

## MECH 2340 –Dynamics

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| <b>Instructor</b>      | Dr. Afroza Shirin                                                             |
| <b>Office</b>          | Engineering Bldg. A117                                                        |
| <b>Office hrs</b>      | Tuesday & Thursday 12:00 PM -3:00 PM                                          |
| <b>E-mail</b>          | <a href="mailto:ashirin@utep.edu">ashirin@utep.edu</a>                        |
| <b>Textbook</b>        | <i>Engineering Mechanics: Dynamics, Edition: 14<sup>th</sup></i> by Hibbeler. |
| <b>Class Location:</b> | Liberal Arts Building   Room 106                                              |

**Course Description:** This course covers Newtonian mechanics both kinematic (study of motion) and kinetic (study of force and its effects on motion). The class is intended to make you THINK about why things do what they do. I will spend a lot of time showing how and why things are the way they are. This does not fit well in traditional textbook-type problems.

### Course Outcomes:

At the end of this class, the typical students should be well prepared in the following areas:

- Determine the kinematic quantities (position, displacement, velocity, and acceleration) of a particle traveling along straight and curved paths.
- Apply the equation of motion using the rectangular coordinates, or the normal and tangential coordinates.
- Apply the principle of work and energy to a particle or system of particles.
- Calculate the linear momentum of a particle and the linear impulse of a force.
- Determine the mass moment of inertia of a rigid body or a system of rigid bodies.
- Apply the three equations of motion for a rigid body in planar motion.
- Analyze the planar kinetics of a rigid body undergoing rotational motion.
- Analyze the planar kinetics of a rigid body undergoing general plane motion.
- Define the various ways a force and couple do work.
- Apply the principle of work and energy to a rigid body.
- Determine the potential energy of conservative forces.

### Topics covered

|                                                              |              |
|--------------------------------------------------------------|--------------|
| 1. Kinematics of a Particle                                  | (Chapter 12) |
| 2. Kinematics of a Particle: Force and Acceleration          | (Chapter 13) |
| 3. Kinematics of a Particle: Work and Energy                 | (Chapter 14) |
| 4. Kinematics of a Particle: Impulse and Momentum            | (Chapter 15) |
| 5. Planar Kinematics of a Rigid Body                         | (Chapter 16) |
| 6. Planar Kinematics of a Rigid Body: Force and Acceleration | (Chapter 17) |
| 7. Planar Kinematics of a Rigid Body : Work and Energy       | (Chapter 18) |

### Grading:

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|--------------------------------------------------|-----|
| Homework                                         | 20% |
| Quizzes, Class response, performance, attendance | 10% |

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| Midterm 1                  | 20% |
| Midterm 2                  | 25% |
| Final Exam - Comprehensive | 25% |

**ATTENDANCE AND TARDINESS:** An 80% of attendance is required.

I will not give make-up exams. If you miss an exam due to a UTEP-approved reason (see the catalog), I will:

- Count the next exam as two scores.
- If the final is missed, I will count exam 2 twice.

**Scale:** A  $\geq$  90%, B  $\geq$  80% but  $<$ 90%, C  $\geq$  70% but  $<$ 80%, D  $\geq$  60% but  $<$ 70% and F  $<$ 60%

**Homework:** See Blackboard

**Quizzes:** In-class/See Blackboard for a link.

**Class notes:** Blackboard/In-class

## Software:

**MATLAB.** <https://www.mathworks.com/academia/tah-portal/university-of-texas-at-el-paso-40735445.html#get>.

**Matlab toolboxes:** Symbolic, Simscape, Multibody.

Refer to ETC for a specific question. Engineering building E351D (915) 747-5131.

## Material For Classes:

Laptop, Non-Programmable Scientific Calculator

**Announcement:** *If you feel you may have a disability that will make it difficult for you to carry out the work as I have outlined and/or if you need special accommodations/assistance due to a disability, please contact the C Center for Accommodations and Support Services (CASS) at 747-5148, go to Room 106E Union, or email [cass@utep.edu](mailto:cass@utep.edu).*

## Academic Honesty

During exams, you are not allowed to use any form of Wi-Fi-enabled electronic device, including cell phones or other electronic communication devices or methods (wrist watches, earbuds, etc.). No wristwatch or other electronic device may be worn. Calculators and watches may be subject to inspection. You may be asked to temporarily remove the 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.

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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 your 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 is mandatory. Anyone with 5 or more absences may be dropped from the class. A drop for not attending will count toward the State Allowed Six Drop Limit. 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

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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.