ENGR 2302
Dynamics

Catalog Course Description:
3 hours. Basic theory of engineering mechanics, using calculus, involving the motion of particles, rigid bodies, and systems of particles; Newton’s Laws; work and energy relationships; principles of impulse and momentum; application of kinetics and kinematics to the solution of engineering problems. Prerequisite(s): ENGR 2301 and MATH 1720.

Instructor
Dr. Reza A. Mirshams Professor
Office Department of Engineering Technology, Discovery Park, F128
Phone 940-565-2594
Email Reza.Mirshams@unt.edu

Course Information
Meeting Hours Mondays and Wednesdays: 4:00-5:20 PM
Office Hours TTH 2:00 -3:00 PM, any other time by appointment
Course webpage UNT Canvas (https://unt.instructure.com)

Course Learning Outcomes:
Upon successful completion of this course, students will:
1. Apply kinematics and kinetics of particles in engineering problems.
2. Apply kinematics and kinetics of rigid bodies in engineering problems.

COURSE MATERIALS AND RESOURCES

REQUIRED TEXTBOOK (print or online version)

- Engineering Mechanics – Dynamics,
- Wiley online access course ID is 682976 for this semester.
- Reading, homework, and exercise problem assignments from the textbook will be accessible through the publisher website.

Course requirements and Homework Assignments
1. Attendance is required.
2. UNT Canvas will be used for posting the course materials and instructions.
3. Homework assignments will be assigned on the course textbook website each Wednesday with due date on the following Wednesday before the class hour.

LECTURES SLIDES

- I will post on UNT Canvas the topics of discussion, reading topics, and a draft of handout prior to the lecture day for you to print and take notes on them. However, you need to take notes of discussion and lectures.
- Some of the class days will be as “flipped classes”. For these classes, your “homework” will be to
watch pre-recorded lectures or/and the in-class period will be a chance to ask questions and work problems.

ASSESSMENT METHODOLOGY

1. Class attendance and engagement
2. Class Exercise and Problem Solving (on paper and online)
3. Online Homework (every week on the textbook website).
4. Class quizzes (in class on paper or online).
5. Three (3) exams.
   ➢ **CLASS ATTANDANCE (iClicker)**

   Engagement, participation and interaction are important elements of the learning process. To that end, we will be using iClicker, so each student must be registered to have a device (computer, smartphone or tablet) for polling responses for this course.

   Please read instruction on the Canvas for registration and downloading the app on your device.

Quizzes and Exams

1. Exam questions will cover all topics discussed by the exam day.
2. Exams are written and closed textbook and notebooks. A copy of the fundamental equations of dynamics will be provided.
3. No electronic devices (i.e., iPhones, smartphones, ipads, laptops) of any kind are permitted during exams and class quizzes. The sole exceptions are electronic calculators that do not have communication capability. Students who use any unauthorized electronic device during an exam will be immediately barred from continuing the examination, and a grade of "F" will be assigned.
4. For in-class quizzes and exams, the backpack with the cell phone will be left at the front of the classroom.
5. Graded paper quizzes and midterm exams will available for review by the students in my office after I post the grade on the Canvas gradebook. Request for reviewing your graded papers will not be accepted after one week of the posting date.
6. No make-up will be given for the scheduled exams, unless the student has a legitimate excuse documented properly (e.g., letter from court clerk that he/she must appear in a court, letter from physician that he/she is sick).
7. Grades are based in part on the student’s ability to communicate in writing solutions to question. You must present your entire solution in an orderly way for problems that need calculations. For some certain questions, you must show the complete process of your solutions. Partial credit may be assigned for correct steps that have been taken in a solution. Points will not be assigned only on the final answers for those types of questions.
8. Requests for a review of a graded exam problem must be submitted during the following class hour after which the grade is posted. In this matter, the review is not limited to a single problem requested by the student. Upon review, the exam score may increase, remain the same, or decrease.
Grade Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Attendance and engagement</td>
<td>5%</td>
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<tr>
<td>Homework assignments</td>
<td>15%</td>
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<tr>
<td>Class problem solving exercises and quizzes</td>
<td>15%</td>
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<tr>
<td>Exam 1</td>
<td>25%</td>
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<tr>
<td>Exam 2</td>
<td>25%</td>
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<tr>
<td>Exam 3 (Final)</td>
<td>25%</td>
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<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Grade Scales

A: ≥ 90%, B: 75 – 89 %, C: 60 – 74 %, D: 50 – 59 %, F: below 50%

Grades will not be curved.

Disabilities Accommodation:

All reasonable accommodation will be made to facilitate special needs. If special accommodations are required, the student must first meet with the staff of the Office of Disability Accommodation (ODA), Union Suite 322, (940) 565-4323. After meeting with that office, please contact me to discuss what accommodations will be necessary. For more information, see [http://www.unt.edu/oda](http://www.unt.edu/oda).

Additional Class Policies

1. This syllabus is subject to change at any time during the semester with changes to be announced during the class hours and posted on the Canvas.

2. Cell phones, iPhones, iPods, iPads, laptops, smartphones, and tablets must be turned off or in silent mode before the start of the class and left in your pocket, purse, or book bag. Laptop Use: Laptop or touchscreen devices will be allowed for notetaking during lecture, however, they should not be disruptive to the class.

3. In email communications, please put your name and course number in the subject line (ENGR 2302-Spring 2019). All email communications should come from your official UNT mailbox. Your email enquiries from other email addresses, such as gmail, yahoo, etc., will not be answered.

4. Dishonesty: The UNT Catalog procedures on cheating and plagiarism will be vigorously enforced. It is the duty of each student to protect their work so it is not available to others for copying or submission as their efforts. Any violation of the established rules and procedures for exams and quizzes could be considered as dishonesty. This is especially true of files and programs that are generated or copied on the computer and handheld programmable calculators for using during class quizzes and exams. Students that knowingly allow others to use their work are partners in this unethical behavior. All rules relating to academic dishonesty will be enforced in accordance with University policies.

5. State common law and federal copyright laws protect this course lectures and materials. They have my own original expression and revisions to the textbook author(s). Whereas you are authorized to take notes in class, thereby creating a derivative work from my lecture, and/or make a print of my lecture notes/slides. The authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes to anyone else or to make any commercial use of them without express prior
permission from me.

Last Update 01/11/2019

<table>
<thead>
<tr>
<th>Week</th>
<th>Homework (Online Submission)</th>
<th>Class Quiz and Exams</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Course begins</td>
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<tr>
<td>Week 2</td>
<td>Required</td>
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<td>Week 3</td>
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<td>Week 4</td>
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<td>Week 5</td>
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<td>Week 6 (Feb. 27)</td>
<td>Required</td>
<td>Exam 1</td>
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<td>Week 7</td>
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<td>Week 8</td>
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<td>Week 9</td>
<td>Spring Break</td>
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<td>Week 10</td>
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<td>Week 11</td>
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<td>Week 12</td>
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<td>Week 13 (April 1)</td>
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<td>Exam 2</td>
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<td>Week 14</td>
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<td>Week 15</td>
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<td>Week 16</td>
<td>Exercise Assignments</td>
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<td>Week 17 (Wed. May 8, 2019)</td>
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<td>Final Exam 1:30 – 3:30 p.m.</td>
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<tr>
<td>Module</td>
<td>Topic</td>
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</table>
| 1      | Kinematics of Particles  
Rectilinear Motion  
Graphical Solutions  
Curvilinear $x,y,z$ Motion  
Curvilinear $n,t,b$ Motion  
Curvilinear $r,u,z$ Motion  
Dependent Motion  
Independent Motion |
| 2      | Kinetics of Particles  
Equation of Motion $x,y,z$  
Equation of Motion $n,t,b$  
Equation of Motion $r,u,z$ |
|        | **Principle of Work and Energy**  
Power and Efficiency  
Conservation of Energy |
| 3      | Plane Kinematics of Rigid Bodies  
Rotation About a Fixed Axis  
Absolute Motion Analysis  
Relative Velocity Analysis  
Inst. Center of Zero Velocity  
Relative Acceleration Analysis  
Motion Using Rotating Axes |
|        | **Plane Kinetics of Rigid Bodies**  
Translation, Fixed-axis rotation, General plane motion  
Work and Energy, Impulse and Momentum |