

COURSE SYLLABUS



COURSE TITLE: CIVE 271 – FLUID MECHANICS
CLASS SECTION: X01A, X01B, X01C
TERM: 2022F
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](#).

For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>.

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: 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:
Either:
 1. *Applied Fluid Mechanics*, 7/E Robert L. Mott, Joseph A. Untener, 2015, Pearson, Print ISBN-13: 9780132558921, e-Text ISBN-13: 9780133414622; or
 2. *Applied Fluid Mechanics*, 8/E Robert L. Mott, Joseph A. Untener, 2022, e-Text ISBN-13: 9780135577127**Note:** Camosun bookstore has e-text versions available for both the 7th and 8th editions.
- 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:

- Mondays 10:30 AM - 12:20 PM in TEC 174
- Wednesdays 12:30 PM - 2:20 PM in TEC 181

Labs are as follows:

- X01A: Thursdays 10:30 AM - 12:30 PM in TEC 106 / TEC 110
- X01B: Tuesdays 12:30 – 2:30 PM in TEC 106 / TEC 110
- X01C: Tuesdays 8:30 – 10:30 AM in TEC 106 / TEC 110

WEEK	DATE RANGE	LECTURE TOPICS	LAB
1	Sept 5 – 9	No lecture Monday 5 th September (Stat – Labour Day) Course Introduction; Fluid Properties; Pressure	No Lab
2	Sept 12 – 16	Fluid Pressure; Pressure Measurement; Surface Tension & Capillary Action; Viscosity	Lab 1 - Pressure measurement

WEEK	DATE RANGE	LECTURE TOPICS	LAB
3	Sept 19 – 23	Forces on submerged planes; Buoyancy	Lab 2 - Viscosity
4	Sept 26 – 30	Stability; Pipe flow Intro; Bernoulli's Equation	Lab 3 – Buoyancy and Stability
5	Oct 3 – 7	General Energy Equation; Reynolds Number; Pipe friction; Velocity profiles	Lab 4 – Bernoulli's Equation
6	Oct 10 – 14	No lecture Monday 10 th October (Stat – Thanksgiving) Hydraulic Radius & Non-circular Cross-Sections; Mid-term review	Lab 5 – Laminar and Turbulent Flow
7	Oct 17 – 21	Minor Losses; Midterm Test (Wednesday 19 October)	No Lab
8	Oct 24 – 28	Hazen-Williams; Series Pipe Flow	Tutorial – Series Pipe Flow
9	Oct 31 - Nov 4	Parallel Pipe Flow	Tutorial – Series and Parallel Pipe Flow
10	Nov 7 – 11	Open Channel Flow	Tutorial – Parallel Pipe Flow
11	Nov 14 – 18	Flow Measurement	Lab 6 – Series and Parallel Pipe Flow
12	Nov 21 – 25	Pumps and Turbines	Lab 7 – Hydraulic Jump
13	Nov 28 – Dec 2	Forces due to fluids in motion; Lift and Drag	Lab 8 - Weirs
14	Dec 5 – 9	Pipe materials and Standards; Review for Final Exam	Tutorial for Final Exam
15 / 16	Dec 12 – 20	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. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

COURSE GUIDELINES & EXPECTATIONS

- Assignments and labs are due at the start of the applicable lecture or lab period, unless otherwise noted. 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 or lab you must speak to the instructor.

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 page on the college's website: <https://camosun.ca/about/camosun-college-policies-and-directives/governance>

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/>.

Support Service	Website
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](http://camosun.ca/services/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.