

DYNAMICS: CE 2338

Class Reference Number:	25258 (MasteringEngineering: CETANDON19027)
Prerequisite:	MATH 1312 and CE 2315
Textbook:	<u>Engineering Mechanics: Dynamics, plus MasteringEngineering 14th ed.</u> by R.C. Hibbeler
Class/Lab Meeting:	10:30 a.m. - 11:50 a.m., TR
Class Room:	Liberal Arts Building 306
Instructor:	Vivek Tandon, Ph.D., P.E. Civil Engineering Department Office: 221 E-mail: vivek@utep.edu
Teaching Assistant:	Office Hours: TR After the class or by Appointment Cheng Zhu

Course Objectives and Topics

At the end of this class the typical students should learn Newtonian mechanics which is an important topic for engineers. The objective of this course is to present to the students the concepts and applications of the motions of bodies using the principles established by Newton and Euler. A list of YouTube videos is included at the end of the syllabus to be used in the class. Students are expected to have listened to them before coming to the class.

Chapter	Topic
12	Kinematics of a particle
13	Kinetics of a particle: Force and acceleration
14	Kinetics of a particle: Work and energy
15	Kinetics of a particle: Impulse and momentum
16	Planar kinematics of a rigid body
17	Planar kinetics of a rigid body: Force and acceleration
18	Planar kinetics of a rigid body: Work and energy
19	Planar kinetics of a rigid body: Impulse and momentum

Grades

Your grade for this course will be assessed based on your performance in the following:

- Homework (20 %)
- Quizzes (20 %)
- Mid-term exams (30 %)
- Final exam (30 %)

Exams Schedule

Date	Exams
2/9	Exam 1
3/2	Exam 2
3/30	Exam 3
4/25	Exam 4
5/4	Exam 5
5/11 (Thursday)	Final Exam (10 to 12:45)

Class quizzes will be given throughout the semester. Lowest two quiz scores will be eliminated. The content of a quiz could be from the materials covered in previous sessions or to be covered that day. There will be no make-up quizzes. Five exams will be given during the semester. **The lowest exam grade will be dropped if you take all five exams. If you miss two exams during the semester, your exam average will be based on the remaining three exams. If you miss three exams, you will get an F in the class.** Final examination will cover the whole course and will last two hours and 45 minutes. **To pass the course it is essential that you receive more than 50% grade in the final exam.** There will not be partial credit given in the final exam.

Your final grade will be calculated based on the points you have accumulated as follows:

- A ≥ 88.5
- B ≥ 78.5 but < 88.5
- C ≥ 68.5 but < 78.5
- D ≥ 58.5 but < 68.5
- F < 58.5

(NOTE: 88.4 IS B, 78.4 IS C, 68.4 IS D, 58.4 IS F. The instructor reserves the right to revise this grading plan).** However, students will be informed of any changes during the semester.

Engineering Honor Code

I have neither given nor received unauthorized aid on this examination, nor have I concealed any violations of the Honor Code.

Signature: _____

Last Four Digits of ID:

Allowed Calculators

The following will be the only calculators allowed in exams:

To protect the integrity of its exams, NCEES limits the types of calculators you may bring to the

exams. The only calculator models acceptable for use during the 2015 exams are as follows.

Casio: **fx-115 MS fx-115 MS Plus fx-115 MS SR fx-115 ES fx-115 ES Plus**

Hewlett Packard: The **HP 33s and HP 35s** models, but no others.

Texas Instruments: All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to):

**TI-30Xa TI-30Xa SOLAR TI-30Xa SE TI-30XS Multiview TI-30X IIB TI-30X IIS
TI-36X II TI-36X SOLAR TI-36X Pro**

These are the same calculators that are currently being allowed in the Fundamental of Engineering (FE) and Professional Engineering (PE) exams (<http://ncees.org/exams/calculator-policy/>). It is your responsibility to get acquainted with the features of the calculator you decide to use. I recommend that you use this calculator for all your work (including other courses) since this will help you learn how to use all the features of your calculator.

Homework

Students are encouraged to solve all problems contained in the book. Students are expected to solve problems from the book and the MasteringEngineering Website. Occasionally, problems will be assigned in the class and will be **due at the beginning of the second class of the following week (Thursday)**. **Late assignment will be accepted for (1 week) delay with penalty of 20% deduction.**

Late assignment for more than a week delay will not be accepted, except in unusual cases.

Start a problem with one new sheet. Use only one side of a sheet. Write down the course number, problem number, and student name on the top line of each sheet. Staple each set of homework problems. Discuss the problems with your classmates, the teaching assistant, or the instructor, but do not copy homework from each other. Past experience clearly shows that a student's grade is strongly dependent upon the effort that is put into working and understanding the homework. We encourage that you team up with your classmates for this activity. You will do well in the class if you understand thoroughly all the problems you solved.

Attendance and Tardiness

Attendance is mandatory. Absence can be checked by the instructor through quizzes, exams, roll calling, randomly picked names for problem solving in class, or other mechanisms. **You could receive an F grade if you miss more than three classes without the instructor's consent.** The instructor appreciates all efforts to attend the class. There will be no penalty for being late. **However, quizzes will be given regularly at the beginning of the classes. No additional time will be allowed for late attendees.**

Study Aids

Instructor's Office Hour

Students are encouraged to talk to the instructor after the class or by making an appointment. Of course, you are always welcomed to visit me at any other times, but I may not be available for discussion because of other commitments. Leave me a note, call for an appointment, or send me an e-mail will be the most effective way to catch me for your questions. Remember, do not pile up questions and expect me to answer all your questions the day before an exam.

Teaching Assistant

There will be a teaching assistant (TA) assigned to each session. The TA will assist the instructor in grading homework, proctoring exams, and answering questions. In addition to the instructor's office hour, there will be TA's office hours to answer your questions. The TA's schedule will be announced in the second week of the class.

ACES and the Tutoring Center

Students are reminded of the tutoring services available in the ACES and the library. These services are provided to you by the University. Check the schedules and make use of the services.

Study Guide

Read the text to be discussed prior to the scheduled class and review the subject thoroughly after the class. Read the textbook carefully. Work on all examples given in the text and solve as many unassigned problems as you can. Expect to spend 10 to 15 after-class hours each week on the subject. Establish a good studying habit and you will do very well in the class.

CELL PHONES AND PAGERS OFF**Policy on Cheating**

Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but 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, any act designed to give unfair advantage to a student, or the attempt to commit such acts@ (Regents= Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22). Scholastic dishonesty harms the individual, all students, and the integrity of the university, policies on scholastic dishonesty will be strictly enforced.

References

Students are encouraged to study materials related to the subjects discussed in the class. There are many books that can help students to improve their understanding of the subjects and their problem solving skills. Some of the books that you can find in the library are:

Beer, Johnston and Cornwell, Vector Mechanics for Engineers: Dynamics. 10th Edition. McGraw-Hill.
Meriam and Kraige, Engineering Mechanics: Dynamics. 7th Edition. Wiley.
Gray, Costanzo and Plesha, Engineering Mechanics: Dynamics. 2nd Edition. McGraw-Hill.
Tongue, Dynamics: Analysis and Design of Systems in Motion. 2nd Edition. Wiley.

Internet Learning

One of the web sites the students may want to visit is <http://cw.prenhall.com/hibbeler/>. There are many exercise (multiple-choice and true-or-false) problems designed to help the students. In addition, look at this website for further understanding of the topics covered in the class:
<http://web.mst.edu/~bestmech/index.html>

Updates and Internet Learning

One of the web sites the students may want to visit is <http://cw.prenhall.com/hibbeler/>. There are many exercise (multiple-choice and true-or-false) problems designed to help the students. Select a

chapter number in the pull down manual and you are ready to go.

Use of Internet for Practice Problems, Quizzes, and Exam

In this class, you are expected to have an electronic device which can be netbook, notebook, tablet, etc. to make sure you can take quizzes and exams in the class. In addition, it is expected that you will be able to login to UTEP system with use of VPN.

Special Provision

Past experience suggests that Peer Learning is a valuable tool in learning. Therefore, I have decided to form groups that will study together. The groups will have four to five members which will be selected by the instructor in coordination with the TA after initial assessment of the class. The Peer Learning can be further categorized in two types: learning from each other and learning from the peer leader. The first category applies to a group that learns together (from each other while studying). The second category applies to a group in which a student teaches to remaining group because some student require more support than available in the class room or who do not have time to get help from traditional sources like the TA, tutoring center, etc.

Student group(s) belonging to first category do not have to take finals if the group total is 85 or higher and their individual grade is B or higher. Those students who have B (without finals) and wish to improve their grade from B to A, they can take the final to improve their grade otherwise their final grade will be B.

The peer leader of student group(s) belonging to second category will also have the benefit of not taking finals if his or her grade before final is B or higher. In addition, the total points obtained by the peer leader will increase by the same amount overall increase in the group (without peer leader) total after formation of the group. Thus, providing incentive to the peer leader for teaching group.

Although experience suggests that peer learning and teaching is valuable, some of you may not be interested in participating. If you are one of them, please let me know and your name will not be added in any one of the groups.

Dynamics Video Lectures

Dynamics Lecture 01: Introduction and Course Overview

<https://www.youtube.com/watch?v=yNIIWETrDF0>

Dynamics Lecture 02: Particle kinematics, Rectilinear continuous motion part 1

<https://www.youtube.com/watch?v=bXBilKV-tOQ>

Dynamics Lecture 03: Particle kinematics, Rectilinear continuous motion part 2

<https://www.youtube.com/watch?v=NweROy2fulU>

Dynamics Lecture 04: Particle kinematics, Rectilinear motion with constant acceleration

<https://www.youtube.com/watch?v=V3SdL7RtCvI>

Dynamics Lecture 05: Particle kinematics, Rectilinear erratic motion

<https://www.youtube.com/watch?v=0ZOzm4xTFUY>

Dynamics Lecture 06: Particle kinematics, Curvilinear motion rectangular components

<https://www.youtube.com/watch?v=mTM5xusBFpM>

Dynamics Lecture 07: Particle kinematics, Motion of a projectile

<https://www.youtube.com/watch?v=E5yGRsRx6Rw>

Dynamics Lecture 08: Curvilinear motion: normal and tangential components

<https://www.youtube.com/watch?v=l1QLG5bG27U>

Dynamics Lecture 09: Curvilinear motion cylindrical components

<https://www.youtube.com/watch?v=lexufmgKt4g>

Dynamics Lecture 10: Absolute dependent motion analysis

<https://www.youtube.com/watch?v=yea9zNCTQGQ>

Dynamics Lecture 11: Relative motion using translating reference frame

<https://www.youtube.com/watch?v=GaDV38bKoMA>

Dynamics Lecture 12: Equations of motion, rectangular coordinates

https://www.youtube.com/watch?v=y4_CQ_vm7j8

Dynamics Lecture 13: Equations of motion: normal and tangential coordinates

<https://www.youtube.com/watch?v=1P7kSkZpH0g>

Dynamics Lecture 14: Equations of motion: cylindrical coordinates

<https://www.youtube.com/watch?v=a1dwqSGM4U>

Dynamics Lecture 15: The work of a force

https://www.youtube.com/watch?v=tf_ECQyEne0

Dynamics Lecture 16: Principle of work and energy

<https://www.youtube.com/watch?v=81sSo2WI9QE>

Dynamics Lecture 17: Power and efficiency

<https://www.youtube.com/watch?v=BeLy5hZHoKg>

Dynamics Lecture 18: Conservation of energy

<https://www.youtube.com/watch?v=d3jpCds3TRY>

Dynamics Lecture 19: Principle of linear impulse and momentum

<https://www.youtube.com/watch?v=Ycj6lwZiZ24>

Dynamics Lecture 20: Conservation of linear momentum for a system of particles

https://www.youtube.com/watch?v=HL841bj7_zE

Dynamics Lecture 21: Impact. Coefficient of restitution

https://www.youtube.com/watch?v=C1cAsl_J6mM

Dynamics Lecture 22: Angular impulse and momentum

<https://www.youtube.com/watch?v=xpP-LmM0Aus>

Dynamics Lecture 23: Rigid body planar motion – Translation

https://www.youtube.com/watch?v=seqqVWP_5P4

Dynamics Lecture 24: Rigid body planar motion -- Rotation about a fixed axis

<https://www.youtube.com/watch?v=PlopvLE3QrE>

Dynamics Lecture 25: General plane motion -- relative motion analysis

https://www.youtube.com/watch?v=sA_6U-aMK4s

Dynamics Lecture 26: Instantaneous center of zero velocity

<https://www.youtube.com/watch?v=EMSP-5yAXrQ>

Dynamics Lecture 27: Mass moment of inertia

https://www.youtube.com/watch?v=scDfAyGi_R8

Remake EGR 245 Lecture 28: Equations of motion for planar motion Translation

<https://www.youtube.com/watch?v=DkMZ-RV3wkA>

Remake EGR 245 Lecture 29: Equations of motion for planar motion Rotation about a fixed axis

<https://www.youtube.com/watch?v=LjOOHwoKoCk>

Dynamics Lecture 30: Equations of motion for general plane motion

<https://www.youtube.com/watch?v=HS6U8sZYabU>

Dynamics Lecture 31: Work and energy for rigid body planar motion

<https://www.youtube.com/watch?v=PCTVzBu0QvY>

Dynamics Lecture 32: Impulse and momentum for rigid body planar motion

<https://www.youtube.com/watch?v=VQ3FPHUwNLc>