ENGG*2160 Engineering Mechanics
Fall 2016

School of Engineering

(Revision 1: July 7, 2016)
(Revision 2: August 30, 2016)

1 Instructional Support

1.1 Instructor

Instructor: Michele Oliver, Ph.D., P.Eng.
Office: THRN 1335 Thornbrough
Email: moliver@uoguelph.ca
Office hours: TBA on Courselink or by appointment

1.2 Teaching Assistants

GTA	Email	Office Hours
Brittany Reiche		TBA on Courselink
Bhoomi Gandhi		TBA on Courselink
Jun Hou		TBA on Courselink
Dhrumil Mehta		TBA on Courselink
TBA		TBA on Courselink

2 Learning Resources

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*2160 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

1. Beer, Johnston, DeWolf and Mazurek. Mechanics of Materials – Seventh Edition, McGraw Hill, New York, New York (available for purchase in the bookstore).
2. I<clickers for quizzes

2.3 Recommended Resources

Not Applicable

2.4 Additional Resources

Lecture Information: Selected lecture notes are provided on the course D2L site.

Assignments: Approximately 11 practice assignments will be available on the course D2L site. Download the assignments according to the schedule provided on the course D2L Site. All the solutions will be posted as indicated

Miscellaneous Information: Other information related to the course is also posted to the course D2L site.

2.5 Communication & Email Policy:

Please use lectures and tutorial help sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course D2L site. **It is your responsibility to check the course D2L site regularly.** As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its student.

3 ASSESSMENT

3.1 Dates and Distribution

In Class Clicker Quizzes: 10% (best 8 of 10) from i>clicker quizzes
Friday September 16
Friday September 23
Friday September 30
Friday October 14
Friday October 21
Friday October 28
Friday November 4
Friday November 11
Friday November 18
Friday November 25

In Tutorial Quizzes (Exam Prep Questions): 10% (best 5 of 7)
Week of September 19
Week of September 26
Week of October 3
Week of October 24
Week of October 31
Week of November 7
Week of November 21

Midterm Test 1: 20%
Wednesday October 19th, 2016 – 11:30-12:20 PM, in class McNaughton 105

Midterm Test 2: 20%
Wednesday November 16th, 2016 - 11:30-12:20 PM, in class McNaughton 105

Final Exam: 40%
Thursday December 8th, 2016 – 7:00-9:00 PM, Room TBA on Webadvisor

3.2 Course Grading Policies

In-Class Clicker Quizzes: There will be ten i>clicker quizzes during the lectures throughout the semester as scheduled. Students are expected to be present and use their own i>clicker during these quizzes. The quizzes are intended to help you better understand the course content and account for 10% of the course marks. Prior to the first quiz, you must register your i>clicker serial number by clicking on the "Student i>clicker Registration" link on the right side of the webpage: http://www.tss.uoguelph.ca/ltci/clickers/index.cfm

Exam Prep Quizzes: There will be seven in-tutorial exam prep quizzes throughout the semester. In order to receive credit for writing a quiz, students must be registered in the tutorial in which they write their quiz. The quizzes are intended to help students better understand the course content and account for 10% of the course marks.

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Passing grade: In order to pass the course, you must pass the exam portion of the course. Students must obtain a grade of 50% or higher on the exam portion of the course in order for the in class clicker quizzes and tutorial exam prep quizzes to count towards the final grade.

Missed quizzes or midterm tests: If you miss a midterm test due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam. If you miss a quiz due to grounds for granting academic consideration, your worst quiz mark will be dropped. There will be no makeup quizzes or makeup midterm tests.

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4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

Study of the fundamental principles of the mechanics of deformable materials; stress and strain; Mohr's circle for transformation of stress and strain; deflection under load; design of beams, shafts, columns and pressure vessels; failure theory and design.
Prerequisite(s): ENGG*1210, ENGG*1500, 0.5 credits in Calculus

4.2 Course Aims

This course is an introductory course in the strength of materials, which is a basic course in most mechanical engineering programs. The main goals of the course are (1) to teach students the fundamental concepts regarding the strength of materials under a variety of loading

conditions and (2) to provide an introduction to how these fundamental concepts can be used in design.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Understand the stress-strain behavior of engineering materials in service
2. Develop adequate procedures for finding the required dimensions of a member of a specified material to carry a given load subject to stated specifications of stress and deflection

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering	1,2	Quizzes, Exams
2. Problem Analysis	1,2	Quizzes, Exams

4.5 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems. Scheduled classes will be the principal venue to provide information and feedback for tests.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.7 Relationships with other Courses & Labs

Previous Courses:

ENGG*1210: Mechanical system fundamentals such as force, torques, friction, moments, free body diagrams

ENGG*1500: Solving systems of linear equations

MATH*1210: Differentiation, integration

Follow-on Courses:

ENGG*2180: Introduction to Manufacturing Processes

ENGG*2340: Kinematics and Dynamics

ENGG*3150: Engineering Biomechanics

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5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures			
Monday		11:30 AM – 12:20 PM	MACN 105
Wednesday		11:30 AM – 12:20 PM	MACN 105
Friday		11:30 AM – 12:20 PM	MACN 105
Tutorials			
Tuesday	Section 1	8:30-9:20 AM	MCKN 237
Tuesday	Section 2	8:30-9:20 AM	MCKN 236
Thursday	Section 5	8:30-9:20 AM	MCKN 230
Tuesday	Section 7	10:30-11:20 PM	JTP 212
Wednesday	Section 8	7:00-7:50 PM	MCKN 233
Friday	Section 9	12:30-1:20 PM	MCKN 234

5.2 Approximate Lecture Schedule

Approximate Lectures	**Lecture Topics**	**References**	**Learning Objectives**
1	Introduction to Mechanics of Materials and Review of Mechanics I (Free Body Diagrams)	Overview of Text, Mechanics I Notes and Textbook	1,2
2-4	Stress (Normal, Shearing and Bearing, Factor of Safety)	Chapter 1	1,2
5	Strain (Normal and Shearing)	Chapter 2	1,2
6-12	Properties of Materials (True and Nominal Stress, Elastic and Plastic Deformation, Elastic, Shear and Bulk Modulus, Poisson's Ratio, Temperature Effects, Biaxial Loading, Generalized Hooke's	Chapter 2	1,2

	Law, Superposition Solution Methods, Stress Concentrations)		
13-17	Torsion (Stresses on Oblique Planes, Power Transmission,	Chapter 3	1,2
18-21	Bending (Beams of 2 Materials, Shearing Stress in a Beam, Relationship Between Load, Shear and Bending Moment,	Chapter 4,5	1,2
22-28	Transformation of Stress and Strain (Principal Stresses, 2D and 3D Mohr's Circle, Thin Walled Pressure Vessels	Chapter 7	1,2
29	Combined loading (Superposition solution methods)	Chapter 8	1,2
30-32	Beam Deflection Analysis Methods	Chapter 9	1,2
33-34	Columns	Chapter 10	1,2

5.3 Tutorials, Quizzes and Midterm Schedule (all deal with learning objectives 1&2)

Week of	Tutorial	Unmarked Assignment	Clicker Quiz	Midterm
Sept. 5				
12	Tutorial	√	i>clicker – Friday during Class	
19	Exam Prep Quiz	√	i>clicker – Friday during Class	
26	Exam Prep Quiz	√	i>clicker – Friday during Class	
Oct. 3	Exam Prep Quiz	√		
10	Open Tutorials Exam Prep Wed-Friday	√	i>clicker – Friday during Class	
17	Open Tutorials Exam Prep Tuesday	√	i>clicker – Friday during Class	Midterm (Wednesday Oct. 19th In-Class)
24	Exam Prep Quiz	√	i>clicker – Friday during Class	
31	Exam Prep Quiz	√	i>clicker – Friday during Class	
Nov. 7	Exam Prep Quiz	√	i>clicker – Friday during Class	
14	Open Tutorials Exam Prep	√	i>clicker – Friday during Class	Midterm (Wednesday Nov. 16th In-Class)
21	Exam Prep Quiz	√	i>clicker – Friday during Class	
28	Open Tutorials			

5.4 Other Important Dates

First day of class: Friday Sept. 9, 2016

Thanksgiving: Monday, October 10, 2016 - no classes

Fall Study day: Tuesday October 11, 2016 - no classes

Last day to drop: Friday November 4, 2016

Last day of class: Friday December 2, 2016

6 LAB SAFETY

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. While there are no laboratories in this course, as a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at: http://www.academicintegrity.uoguelph.ca/

Please also review the section on Academic Misconduct in your Engineering Program Guide.

The School of Engineering has adopted a Code of Ethics that can be found at: http://www.uoguelph.ca/engineering/undergrad-counselling-ethics

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/

9 RECORDING OF MATERIALS

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10 RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: http://www.uoguelph.ca/registrar/calendars/index.cfm?index