



ENGG*2160 Engineering Mechanics II

01

Fall 2023

Section(s): C01

School of Engineering

Credit Weight: 0.50

Version 1.00 - September 01, 2023

1 Course Details

1.1 Calendar Description

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.

Pre-Requisites:

ENGG*1210, ENGG*1500, 0.50 credits in calculus

Restrictions:

This is a Priority Access Course. Enrolment may be restricted to the BME and MECH specializations in the BENG and BENG:C programs. See department for more information. Non-BENG students may take a maximum of 4.00 ENGG credits.

1.2 Timetable

Lectures

Lecture 1:

Tuesday 11:30AM - 12:50PM MCKN 117

Thursday 11:30AM - 12:50PM MCKN 117

Lecture 2:

Tuesday 04:00PM - 05:20PM MCLN 102

Thursday 04:00PM - 05:20PM MCLN 102

Tutorials

Monday Section 1 09:30AM - 10:20AM MCKN 236

Monday	Section 2	05:30PM - 06:20PM	ROZH 105
Thursday	Section 3	10:30AM - 11:20AM	MCKN 237
Tuesday	Section 4	10:30AM - 11:20AM	MCKN 223
Tuesday	Section 5	01:30PM - 02:20PM	MCKN 235

1.3 Final Exam

Wednesday, December 6th, 2023 08:30 AM- 10:30 AM, Room TBA

Final Exam date, time and location is set by the University Registrar.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Alexander Bardelcik Ph.D., P.Eng.
Email: abardelc@uoguelph.ca
Telephone: +1-519-824-4120 x53228
Office: THRN 2501
Office Hours: TBA on Courselink or by appointment

Instructor: Abdallah Elsayed Ph.D., P.Eng.
Email: aelsay01@uoguelph.ca
Telephone: +1-519-824-4120 x56933
Office: RICH 2523
Office Hours: TBA on Courselink or by appointment

2.2 Teaching Assistants

Teaching Assistant (GTA): Stephanie Kotiadis
Email: skotiadi@uoguelph.ca
Office Hours: By appointment

Teaching Assistant (GTA): Manpreet Kaur
Email: mkaur16@uoguelph.ca
Office Hours: By appointment

Teaching Assistant (GTA): Digant Sanjaybhai Purandare
Email: dpuranda@uoguelph.ca

Office Hours:	By appointment
Teaching Assistant (GTA):	Sevda Fathipour
Email:	sfathipo@uoguelph.ca
Office Hours:	By appointment

3 Learning Resources

3.1 Required Resources

Course Website (Website)

<https://courselink.uoguelph.ca>

Course material, news, announcements, and grades will be regularly posted to the ENGG*2160

Courselink site. You are responsible for checking the site regularly.

Beer, Johnston, DeWolf and Mazurek. **Mechanics of Materials – Seventh Edition in SI Units (Textbook)**

McGraw Hill, New York, New York (available for purchase in the bookstore).

3.2 Additional Resources

Lecture Information (Notes)

Selected lecture notes are provided on the ENGG*2160 Courselink site.

Miscellaneous Information (Other)

Other information related to the course is also posted to the ENGG*2160 Courselink site.

3.3 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 ENGG*2160 Courselink site. **It is your responsibility to check the Courselink 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.

4 Learning Outcomes

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.

4.1 Course Learning Outcomes

By the end of this course, you should be able 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

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
1	Knowledge Base	1, 2
1.1	Recall, describe and apply fundamental mathematical principles and concepts	1, 2
1.2	Recall, describe and apply fundamental principles and concepts in natural science	1, 2
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2
1.4	Recall, describe and apply program-specific engineering principles and concepts	1, 2
2	Problem Analysis	1, 2
2.1	Formulate a problem statement in engineering and non-engineering terminology	1, 2
2.2	Identify, organize and justify appropriate information, including assumptions	1, 2
2.3	Construct a conceptual framework and select an appropriate solution approach	1, 2
2.4	Execute an engineering solution	1, 2

4.3 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*3280: Machine Design

5 Teaching and Learning Activities

5.1 Lecture

Topics:

Approximate Lectures	Lecture Topics	References	Learning Outcomes
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,	Chapter 2	1,2

Approximate Lectures	Lecture Topics	References	Learning Outcomes
	Elastic, Shear and Bulk Modulus, Poisson's Ratio, Temperature Effects, Biaxial Loading, Generalized Hooke's 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	Chapter 9	1,2

Approximate Lectures	Lecture Topics	References	Learning Outcomes
	Analysis Methods		
33-34	Columns	Chapter 10	1,2

5.2 Tutorials, Quizzes and Midterm Schedule

Week of	Tutorial	Tutorial Quiz	Midterm
Sept 4	No Tutorial	No Quiz	
Sept 11	Tutorial	Trial Quiz (not for marks)	
Sept 18	Tutorial	Quiz 1	
Sept 25	Tutorial	Quiz 2	
Oct 2	Tutorial	Quiz 3	
Oct 9	Tutorial	No Quiz	
Oct 16	Open Tutorial	No Quiz	Midterm (Oct. 19)
Oct 23	No Tutorial	No Quiz	
Oct 30	Tutorial	Quiz 4	
Nov 6	Tutorial	Quiz 5	
Nov 13	Tutorial	Quiz 6	
Nov 20	Tutorial	Trial Quiz (not for marks)	
Nov 27	Open Tutorial	No Quiz	

5.3 Other Important Dates

- **Thursday, September 7, 2023:** First day of F23 classes
- **Monday, October 9, 2023:** Thanksgiving Day, No Classes

- **Tuesday, October 10, 2023:** Fall Study Day, No Classes
 - **Thursday, November 30, 2023:** Make up for Study Day (Tuesday Schedule)
 - **Friday, December 1, 2023:** Make up for Thanksgiving Day (Monday Schedule) and Last Day to Drop Fall Courses
-

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)	Scheme B (%)
Tutorial Quizzes	30	30
Midterm	35	30
Final Exam	35	40
Total	100	100

6.2 Assessment Details

Tutorial Quizzes (the best 4 of 6 quizzes count) (30%)

Date: Mon, Sep 18 - Mon, Nov 13, Tutorial Rooms

Learning Outcome: 1, 2

Quiz	Date
1	Week of September 18th
2	Week of September 25th
3	Week of October 2nd
4	Week of October 30th
5	Week of November 6th
6	Week of November 13th

Midterm (35%)**Date:** Thu, Oct 19**Learning Outcome:** 1, 2**Final Exam (35%)****Date:** Wed, Dec 6, 8:30 AM - 10:30 AM**Learning Outcome:** 1, 2

Final Exam date, time and location is set by the University Registrar.

6.3 Course Grading Policies

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:

Students must obtain a grade of 50% or higher.

Missed quizzes:

If you miss a quiz due to grounds for granting academic consideration, your lowest quiz mark will be dropped. There will be no makeup quizzes.

Reassessment

Students are only allowed to ask questions regarding their quiz or midterm marks 1 week

after the mark is released.

7 School of Engineering Statements

7.1 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 but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

7.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. 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.

7.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. 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.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

8.6 Academic Integrity

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 encourages academic integrity. 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 or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

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

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
<https://www.uoguelph.ca/academics/calendars>

8.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).
