Date:** 12/1/2022 

Enrollment:

- Students can search for and self-enroll in this course.
- Students must be invited to this course. [Learn More](#)

Optional

Course ID: *Optional*
MECH 4346

Term: *Optional*
CRN 12351

Meeting Times: *Optional*

- Monday 9:00 AM
- Tuesday
- Wednesday 9:00 AM

Please note, Course ID and CRN 12351, Date, MW and time 9:00 am in the picture left.
Link: <https://app.reef-education.com/#/courses/add>

Depending on the project decided, student (in group) should buy components, electronics, and necessary items to build their project.

Date	Class Topic (subject to change)	NOTE
Week 1	8/22	Meet and Greet, Course objective, syllabus discussion, Grading policy, iClicker setup
	8/24	Previous projects, Team formation, and project distribution.
Week 2	8/29	Introduction to Mechatronics, Application in daily life
	8/31	Introduction to Mechatronics, Application in daily life
Week 3	9/5	Electrical/Electronic Components for Mechatronics System
	9/7	Electrical/Electronic Components for Mechatronics System Midterm project guideline discussion
Midterm Project submission due 9/13 (On BB)		
Week 4	9/12	Details about Sensors and its usages
	9/14	Details about Sensors and its usages
Week 5	9/19	Details about Sensors and its usages
	9/21	Details about Sensors and its usages
Week 6	9/26	Details about Sensors and its usages
	9/28	Details about Sensors and its usages
Week 7	10/3	Midterm-1 Exam Review Topic: Into to mechatronics and Sensors
	10/5	Electric Actuator and its application
		Black Board Online Camera activated Lockdown browser
Week 8	10/10	Electric Actuator and its application
	10/12	Electric Actuator and its application
Week 9	10/17	Electric Actuator and its application
	10/19	Electric Actuator and its application
Week 10	10/24	Programmable Logic Controller (PLC) (Arduino/ LabVIEW/MATLAB based)
	10/26	Programmable Logic Controller (PLC) (Arduino/ LabVIEW/MATLAB based)
Oct. 29: Fall Drop/Withdrawal deadline		

Week 11	10/31	Programmable Logic Controller (PLC) (Arduino/ LabVIEW/MATLAB based)	Home practice for Class quiz.
	11/2	Programmable Logic Controller (PLC) (Arduino/ LabVIEW/MATLAB based)	Home practice for Class quiz.
Week 12	11/7	Midterm-2 Exam Review Topic: Actuator and PLC	Black Board Online Camera activated Lockdown browser
	11/9	Final Project Presentation (A1, A2, A3)	Home practice for Class quiz.
Week 13	11/14	Final Project Presentation (A4, A5, A7)	Home practice for Class quiz.
	11/16	Final Project Presentation (A8, A9, B1)	Home practice for Class quiz.
	11/18	Project Showcase, 10 am to 1 pm (all Teams)	
Week 14	11/21	Project report submission due date Best-Project declaration	Home practice for Class quiz.
	11/23	Grade declaration Final exam Review (Optional)	Home practice for Class quiz.
Nov. 24-25 Thanksgiving Holiday, University closed			
Week 15	11/28	Final exam Review (Optional)	No Quiz, No Attendance
	11/30	Final exam Review (Optional)	No Quiz, No Attendance
Week 16	12/6-10	Final Exam week (Online BB)	Comprehensive and optional

Grade Calculation (Example)

Class performance (30%) : Iclicker Quiz and Attendance

Points for each quiz: 1.5 (almost each class)

Points for each attendance: 0.5 (almost each class)

Student's score (for example): $\frac{72(\text{Student score}) \times 30\%}{85(\text{out of total score})} = 25.41\%$

Midterm-1 (20%)= 19 (student's score)/20 (out of total score)

Midterm-2 (20%)= 16 (student's score)/20 (out of total score)

Projects (total 4 projects)= 7 + 6.5 + 7.5 + 7 = 28 out of 30.

Total Score without final exam:

Class performance= 25.41 out of 30

Midterm-1 = 18 out of 20

Midterm-2= 16 out of 20

Projects= 28 out of 30

Total= 87.41 (Grade B)

If any student likes to improve the grade, it can be done by joining the final exam.

Score in the final exam (for example): 19 out of 20.

Between the two midterms, the worst will be dropped or ignored if Final exam score is higher than any of the midterm scores. If not, final exam score will be ignored.

New grade calculation (if final exam's score is better than any of the midterms)

Total Score after final exam:

Class performance= 25.41 out of 30

Midterm-1 = 18 out of 20

~~Midterm-2= 16 of 20 (dropped/ignored)~~

Final exam: 19 out of 20

Projects= 28 out of 30

Total= 90.41 (Grade A)

IMPORTANT DATES: Fall 2022

Mar 28th	Fall Registration Begins
Aug 11th	Last Day to Clear Students on Suspension/Probation as well as those with Insufficient Prerequisites
Aug 12th	Drops for Students with Unsatisfactory Academic Standing, Insufficient Prerequisites, and Prior Grades of C in the Course
Aug 15th	Financial Aid is Disbursed
Aug 22nd	Fall classes begin
Aug 22nd-26th	Late Registration (Fees are incurred)
Sept 5th	Labor Day Holiday - University Closed
Sept 7th	Fall Census Day Note: This is the last day to register for classes. Payments are due by 5:00 pm.
Sept 19th	20 th Class Day Note: Students who were given a payment deadline extension will be dropped at 5:00 pm if payment arrangements have not been made.
Sept 30th	Graduation application deadline for degree conferral
Oct 28th	Fall Drop/Withdrawal Deadline Note: Student-initiated drops are permitted after this date, but the student is not guaranteed a grade of W. The faculty member of record will issue a grade of either W or F.
Nov 11th	Deadline to submit candidates' names for degree conferral
Nov 24-25th	Thanksgiving Holiday - University Closed
Dec 1st	Fall – Last day of classes
Dec 2nd	Dead day
Dec 5-9th	Fall Final Exams
Dec 10-11th	Fall Commencement
Dec 14th	Grades are Due
Dec 15th	Grades are posted to student records; students are notified of grades and academic standing
Payment Deadlines	For more information on payment deadlines, visit the Student Business Services Website

Important Information

NETIQUETTE

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

Class Attendance

The student is expected to attend all classes and laboratory sessions and attendance is mandatory for all freshman-level courses (1XXX). It is the responsibility of the student to inform each instructor of extended absences. When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor can drop the student from the class with a grade of W before the course drop deadline and with a grade of F after the course drop deadline.

Excused Absences for University-Recognized Activities

Students who will be absent while representing the University in officially recognized University activities (sports, band, professional conferences, etc.) must notify the Dean of Students not less than ten (10) days prior to the absence. The Dean of Students will provide the student with a letter of excuse for the professors. It is the student's responsibility to give the letter to the professors prior to the official recognized activity. Students following these procedures will be permitted to make up both assignments and examinations in consultation with faculty.

Military Leave

Section 51.9111, *Texas Education Code*, and [19 Texas Administrative Code 4.9](#) provides that students be excused from scheduled classes or other required activities if the student is called to and participates in active military service for a reasonably brief period and that the student shall be allowed to complete an assignment or exam within a reasonable time after the absence. The excused absence is permitted only if the student will not miss more than 25% of the total number of class meetings or the contact-hour equivalent (not including the final examination period) for the specific course or courses in which the student is enrolled at the beginning of the period of active military service.

Students called to active military service must provide a copy of their military orders to the instructor of each course. Further information is available under [Complete Withdrawal Due to Active Military Service](#).

Absence From Examinations

A student absent from a test during the semester is graded zero (0) unless another policy is set by the instructor.

Dead Day

This specific day will be scheduled one day after the last day of classes during the fall and spring semesters. The following policy will be observed:

1. No classes will be held on this day, except classes which meet once a week on that day.
2. Make-up exams should be left to the discretion of each individual instructor.
3. All student work (e.g., research papers, lab reports, term paper, etc.) should be due prior to this day.
4. If a comprehensive final is given, no new material, quizzes, or exams should be given two calendar days prior to Dead Day, and attention should be given to review of semester material. Implementation of this recommendation is to be left to the discretion of the individual instructor.

Absence for Religious Holy Days

Religious holy day means a day observed by a religion whose places of worship are exempt from property taxation under Section 11.20, *Tax Code*. Section 51.911 of the *Texas Education Code* and 19 *Texas Administrative Code* 4.4 related to absences by students for observance of religious holy days states that the institution shall excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection cannot be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. The student must provide written notice to the instructor of each course that he or she will be absent for a religious holy day **not less than 10 days prior to the absence**. If a student and an instructor disagree about the nature of the absence being for the observance of a religious holy day as defined therein, or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor can request a ruling from the Provost or the Provost's designee. The student and the instructor shall abide by the decision of the Provost or designee.

Academic Integrity

The University of Texas at El Paso prides itself on its standards of academic excellence. In all matters of intellectual pursuit, UTEP faculty and students must strive to achieve excellence based on the quality of work produced by the individual. In the classroom and in all other academic activities, students are expected to uphold the highest standards of academic integrity. Any form of academic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. It is imperative, therefore, that the members of this academic community understand the regulations pertaining to academic integrity and that all faculty insist on adherence to these standards.

Any student who commits an act of academic dishonesty is subject to discipline. Academic dishonesty includes, and is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the [Handbook of Operating Procedures \(HOP\)](#) can result in sanctions ranging from disciplinary probation, to a failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.

More detail: <http://catalog.utep.edu/policies-regulations/attendance-grading/>

EXCUSED ABSENCES AND/OR COURSE DROP POLICY

According to UTEP Curriculum and Classroom Policies, "When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of "W" before the course drop deadline and with a grade of "F" after the course drop deadline." See academic regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.

OR

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please let me know and then contact the [Registrar's Office](#) to initiate the drop process. If you do not, you are at risk of receiving an "F" for the course.

MAKE-UP WORK

Make-up work will be given *only* in the case of a *documented* emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

INCOMPLETE GRADE POLICY

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as one's own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

CLASS RECORDINGS

The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. **You may not share recordings outside of this course.** Doing so may result in disciplinary action.

TEST PROCTORING SOFTWARE

Two course assessments (the midterm and final exams) will make use of Respondus Lock Down Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first test.

Please review the following guidelines:

- The assessments will only be available at the times identified on the course calendar.
- You may take the test at any time during the 24-hour window.
- A reliable Internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- You have 2 attempts to take the test. Once the window closes, your answers will be saved, and no changes can be made. The higher score will be recorded.
- Respondus Lockdown Browser will require that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your student ID prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- No notes or textbook materials are permitted during the test. Respondus Monitor requires you to take a video of your surrounding area (desk, chair, walls, etc.)

- You should not have conversations with other people and/or leave and return to the area during the test.

PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

COVID-19 PRECAUTIONS

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org

Course Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources

- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.

- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

Individual Resources

- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

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.