



ENGG*2160 Engineering Mechanics II

01

Fall 2021

Section(s): C01

School of Engineering

Credit Weight: 0.50

Version 2.00 - September 10, 2021

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.

1.2 Timetable

Lectures

Tuesday 04:00PM - 05:20PM AD-S, Room Virtual

Thursday 04:00PM - 05:20PM AD-S, Room Virtual

Tutorials

Monday Section 1 02:30PM - 3:20PM MCLN 107

Monday Section 2 09:30AM - 10:20AM MINS 103

Monday Section 3 10:30AM - 11:20AM MCLN 107

Monday Section 4 09:30AM - 10:20AM MCKN 116

Monday Section 5 02:30PM - 3:20PM ALEX 218

1.3 Final Exam

Monday, December 13th, 2021 8:30 AM- 10:30 AM

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

2 Instructional Support

2.1 Instructional Support Team

Instructor: Marwan Hassan Ph.D., P.Eng.
Email: mahassan@uoguelph.ca
Telephone: +1-519-824-4120 x52429
Office: THRN 1339
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): Alex Doucette
Email: doucette@uoguelph.ca
Office Hours: By appointment

Teaching Assistant (GTA): Jay McNeill
Email: jmcnei01@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 – Eighth Edition, International Student Edition for use outside of the U.S. (Textbook)

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

It is mandatory to purchase one of two following ordering options for the textbook:

1) CONNECT (includes the textbook in electronic form as well as the ability to access and do the online assignments which are worth 10% of your final grade). Without CONNECT you cannot do and receive a grade for the assignments. **ISBN: 9781260403831**

OR

2) CONNECT + Hard Copy of Textbook. **ISBN: 9781260327571**

You cannot do the assignments without having your own access to CONNECT.

3.2 Additional Resources**Lecture Information (Notes)**

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

CONNECT (Software)

The CONNECT system provides an integrated course eBook coupled with adaptive learning tools to help focus your study time. The system also includes supporting how-to videos and interactives along with extra practice materials.

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

Approximate Lectures	Lecture Topics	References	Learning Outcomes
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 Law, Superposition Solution Methods, Stress Concentrations)	Chapter 2	1,2
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

Approximate Lectures	Lecture Topics	References	Learning Outcomes
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

5.2 Tutorials, Quizzes and Midterm Schedule

Week of	Tutorial	CONNECT Assignments	Tutorial Quiz	Midterm
Sept 6	No Tutorial	No Assignment	No Quiz	
Sept 13	Tutorial	Assignment 1	Trial Quiz (not for marks)	
Sept 20	Tutorial	Assignment 2	Quiz 1	
Sept 27	Tutorial	Assignment 3	Quiz 2	
Oct 4	Tutorial	Assignment	Quiz 3	

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Oct 11	Tutorial	Assignment 5	No Quiz	
Oct 18	Open Tutorial	Review Assignment (not for marks)	No Quiz	Midterm (Oct. 21)
Oct 25	No Tutorial	Assignment 6	No Quiz	
Nov 1	Tutorial	Assignment 7	Quiz 4	
Nov 8	Tutorial	Assignment 8	Quiz 5	
Nov 15	Tutorial	Assignment 9	Quiz 6	
Nov 22	Tutorial	Assignment 10	Trial Quiz (not for marks)	
Nov 29	Open Tutorial	Review Assignment (not for marks)	No Quiz	

5.3 Other Important Dates

- **Thursday, September 9, 2021:** First day of F21 classes
- **Monday, October 11, 2021:** Thanksgiving Day, No Classes
- **Tuesday, October 12, 2021:** Fall Study Day, No Classes
- **Thursday, December 2, 2021:** Make up for Study Day (Tuesday Schedule)
- **Friday, December 3, 2021:** 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 (%)
CONNECT Assignments	10	10
Tutorial Quizzes	10	10
Midterm	40	35
Final Exam	40	45
Total	100	100

6.2 Assessment Details

CONNECT Assignments (the best 8 of 10 assignments count) (10%)

Date: Mon, Sep 6 - Mon, Nov 29

Learning Outcome: 1

CONNECT Assignment	Date Assigned	Due Date (Due by 11 pm)
1	Monday September 13th	Monday September 20th
2	Monday September 20th	Monday September 27th
3	Monday September 27th	Monday October 4th
4	Monday October 4th	Monday October 11th
5	Monday October 11th	Monday October 25th
6	Monday October 25th	Monday November 1st
7	Monday November 1st	Monday November 8th
8	Monday November 8th	Monday November 15th

9	Monday November 15th	Monday November 22nd
10	Monday November 22nd	Monday November 29th

Tutorial Quizzes (the best 4 of 6 quizzes count) (10%) (10%)

Date: Mon, Sep 20 - Mon, Nov 15, Tutorial Rooms

Learning Outcome: 1, 2

Quiz	Date
1	Week of September 20th
2	Week of September 27th
3	Week of October 4th
4	Week of November 1st
5	Week of November 8th
6	Week of November 15th

Midterm (40%)

Date: Thu, Oct 21

Final Exam (40%)

Date: Mon, Dec 13, 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

CONNECT Assignments:

There will be ten assignments for marks through the semester. The assignments 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:

Students must obtain a grade of 50% or higher.

Missed CONNECT assignments:

If you miss an assignment or don't complete the assignment before the due date due to grounds for granting academic consideration, your lowest assignment mark will be dropped.

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 book their exams at least 7 days in advance and not later than the 40th Class Day.

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 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 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).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
