CAMOSUN COLLEGE
School of Trades and Technology
Department of Civil Engineering Technology

CIVE 271
Fluid Mechanics
Fall - 2018

COURSE OUTLINE

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1 Instructor Information

Instructor	Peter Fell, P.Eng.		
Office hours	See course website and office for posting		
Location	TEC 108		
Phone	250-370-4483	Alternative:	250-857-2547 (Text please)
E-mail	fellp@camosun.bc.ca		
Website	http://civil.camosun.bc.ca/student/		

2 Prerequisites and Corequisites

Prerequisite: 'C' in CIVE 191

3 Hours and Credits

Course Activity	Hours / Week	Instruction – No of Weeks *(Q=11; S=14; "P or S" = 7)*
☒ **Lecture (Direct Instruction)**	4	14
☐ **Seminar (Direct Instruction)**		14
☒ **Lab /Collaborative Learning**	2	14
☐ **Supervised Field Practice**		
☐ **Workplace Integrated Learning** *(Coop, Internship, etc.)*		
☐ **Other*(*please note*):**		

Credits = 4

4 Short 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 appurtenances.

5 Intended Learning Outcomes

Upon successful completion of this course, students 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.

6 Course Content and Schedule

a. Refer to the course website for course content and updates to the schedule. This course consists of 4 hours of lecture and two hours lab per week.
b. Lectures are Monday 10:30am to 12:20pm - TEC 174 and Wednesday 8:30 to 10:20am – TEC 175. Labs are as follows:
   i. Section X01A Friday 8:30 to 10:20am - TEC 106
   ii. Section X01B Tuesday 8:30 to 10:20am - TEC 106
   iii. Section X01C Thursday 1:00 to 2:50pm - TEC 106

Week	*Lecture Topic*	*Lab*
1	Course Introduction	No lab
2	Fluid properties; Viscosity; Pressure	Pressure measurement (Demo)
3	Forces on submerged planes; Buoyancy and Stability	Viscosity
4	Pipe flow; Bernoulli's Equation; General Energy Equation	Buoyancy and Stability
5	Reynolds Number; Pipe friction; Velocity profiles	Bernoulli's equation
6	Mid-term review	Laminar and Turbulent flow
7	Mid-term exam; Minor losses	No lab
8	Series pipe flow	Tutorial – Series pipe flow
9	Series pipe flow; Parallel pipe flow	Tutorial – Series and Parallel pipe flow
10	Parallel pipe flow	Series and Parallel pipe flow (Demo)
11	Open channel flow	Tutorial – Open channel flow
12	Flow measurement; Pumps and turbines	Hydraulic jump (Week 1)
13	Forces due to fluids in motion; Lift and Drag	Hydraulic jump (Week 2)
14	Review for final exam; Pipe materials and Standards	Weirs
15	Exam Week (Final exam)	

7 Basis of Student Assessment

Component	*Weighting %*	*Comments*
Assignments	15	Assignments, submitted individually, unless otherwise noted.
Labs	10	Group lab technical memorandums.
Mid-term exam	30	Open book, 2-hr duration. Held in Week 7.
Final exam	40	Open book, 3-hr duration. Held during exam week.
Other	5	Instructor assessment based upon attendance, cooperation, participation, not submitting plagiarized work, etc.
TOTAL	100	

8 Recommended Materials to Assist Students to Succeed Throughout the Course

a) Texts – *Applied Fluid Mechanics*, 7/E Robert L. Mott, Joseph A. Untener, 2015, Pearson, ISBN-10: 0132558920 ISBN-13: 9780132558921
b) Other – Course handouts and references posted to the course web site.

9 College Supports, Services and Policies

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies
Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

10 Grading System

☒ *Standard Grading System (GPA)*
☐ *Competency Based Grading System*

See Camosun Grading Policy E-1.5

11 Class Policies

- 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 solutions are posted are worth 0.
- You must complete all assignments and labs prior to the final exam to be permitted to write the final exam
- You must pass the final 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.