Instructor: Xiaohua Li
Office: NTDP F101G
Phone: 940-369-8020
Email: xiaohua.li@unt.edu
Lecture Time: Tu & Th 2:30 p.m.-3:50 p.m. room B142

Instructor Office Hours: Open Office Policy. M/Tu/W/TH//F, 1:00pm-2:00pm
TA Office Hours: will be posted in blackboard later


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): MATH 1720 and ENGR 2301.

Course Learning Outcomes (CLO):
Upon successful completion of this course, students will:
1. Express dynamic quantities as vectors in terms of Cartesian components, polar coordinates, and normal-tangential coordinates.
2. Compute mass moments of inertia for systems of particles and rigid bodies.
3. Solve kinematic problems involving rectilinear and curvilinear motion of particles.
4. Solve kinetic problems involving a system of particles using Newton’s Second Law.
5. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving particles and systems of particles.
6. Solve kinematic problems involving the translation and rotation of a rigid body.
7. Solve kinetic problems involving planar translation and rotation of rigid bodies.
8. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving rigid bodies in planar motion.

ABET Student Learning Outcomes (SO)
a Ability to apply mathematics, science and engineering principles.
b Ability to design and conduct experiments, analyze and interpret data.
c Ability to design a system, component, or process to meet desired needs.
d Ability to function on multidisciplinary teams.
e Ability to identify, formulate and solve engineering problems.
f Understanding of professional and ethical responsibility.
g Ability to communicate effectively.
h The broad education necessary to understand the impact of engineering solutions in a global and societal context.
i Recognition of the need for and an ability to engage in life-long learning.
j Knowledge of contemporary issues.
k Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
Grades:  
- Homework (10) 10%  
  \( \geq 90\% \) A  
- Pop Quizzes (最高 3/4) 10%  
  80-89.9% B  
- Exam 1 25%  
  70-79.9% C  
- Exam 2 25%  
  60-69.9% D  
- Final/Exam 3 (Comprehensive) 25%  
  < 60% F  
- Attendance (5/6) 5%  
- Total 100%  

Homework Policy:  
1. Please turn in your homework on the due day before the lecture starts. NO late homework will be collected.  
2. Definition of “late”: when class is over and the instructor steps outside the classroom, homework turned in thereafter will be considered as “late” and will not be collected.  
3. Having no textbook is not a valid excuse for not doing your homework. It is the student’s responsibility to acquire textbook for his/her study.  
4. Homework can be turned in earlier than the due day.  
5. Homework dropped in the instructor’s departmental mailbox will NOT be collected.  
6. Homework slid into the instructor’s office will NOT be collected.  
7. Homework dropped in the “homework dropbox” in front of the department door will NOT be collected.  
8. If you want to turn in your homework other than the due day or if you want to turn in your homework outside the classroom, you need to turn in your homework to the instructor either IN PERSON or through email.  
9. You can ask your friend/classmate to turn in homework for you.  
10. You can scan (or take a picture using smart phone) and email the homework before the class ends (3:50 p.m.)  
11. Homework must be stapled, instructor or TA will not be responsible for lost loose homework.  
12. Exceptions (late homework will be collected): medical emergence (student and important ones), transportation/traffic emergency; religious holidays/duty; jury duty and military duty. Documentary evidences must be submitted.
Exams and Quizzes:
(1) Quizzes are open book and open notes. **Exams are closed book closed notes with formula sheets.**
(2) Formula sheets can be maximum 5 pages, A4 or letter size, both sides
(3) Each student is responsible for preparing his/her own formula sheets.
(4) Formula sheets could include anything BUT: solutions to homework or examples. Student who failed to follow this rule will score zero in the exam and this cheating matter will be reported to the department and university.
(5) Formula sheets must be turned in with the exam papers (in the case of formula sheets were not checked by the instructor during the exam). Student who failed to follow this rule will score zero in the exam and this cheating matter will be reported to the department and university.
(6) **There will be NO make-up quiz.**
(7) **There will be NO make-up exam.** Exceptions: medical emergence (student and important ones), transportation/traffic emergency; religious holidays/duty, jury duty and military duty. Documentary evidences must be submitted.

**Disability Accommodations:** If you need academic accommodations for disability you must have document which verifies the disability and makes you eligible for accommodations, then you can schedule an appointment with the instructor to make appropriate arrangements.

**Academic Dishonesty:**
There is a zero tolerance policy. Cheating of whatsoever will result in an automatic ‘F’ in this course and the matter will be turned over to the appropriate student disciplinary committee.

**IMPORTANT EXAM DATES**

Exam #1 (Temporary schedule and subject to change):
Sept. 30th, Tuesday
Covers Ch 12, 13 and 14
2:30 p.m. - 3:50 p.m., room B142

Exam #2 (Temporary schedule and subject to change):
Oct. 30th, 2014, Thursday
Covers Ch 15 and 16
2:30 p.m. - 3:50 p.m., room B142

Exam #3 (UNT official final schedule):
Dec. 9th, 2014, Tuesday,
Comprehensive, covers ch 12-17
2:00 p.m.-4:00 p.m., room B142
## ENGR 2302.001 Dynamics

### Schedule Overview

(Subject to change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topics</th>
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</table>
| #1   | Aug.25th - Aug.29th | Overview of syllabus; Ch.12.1-12.2: Rectilinear Motion  
                                        Ch.12.4-12.5: General Curvilinear Motion |
| #2   | Sept.1st – Sept.5th | Ch.12.7: Curvilinear Motion: Normal and Tangential components/coordinates  
                                        Ch.12.8: Curvilinear Motion: Cylindrical/polar components/coordinates |
| #3   | Sept.8th – Sept.12th | Ch.13.1-13.4 Equation of Motion: Rectangular Coordinates  
                                        Ch.13.5 Equation of Motion: Normal and Tangential Coordinates |
| #4   | Sept.15th – Sept.19th | Ch.13.6 Equation of Motion: Cylindrical/polar Coordinates  
| #5   | Sept.22nd – Sept.26th | Ch.14.4-14.6 Power, efficiency and Conservation of Energy  
                                        Review & Homework session |
| #6   | Sept.29th – Oct.3rd | Sept. 30th, Tuesday Exam #1: covers Ch 12, 13 and 14  
                                        Ch.15.1-Ch.15.2 Impulse and Momentum |
| #7   | Oct. 6th – Oct.10th | Ch.15.3 Conservation of linear Momentum for a System Particles  
                                        Ch.15.3 Conservation of linear Momentum: |
| #8   | Oct. 13th – Oct.17th | Ch.16.1-16.2 Planar Motion of a Rigid Body; Translation  
                                        Ch.16.3-16.4 Rotation about a fixed Axis; Absolute Motion analysis |
| #9   | Oct. 20th – Oct.24th | Ch.16.5: Relative motion Analysis: Velocity; Instantaneous center  
                                        Ch.16.5: Relative motion Analysis: Acceleration |
| #10  | Oct.27th – Oct.31st | Review & Homework session  
                                        Oct. 30th, Thursday, Exam #2: covers Ch 15 and 16 |
| #11  | Nov.3rd – Nov.7th | Ch.17.1-17.2 Planar Kinetic Equations of Motion  
                                        Ch.17.3 Equations of Motion: Translation |
| #12  | Nov.10th – Nov.14th | Ch.17.4 Equations of Motion: Rotation about a Fixed Axis  
                                        Ch.17.5 Equations of Motion: General Plane Motion |
| #13  | Nov.17th – Nov.21st | Ch.17.4 Equations of Motion: Rotation about a Fixed Axis  
                                        Ch.17.5 Equations of Motion: General Plane Motion |
| #14  | Nov.24th – Nov. 28th | Ch.17.5 Equations of Motion: General Plane Motion- Continue  
                                        No class, Thanksgiving holidays |
| #15  | Dec.1st – Dec. 5th | (Pre-final week) Review & Homework session |
| #16  | Dec 11th | Exam #3 (Final): Comprehensive covers Ch 12 to 17  
                                        (Dec. 9th Tuesday: 2:00-4:00) |

**Document History:**
Dr. Xiaohua Li, Prepared on 8/18/2014
Link for Fall 2014 Final Exams - Discovery Park  
http://registrar.unt.edu/exams/fall

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 25, 2014</td>
<td>First Class Day</td>
</tr>
<tr>
<td>September 1, 2014</td>
<td>Labor Day (no classes; university closed)</td>
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<tr>
<td>November 27-30, 2014</td>
<td>Thanksgiving Break (no classes; university closed)</td>
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<tr>
<td>November 29 - December 5, 2014</td>
<td>Pre-finals Week</td>
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<tr>
<td>December 4, 2014</td>
<td>Last Class Day</td>
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<tr>
<td>December 5, 2014</td>
<td>Reading Day (no classes)</td>
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<tr>
<td>December 6-12, 2014</td>
<td>Finals</td>
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<tr>
<td>December 12, 2014</td>
<td>Doctoral and Master's Commencement</td>
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<tr>
<td>December 12-13, 2014</td>
<td>Undergraduate Commencement</td>
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<tr>
<td>December 24, 2014 – January 2, 2015</td>
<td>Winter Break (no classes; university closed)</td>
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**Monday, December 8**

<table>
<thead>
<tr>
<th>Time</th>
<th>Exam Time</th>
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<tbody>
<tr>
<td>MWF 8:30 a.m.</td>
<td>8:30 a.m. - 10:30 a.m.</td>
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<tr>
<td>MWF 11:30 a.m.</td>
<td>11:00 a.m. - 1:00 p.m.</td>
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<tr>
<td>MWF 2:30 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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<tr>
<td>MW 2:30 p.m. - 3:50 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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<tr>
<td>M 2:30 - 5:20 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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**Tuesday, December 9**

<table>
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<th>Time</th>
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<tbody>
<tr>
<td>TR 8:30 a.m.</td>
<td>8:30 a.m. - 10:30 a.m.</td>
</tr>
<tr>
<td>TR 11:30 a.m.</td>
<td>11:00 a.m. - 1:00 p.m.</td>
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<tr>
<td><strong>TR 2:30 p.m.</strong></td>
<td><strong>2:00 p.m. - 4:00 p.m.</strong></td>
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<tr>
<td><strong>T 2:30 p.m. - 5:20 p.m.</strong></td>
<td><strong>2:00 p.m. - 4:00 p.m.</strong></td>
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**Wednesday, December 10**

<table>
<thead>
<tr>
<th>Time</th>
<th>Exam Time</th>
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<tbody>
<tr>
<td>MWF 9:30 a.m.</td>
<td>8:30 a.m. - 10:30 a.m.</td>
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<td>MWF 12:30 p.m.</td>
<td>11:00 a.m. - 1:00 p.m.</td>
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<tr>
<td>W 2:30 p.m. - 5:20 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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<tr>
<td>MWF 3:30 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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<tr>
<td>MW 4:00 p.m. - 5:20 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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**Thursday, December 11**

<table>
<thead>
<tr>
<th>Time</th>
<th>Exam Time</th>
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<tbody>
<tr>
<td>TR 10:00 a.m.</td>
<td>8:30 a.m. - 10:30 a.m.</td>
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<tr>
<td>TR 1:00 p.m.</td>
<td>11:00 a.m. - 1:00 p.m.</td>
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<tr>
<td><strong>R 2:30 p.m. - 5:20 p.m.</strong></td>
<td><strong>2:00 p.m. - 4:00 p.m.</strong></td>
</tr>
<tr>
<td>TR 4:00 p.m.</td>
<td>2:00 p.m. - 4:00 p.m.</td>
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