COURSE SYLLABUS

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.
Learn more about Camosun's

COURSE TITLE:	MENG 273 – Strength of Materials
CLASS SECTION:	DX01
TERM:	2023F
COURSE CREDITS:	3
DELIVERY METHOD(S):	3 Lecture hours and 2 Lab hours per week

The COVID-19 pandemic has presented many challenges, and Camosun College is committed to helping you safely complete your education. Following guidelines from the Provincial Health Officer, WorkSafe BC, and the B.C. Government to ensure the health and wellbeing of students and employees, Camosun College is providing you with every possible protection to keep you safe. Our measures include COVID Training for students and employees, health checks, infection control protocols including sanitization of spaces, PPE and ensuring physical distancing. For details on these precautions please follow this link: http://camosun.ca/covid19/faq/covid-faqs-students.html. However, if you're at all uncomfortable being on campus, please share your concerns with your Instructor. If needed, alternatives will be discussed.

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME:	Russ Rook
EMAIL:	rook@camosun.ca
OFFICE:	TEC 113
HOURS:	T.B.A.

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

Using the laws of statics as a foundation, students will study topics in basic strength of materials theory including axial, direct shear, torsion, bending, and transverse shear stresses. The Bernoulli-Euler beam theory will be used to predict the deflection of beams, and shear and bending moment diagrams will be constructed. Students will learn how to combine stresses using transformation equations and Mohr's circle to determine maximum shear and principal stresses, in order to predict elastic failure. Types of failure and welded connections will also be considered. Case studies and practical design examples will be emphasized. Only open to students in the Mechanical Engineering Technology program.

PREREQUISITE(S): C in MENG 172
CO-REQUISITE(S): None
EXCLUSION(S): Open to students in Mechanical Engineering Technology

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon successful completion of this course a student will be able to:

- Describe the mechanical properties of elastic materials, such as strength, toughness, hardness, modulus of elasticity (through Hooke's law), modulus of rigidity, and Poisson's ratio.
- Use the principles of static equilibrium and free-body diagrams to compute internal forces and moments within various structures.
- Construct shear and moment diagrams for beam geometries.
- Analyze structural systems to determine:
    - average normal stresses and deformations in bars under axial loads, and work through statically determinant and indeterminant problems
    - direct shear stresses on bolted connections
    - torsional shear stresses and angle of twist in circular sections
    - normal bending stresses using the flexure formula
    - the transverse shear stress, and understand how to properly compute the statical moment and shear flow in thin sections
- Calculate combined stresses at any location in cases of axial, bending, torsion, and transverse shear stresses, and understand the concept of the stress element.
- Explain the stress transformation equations and Mohr's circle.
- Calculate axial and hoop stresses in pressure vessels.
- Use the Bernoulli-Euler beam theory of deflection to calculate statically determined and statically indeterminate problems.
- Discuss a basic analysis of welded connections.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Mechanics of Materials, 11th Ed., R.C. Hibbeler (hard-copy or etextbook)

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

WEEK	ACTIVITY or TOPIC	QUIZZES	LABS	ASSIGNMENTS
1	Mechanical properties of elastic materials, load-deflection and stress-strain diagrams, Hooke's law, the laws of static equilibrium and free-body diagrams.		-	
2	Internal forces and moments, internal loading sign convention, shear and bending moment diagrams.		Tutorial	
3	The stress element, linear and angular stress and strain, average normal stress, axial deformation, statically indeterminant systems.		Tutorial	1-1,1-6,1-11, 1-13,1-22,6-1

WEEK	ACTIVITY or TOPIC	QUIZZES	LABS	ASSIGNMENTS
4	Direct shear stress, centroid review, second-moment of area, parallel axis theorem.		Tutorial	
5	Torsional shear stress, angle of twist.		Lab #1	
6	Normal bending stress, the flexure formula.		Lab #1 Analysis	1-88,1-93,2-2,5-13, 5-27,5-31,5-49
7	Transverse shear stress.		Tutorial	
8	Shear flow in thin-walled sections, combined stresses.		-	6-49,6-54,6-70, 6-73,7-3,7-5,7-11
9	Prediction of failure for ductile materials.	Midterm Exam	Tutorial	
10	Transformations of biaxial stresses, maximum in-plane shear stresses and principal stresses, Mohr's circle.		Lab #2	8-21,8-22,8-25,8-41
11	Examples of combined stresses and stress transformations, including thin-walled pressure vessels.		Lab #3	
12	Beam analysis, deflections using singularity functions.		Lab #3 Analysis	9-15,9-17,9-25, 9-31,9-69,9-71
13	Examples of beam analysis for statically indeterminant systems.		Tutorial	
14	Weld specification and analysis, course review (time permitting).		-	12-15,12-37, 12-43,12-107,+Weld Questions on D2L

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced noticed is required. Deadlines scan be reviewed on the CAL exams page. http://camosun.ca/services/accessible-learning/exams.html

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Assignments	10
Labs	25
Midterm Exam	30
Final Exam	35
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the Grade Review and Appeals policy for more information. http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

COURSE GUIDELINES & EXPECTATIONS

Lecture Attendance

To get the most out of this course, students are expected to attend all classes and be on time. It is your responsibility to acquire all information given during a class missed, including notes, hand-outs, changed exam dates etc.

Due Dates and Late Assignments
Laboratory experiments and/or tutorials will be given throughout the semester, tentatively planned for the weeks given in the above table. Assignments will be graded based on completion, with solutions posted after the assignment is due. **Assignments are due by 5:30 on the Friday of the weeks indicated** in the above table, and **no late assignments will be accepted for grading**. Assignment solutions will be posted to D2L after the due date. See http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf for the Camosun grading policies.

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit http://camosun.ca/students/.

Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its

Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the Centre for Accessible Learning (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started: http://camosun.ca/services/accessible-learning/

Academic Integrity

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit http://camosun.ca/learn/fees/#deadlines.

Grading Policy

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf for further details about grading.

Grade Review and Appeals

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the

"Attendance" section under "Registration Policies and Procedures" (http://camosun.ca/learn/calendar/current/procedures.html) and the Grading Policy at http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized Violence and Misconduct Policy: http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-3703841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.