

COURSE SYLLABUS



COURSE TITLE:	CIVE 271 – FLUID MECHANICS
CLASS SECTION:	X01A and X01B
TERM:	2023F
COURSE CREDITS:	3
DELIVERY METHOD(S):	Lecture and Lab

Camosun College campuses are located on the traditional territories of the Ləkʷəŋən and WSÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here. Learn more about Camosun's [Territorial Acknowledgement](#).

INSTRUCTOR DETAILS

NAME:	Peter Fell (Lectures) David Ley (Labs)
EMAIL:	fellp@camosun.ca LeyD@camosun.ca
OFFICE:	Peter Fell - TEC 108 David Ley - TEC 264
HOURS:	See office door / D2L

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

Students are introduced to the fundamental properties of fluids including fluid statics, laminar and turbulent flow, buoyancy and stability, and fluid flow friction problems. Advanced topics include series, parallel and pipe network problems, open channel flow, and lift and drag to enable students to later design water and sewerage networks and other hydraulic appertenances.

PREREQUISITE(S):	All of: C in CIVE 191
PRE or CO-REQUISITE(S):	none
EXCLUSION(S):	none

COURSE LEARNING OUTCOMES / OBJECTIVES

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

- Apply relevant safety regulations and best practices in the lab and in the field.
- Calculate fluid pressures and forces for static fluids and fluids in motion.
- Assess a floating object's metacentric height to determine its stability.
- Apply the General Energy Equation to flow in a closed conduit for series and parallel pipe flow, considering pipe friction and minor losses.

- Apply the Hardy Cross method to solve for flows, losses and pressures in a pipe network.
- Select a pump appropriate to the pipe configuration and flow requirements.
- Select an appropriate flow measurement device.
- Analyse uniform steady flow conditions in open channels and determine specific energy for supercritical, subcritical and critical flow regimes.
- Discuss pipe materials and standards for the purpose of selecting appropriate pipes in design.
- Identify various types of turbines and their suitability for electricity generation.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

- Required Text:
Applied Fluid Mechanics, 8/E Robert L. Mott, Joseph A. Untener, 2022, e-Text ISBN-13: 9780135577127 (e-book)
- Lecture notes, lab procedures, videos and other supporting material posted on course web pages.

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.

Lectures are as follows:

- Tuesdays 8:30 AM - 10:20 AM in LACC 124
- Thursdays 8:30 AM – 10:20 AM in CBA 209

Labs are as follows:

- X01A: Fridays 12:30 PM - 2:30 PM in TEC 106 / TEC 110
- X01B: Wednesdays 10:30 AM – 12:30 PM in TEC 106 / TEC 110

WEEK	DATE RANGE	LECTURE TOPICS	LAB
1	Sept 4 – 8	Course Introduction; Unit 1: Fluid Properties; Fluid Pressure; Unit 2a: Pressure Measurement	Safety procedures and lab orientation.
2	Sept 11 – 15	Unit 2b: Surface Tension & Capillary Action; Unit 3: Viscosity	Lab 1 - Pressure measurement
3	Sept 18 – 22	Unit 4a: Buoyancy; Unit 4b: Stability	Lab 2 - Viscosity
4	Sept 25 – 29	Unit 5: Forces on submerged planes; Unit 6a: Pipe flow Intro & Bernoulli's Equation	Lab 3 – Buoyancy and Stability
5	Oct 2 – 6	Unit 6b: General Energy Equation; Unit 7a: Reynolds Number, Pipe friction (Darcy's and Hagen-Poiseuille Equation); Unit 7b: Moody Diagram & application to Pipe Friction.	Lab 4 – Bernoulli's Equation

WEEK	DATE RANGE	LECTURE TOPICS	LAB
6	Oct 9 – 13	Unit 7c: Pipe Friction (Hazen Williams Formula); Unit 8: Hydraulic Radius & Non-circular Cross-Sections; Mid-term review	Lab 5 – Laminar and Turbulent Flow
7	Oct 16 – 20	Unit 9: Minor Losses; Midterm Test (Thursday 19 October)	No Lab
8	Oct 23 – 27	Unit 10: Series Pipe Flow; Unit 11: Pumps and Turbines	Tutorial – Series Pipe Flow
9	Oct 30 - Nov 3	Unit 11: Pumps and Turbines (cont.); Unit 12a: Parallel Pipe Flow – 2 Pipe systems	Tutorial – Series Pipe Flow
10	Nov 6 – 10	Unit 12b: Parallel Pipe Flow network systems – Hardy Cross Intro; Unit 12c: Parallel Pipe Flow – Hardy Cross	Tutorial – Parallel Pipe Flow – 2 Pipe Systems
11	Nov 13 – 17	Unit 13: Open Channel Flow	Tutorial – As required – Series and Parallel Pipe Flow
12	Nov 20 – 24	Unit 14: Flow Measurement	Lab 6 – Series and Parallel Pipe Flow
13	Nov 27 – Dec 1	Unit 15: Forces due to fluids in motion; Unit 16: Lift and Drag	Lab 7 – Hydraulic Jump
14	Dec 4 – 8	Review for Final Exam	Lab 8 - Weirs
15 / 16	Dec 11 – 19	Exam Week (Final Exam)	

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 notice is required. Deadlines can be reviewed on the CAL exams page. <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Assignments	15%
Labs	10%
Mid-Term Test	30%
Final Exam	40%
Instructor Evaluation	5%
	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.

<https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf>

COURSE GUIDELINES & EXPECTATIONS

- Unless otherwise noted, assignments and labs are due at the start of the applicable lecture or lab period. Late assignments and labs will have 10% deducted. Assignments and labs submitted after graded assignments and labs have been returned or after solutions have been posted are worth 0.
- You must complete all assignments and labs prior to the final exam in order to be permitted to write the final exam.
- You must pass the final exam to pass the course. In addition, a weighted average of 50% on the mid-term and final exam must be achieved in order to pass the course.
- A minimum of 60% (C) must be achieved in the course in order to gain credit for the purpose of continuing to courses for which this course is a prerequisite.
- Attendance for the lectures and labs is included as part of the instructor assessment portion of your final grade. If you plan to or do miss a lecture you must notify the instructor. Labs are mandatory and any missed labs must be rescheduled with the instructor as soon as possible.

SCHOOL OR DEPARTMENTAL INFORMATION

Department:

- Civil Engineering Department. Chair is Zoe Broom, TEC 116.
- See the chair if you need:
 - program help such as working out a part-time schedule
 - help with transfer credits
 - info on services from other departments.

See your instructor if you need help with the course.

School: School of Trades and Technology. Office TEC 169

- Dean is Eric Sehn
- Associate Dean is Ken Kosik
- Both are in TEC 169
- Student issues are looked after by the Associate Dean. However, if you need anything, go to the department chair first.

Equity, diversity, and inclusion (EDI) are central to Camosun's culture and values. The Camosun community and the engineering community at large commit to pursuing equity in education regardless of race, heritage, religion, gender or gender identity, and ability. We learn best when we feel safe. Inappropriate, hateful or demeaning comments or actions will not be tolerated. Your suggestions on how to make your experience here better are encouraged and appreciated. Please let me or the department chair know ways to improve your experience at Camosun. If you wish to know more about Camosun's EDI policy, please see the EDI policy <https://camosun.ca/sites/default/files/2021-05/g-2.1.pdf>

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 camosun.ca/services.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards
Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

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.

Academic Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities: <https://camosun.libguides.com/academicintegrity/welcome>

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf> for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

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:

<https://camosun.ca/services/academic-supports/accessible-learning>

Academic Progress

Please visit <https://camosun.ca/sites/default/files/2023-02/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 <https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <https://camosun.ca/registration-records/tuition-fees#deadlines>.

Grading Policy

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

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 (see policy). Please visit <https://camosun.ca/services/forms#medical> 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: <https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf> and camosun.ca/services/sexual-violence-support-and-education. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

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 <https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Looking for other policies?

The full suite of College policies and directives can be found here: <https://camosun.ca/about/camosun-college-policies-and-directives>

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.