**Course Title**: MECH 2342 Electro-Mechanical System (002), CRN: 15623
(Fall-2022): Credit: 3

**Instructor**: Dr. Arifur R. Khan (arkhan@utep.edu), Associate Professor, ME.

**TA**: TBA

**Class Schedule**: Liberal Arts Building 319, (Aug 22 - Dec 01, 2022), TR: 1:30-2:50 pm

**Course Prerequisite**: MATH 1312 (Calculus-II) or MATH 2313 or MATH 2326 (not concurrently)

**Course Description**: The Electro-Mechanical System requires basic knowledge on electrical circuits and circuit analysis, electronic device, the digital network, electromechanics, etc. appropriate for Electrical, Mechanical, Industrial, Civil, Chemical, Computer, Spacecraft engineering, Aerospace Engineering and Space science education, etc.

**Course Objective**: This course provides an ability to identify, formulate and solve engineering problems, related to electromechanical system by applying principles of engineering (electrical and mechanical), science and mathematics. This course also takes steps to improve the ability of students to apply engineering design; help students function effectively on a team; develop and conduct appropriate experimentation, analyze, and interpret data; acquire and apply new knowledge as needed using appropriate learning strategies.

**Course Topics**
- Introduction (Power, Energy, Current, Voltage, Circuits)
- Resistance, Capacitance, and Inductance (RLC circuits) with Hands-on learning, Transient signal analysis and numerical problems
- Diode and Bipolar Junction Transistors (BJT) with Hands-on activities.
- Signal Amplification and Operational Amplifiers (OpAmp).
- Magnetism, Magnetic Circuits and Transformers with numerical problems.
- DC and AC Machines with numerical problems and Hands-on learning.
- Projects: Sensors, Logic gates, Signal capturing from sensor (Temperature and Distance) and displaying on computer display.

**Reference**
2. Additional Reference materials (notes, projects, web links, etc.) may be handed out in class, also available in Blackboard.

**Software in class**: iClicker (Free for UTEP student email ID), Arduino (Online, Free), NI Multisim (Provided by UTEP).

**Student’s assessment**
1. Class performance: 30% [Class quiz and attendance in every class]
2. Midterm Exam-1: 20%
3. Midterm Exam-2: 20% **Final exam will replace the worst midterm.**
4. Final Exam: 20%
5. Projects: 30% (Arduino Kit, Video links of project and word reports)
6. Final exam 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= ≥ 90%; B= < 90% and ≥ 80%; C= < 80% and ≥ 70%; D= < 70% and ≥ 60%; F= < 60% (UTEP Standard)

**Tools in Class/Lab**
1. Scientific calculator, Laptop, Pad, e-book, Cell phones (silent mode, no text/call) can be used as problem solving tools in class, **not in the exams**.
2. Arduino Kit (link at the next page)
Necessary ITEMS

- Each student is recommended to register in the iClicker (Attendance and Quiz)

<table>
<thead>
<tr>
<th>Course Discipline:</th>
<th>Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Electrical Mechanical System</td>
</tr>
<tr>
<td>Start Date:</td>
<td>8/20/2022</td>
</tr>
<tr>
<td>End Date:</td>
<td>12/1/2022</td>
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</tbody>
</table>

Enrollment:
- Students can search for and self-enroll in this course.
- Students must be invited to this course. Learn More

<table>
<thead>
<tr>
<th>Course ID:</th>
<th>MECH 2042</th>
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<tbody>
<tr>
<td>Term:</td>
<td>CRN 15623</td>
</tr>
<tr>
<td>Meeting Times:</td>
<td>Monday:</td>
</tr>
<tr>
<td></td>
<td>Tuesday:</td>
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<td></td>
<td>Thursday:</td>
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<td>Friday:</td>
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</tbody>
</table>

- Each student has to manage/arrange one set of Arduino Kit

https://www.amazon.com/ELEGOO-Project-Starter-Tutorial-Arduino/dp/B01D8KOZF4/ref=sr_1_3?ie=UTF8&qid=1547597906&sr=8-3&keywords=arduino+uno (Web access: 1/16/19.)

Please note, Course Title, CRN 15623 and Meeting time (TR: 1:30) in the picture left.

Link: https://app.reef-education.com/#/courses/add
<table>
<thead>
<tr>
<th>Date</th>
<th>Class Topic (subject to change)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong>&lt;br&gt;8/23</td>
<td>Introduction, Syllabus. High Impact Practices.</td>
<td>Class policy, syllabus details Projects, Guideline, etc.</td>
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<tr>
<td>8/25</td>
<td>Basic concept of Voltage Current, and Power</td>
<td>Home practice for random class quiz</td>
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<tr>
<td><strong>Week 2</strong>&lt;br&gt;8/30</td>
<td>Voltage Current, Resistor, Ohms Law, Numerical problems, Hands On</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>9/1</td>
<td>Voltage Current, Resistor, Ohms Law, Numerical problems, Hands On</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td><strong>Week 3</strong>&lt;br&gt;9/6</td>
<td>Voltage Current, Resistor, Ohms Law, Numerical problems, Hands On</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>9/8</td>
<td>Voltage Current, Resistor, Ohms Law, Numerical problems, Hands On</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td><strong>Week 4</strong>&lt;br&gt;9/13</td>
<td>Voltage Current, Resistor, Ohms Law, Numerical problems, Hands On</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td>9/15</td>
<td><strong>Project-1</strong>&lt;br&gt;Home automation using LDR</td>
<td>Project submission due date: 9/20 Home practice for random class quiz</td>
</tr>
<tr>
<td><strong>Week 5</strong>&lt;br&gt;9/20</td>
<td>Capacitor and Capacitance, Numerical Problems with examples</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td>9/22</td>
<td>Capacitor and Capacitance, Numerical Problems with examples</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td><strong>Week 6</strong>&lt;br&gt;9/27</td>
<td>Inductor and Inductance, Numerical Problems</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>9/29</td>
<td>Inductor and Inductance, Numerical Problems</td>
<td>Home practice for random class quiz</td>
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<tr>
<td><strong>Week 7</strong>&lt;br&gt;10/4</td>
<td><strong>Midterm-1 Exam review</strong>&lt;br&gt;Topic: Resistor, Capacitor, Inductor</td>
<td><strong>Midterm-1 Exam On Black Board, Camera activated Lockdown browser</strong></td>
</tr>
<tr>
<td>10/6</td>
<td>Transients and Sinusoidal Signal Analysis with numerical problems and simulation.</td>
<td>Home practice for random class quiz</td>
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<tr>
<td><strong>Week 8</strong>&lt;br&gt;10/11</td>
<td>Diode, Numerical Problems, Hands on Graphical Presentation of I-V curve</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td>10/13</td>
<td>Diode, Numerical Problems, Hands on Graphical Presentation of I-V curve</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td><strong>Week 9</strong>&lt;br&gt;10/18</td>
<td>Transistor, Numerical Problems, Hands on (Need you Arduino Kit)</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>10/20</td>
<td>Transistor, Numerical Problems, Hands on (Need you Arduino Kit)</td>
<td>Home practice for random class quiz</td>
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<tr>
<td><strong>Week 10</strong>&lt;br&gt;10/25</td>
<td><strong>Project-2</strong>&lt;br&gt;Transistor-Transistor Logic gate (Take your Arduino kit)</td>
<td>Project submission due date: 11/1 Home practice for random class quiz</td>
</tr>
<tr>
<td>10/27</td>
<td>Transistor, Numerical Problems, Hands on (Need you Arduino Kit)</td>
<td>Home practice for random class quiz</td>
</tr>
</tbody>
</table>
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)

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

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 out of 20 (dropped/ignored)
Final exam: 19 out pf 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: 20th 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.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 11th</td>
<td>Deadline to submit candidates’ names for degree conferral</td>
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<tr>
<td>Nov 24-25th</td>
<td>Thanksgiving Holiday - University Closed</td>
</tr>
<tr>
<td>Dec 1st</td>
<td>Fall – Last day of classes</td>
</tr>
<tr>
<td>Dec 2nd</td>
<td>Dead day</td>
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<tr>
<td>Dec 5-9th</td>
<td>Fall Final Exams</td>
</tr>
<tr>
<td>Dec 10-11th</td>
<td>Fall Commencement</td>
</tr>
<tr>
<td>Dec 14th</td>
<td>Grades are Due</td>
</tr>
<tr>
<td>Dec 15th</td>
<td>Grades are posted to student records; students are notified of grades and academic standing</td>
</tr>
</tbody>
</table>

**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.
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.