

Course Outline

Course Description

The fundamental principles of Newtonian mechanics; statics of particles in 2-D space; equilibrium of rigid bodies in 2-D; distributed forces; friction, linear and angular momentum of rigid bodies; conservation of energy; principles of impulse and momentum; and, plane motion of rigid bodies.

Course Objectives

This course is to introduce the basic principles of engineering mechanics with emphasis on their analysis and application to practical engineering problems. After taking this course, you should have the ability to:

1. Solve for the resultants of any force systems;
2. Determine equivalent force systems;
3. Determine the internal forces in plane frames, simple span trusses and beams;
4. Solve the mechanics problems associated with friction forces;
5. Obtain the centroid, first moment and second moment of an area;
6. Describe the motion of a particle in terms of its position, velocity and acceleration in different frames of reference;
7. Analyze the forces causing the motion of a particle;
8. Use the equation of motion to describe the accelerated motion of a particle;
9. Apply work, energy, impulse and momentum relationships for a particle in motion;
10. Describe the motion of a rigid body in different frames of reference.

Why?

This course will focus on the most basic branch of mechanics: rigid-body mechanics. It is essential for the design and analysis of many types of structural members, mechanical components, or electrical devices encountered in engineering. It also forms the basis for future studies in mechanics, including deformable-body mechanics and fluid mechanics. Hopefully, by the end of the semester, you will have a better understanding of what mechanics means, and how this branch of science is useful for engineers.

Contacts

Instructor

Dr. Graham Taylor
gwtaylor@uoguelph.ca
 THRN 2413
 Office Hours: Tu, Thu 4:00 - 5:00pm

Teaching Assistants

Ajay Kahlon	Subhash Paul	Matthew Zaverl	Chen Zhang
Sec. 0103,0106	Sec. 0101,0102	Sec. 0104,0105	Sec. 0108,0109
akahlon@uoguelph.ca	subhash@uoguelph.ca	mzaverl@uoguelph.ca	czhang03@uoguelph.ca
OH: Mon 9:30am-11:30am	OH: Mon 12:30-2:30pm	OH: Thu 4:00-6:00pm	OH: Wed 9:00-11:00am

All TA office hours (OH) will be held in THRN 1425, except for Feb 20-27 when this room is unavailable. We will announce the location for those Office Hours on the course website.

TA office hours will start in Week 2. TA office hours will not be held in Week 7 (Reading Week).

Course Website

We will use the CourseLink system to distribute course materials and make announcements. Please check the course website right away to make sure you have access.

<http://courselink.uoguelph.ca>

Course Format and Organization

- The course will have two lectures per week: Tu, Thu 11:30 - 12:50 in THRN 1200
- There are weekly tutorials organized in sections:

Section	Time	Location	TA
Section 0101	Monday 9:30am - 10:20am	MACK 311	Subhash
Section 0102	Monday 10:30am - 11:20am	MACK 312	Subhash
Section 0103	Tuesday 10:30am - 11:20am	MACK 306	Ajay
Section 0104	Thursday 10:30am - 11:20am	MACK 305	Matthew
Section 0105	Friday 10:30am - 11:20am	MACK 309	Matthew
Section 0106	Monday 1:30pm - 2:20pm	MACK 317	Ajay
Section 0108	Friday 1:30pm - 2:20pm	MACK 305	Chen
Section 0109	Monday 4:30pm - 5:20pm	MACK 315	Chen

- The TAs and the instructor hold office hours; see the schedules above

Tentative Syllabus

Your learning is my principal concern, so I may modify the schedule if it will facilitate your learning.

Week	Topic	Assessments	Chapters
1	<ul style="list-style-type: none"> • Introduction • Force Vectors (1/2) 	<ul style="list-style-type: none"> • Assignment 1 out 	1,2
2	<ul style="list-style-type: none"> • Force Vectors (2/2) • Equilibrium of a Particle 	<ul style="list-style-type: none"> • Quiz 1 • Assignment 2 out 	2,3
3	<ul style="list-style-type: none"> • Rigid Body Force Systems 	<ul style="list-style-type: none"> • Quiz 2 • Assignment 3 out 	4
4	<ul style="list-style-type: none"> • Equilibrium of a Rigid Body 	<ul style="list-style-type: none"> • Quiz 3 • Test 1 • Assignment 4 out 	5
5	<ul style="list-style-type: none"> • First Moments and Centroids 	<ul style="list-style-type: none"> • Quiz 4 • Assignment 5 out 	9
6	<ul style="list-style-type: none"> • Analysis of Structures (1/2) 	<ul style="list-style-type: none"> • Midterm • Assignment 6 out 	6
7 Reading Week		
8	<ul style="list-style-type: none"> • Analysis of Structures (2/2) • Forces in Beams 	<ul style="list-style-type: none"> • Quiz 5 • Assignment 7 out 	6,7
9	<ul style="list-style-type: none"> • Moments of Inertia • Particle Kinematics (1/2) 	<ul style="list-style-type: none"> • Quiz 6 • Assignment 8 out 	10,12
10	<ul style="list-style-type: none"> • Particle Kinematics (2/2) • Kinetics of a Particle: Force & Acceleration 	<ul style="list-style-type: none"> • Quiz 7 • Assignment 9 out 	12,13
11	<ul style="list-style-type: none"> • Kinetics of a Particle: Work & Energy (1/2) 	<ul style="list-style-type: none"> • Quiz 8 • Test 2 • Assignment 10 out 	14
12	<ul style="list-style-type: none"> • Kinetics of a Particle: Work & Energy (2/2) • Kinetics of a Particle: Impulse & Momentum (1/2) 	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Study for final!</div>	14, 15
13	<ul style="list-style-type: none"> • Kinetics of a Particle: Impulse & Momentum (2/2) • Planar Kinematics of a Rigid Body 		15, 16

Required Text

Russell C. Hibbeler, "Engineering Mechanics: Statics & Dynamics", 13th edition, Prentice Hall, 2012.

Notes to accompany lectures will be posted on the course website (CourseLink) throughout the semester. You will be granted access to the website when you register for the course. These lecture notes are not complete and it is still highly recommended that you print the notes prior to lectures and fill in the blank sections. A number of standard engineering mechanics books are also available in the library which may be consulted.

Attendance at Lectures and Tutorials

Attendance at lectures and tutorials is mandatory. Much material and interpretation is covered during lectures that is not present in textbooks or other resources.

Your TAs will be grading your quizzes. Therefore it is important to attend the tutorials and seek help from your TA. The tutorials will cover background material and problem sets not covered in lectures.

Communication and Email Policy

Please use lectures and tutorials as your main opportunity to ask questions about the course. Major announcements and/or changes will be posted to the course website. **It is your responsibility to check the course website regularly.**

Electronic communication should be limited to the course forum, however topics of a personal and confidential nature (e.g. marks) should be emailed to the instructor: gwtaylor@uoguelph.ca. Please note that **all email communication must be made through your University of Guelph email account** (i.e. <username>@uoguelph.ca).

Evaluation

Your final mark will be based on in-tutorial quizzes, in-class tests, a midterm exam and a final exam.

Task	%	Approximate date
Assignments (approximately 10)	0	-
In-tutorial Quizzes (8, best 7)	15	-
In-class Tests (2)	15	Jan 29, Mar 21
Midterm Exam (material to-date)	30	Feb 14
Final Exam (all course material)	40	Apr 8

Assignments: There will be approximately 10 unmarked assignments, consisting of questions from the required text. These will be posted on the course website. These assignments are for practice and are not worth any marks.

In-tutorial Quizzes: There will be approximately 8 in-tutorial quizzes, closely based on the assignment questions. Quizzes must be written in the students' assigned tutorial section. Only in extenuating circumstances, when accompanied by appropriate documentation and timely instructor notification (at least one week in advance), will students be allowed to write a quiz in a section other than the one to which they have been assigned.

In-class Tests: The in-class tests will be held during lecture period, and will be announced at least one week in advance.

If you have questions about the grade your quiz or test received, please ask your TA within one week of the document being returned. However, all requests for re-marking must be made to the instructor. Any item that is re-marked will be re-marked entirely. Therefore it is strongly suggested that you thoroughly review your entire document **before** making a re-marking request. Pencil-written works will not be re-marked. Re-marking requests will not be honoured more than one week after the document has been returned.

Engineering Peer Helpers

Engineering Mechanics Focused Engineering Problem Solving Sessions (FEPS sessions) are student-run, course based group sessions to help you get started on your assignments and keep up with your class work.

They will be happening three times each week, all in THRN 1427:

Mondays: 2:30-3:20pm

Tuesdays: 5:30-6:30pm

Wednesdays: 5:30-6:30pm

For more information on FEPS sessions, contact Geneva Starr, gstarr@uoguelph.ca.

Policy on Missed Quizzes, Tests, and Exams

Generally, when you find yourself unable to meet a course requirement such as a quiz, test, or exam as a result of compassionate, illness or physiological reasons, a formal explanation must be made in writing to the instructor and (where possible) proper documentation must be provided. This should be done prior to a quiz, test, or exam (if possible) or as soon as possible but definitely within a week after the date of the course requirement. If no explanations are provided, quizzes, tests, and exams receive a grade of zero.

No makeup/deferred quizzes, tests, or exams will be offered. If acceptable justification was provided for the missed quiz/test/exam, the next quiz/test/exam will serve as the replacement.

If any of the due dates for course requirements are unacceptable based on foreseeable circumstances (e.g. on religious grounds) it is your responsibility to notify the instructor **within the first two weeks of lectures** so that an accommodation can be made.

University Policy on Academic Misconduct

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. It is your responsibility to consult the Undergraduate Calendar 2011-2012 and School of Engineering program guide, for offences, penalties and procedures relating to academic misconduct: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Disclaimer

The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to the University of Guelph Academic Regulations.