CAMOSUN COLLEGE
School of Trades and Technology
Mechanical Engineering

ENGR 292 Fluids and Thermodynamics
Winter 2018

COURSE OUTLINE

The calendar description is available on the web @ http://camosun.ca/learn/calendar/current/web/engr.html

Ω *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

(a) Instructor	Scott Li			
(b) Office hours	Open Door, by appointments			
(c) Location	TEC 261			
(d) Phone	250-370-4459	**Alternative:**	N/A	
(e) E-mail	scott.li@camosun.bc.ca			
(f) Website	This course is fully supported by D2L ©			

2. Intended Learning Outcomes

(If any changes are made to this part, then the Approved Course Description must also be changed and sent through the approval process.)
Upon successful completion of this course a student will be able to:
Fluid Mechanics:

- *Calculate how pressure varies with depth in a stationary fluid.*
- *Calculate force and moment due to pressure on a submerged surface.*
- *Describe buoyant force and apply it for submerged and floating bodies.*
- *Explain why and when control volume analysis is used in fluids and thermodynamics.*
- *Identify an appropriate control volume.*
- *Apply control volume analysis of mass and momentum conservation to solve problems in steady and unsteady fluid mechanics and thermodynamics.*
- *Apply Bernoulli's equation.*
- *Explain the physical significance of each of the terms in the Navier-Stokes equations.*
- *Determine the non-dimensional parameters for a problem from a list of relevant dimensional parameters.*
- *Apply scaling to predict full-scale behavior from experimental data on a model.*
- *Describe the fundamental differences between laminar and turbulent flow.*
- *Use the Moody diagram to determine pressure loss in a fully-developed pipe flow.*
- *Account for minor losses in a pipe system.*
- *Determine a system curve for a pipe system.*
- *Use a pipe system curve and pump performance data to predict performance and select an appropriate pump.*

Thermodynamics:

- *Define a thermodynamic system and its boundary interactions.*
- *Apply the First Law of Thermodynamics to both 'closed' and 'open' systems.*
- *Describe the implications of the Second Law of Thermodynamics and entropy generation.*
- *Calculate entropy change for 'open' and 'closed' systems.*
- *Perform a cycle analysis for ideal power generation and refrigeration cycles.*

3. Required Materials

(a) Texts
None required.

(b) Other:
Class notes

(c) Reference Books:

- Applied Fluid Mechanics by Mott, 7th Ed., Pearson
- Introduction to Thermodynamics and Heat Transfer by Yunus A. Cengel, 2nd Ed., McGraw-Hill
- Fundamentals of Thermal-Fluid Sciences, By Yunus A. C. etc., 5th Ed., McGraw-Hill

4. Course Content and Schedule

(Can include: Class hours, Lab hours, Out of Class Requirements and/or Dates for quizzes, exams, lecture, labs, seminars, practicums, etc.)

Credits:	3
Class hours:	3.5 hours lecture (per week)
Lab hours:	0
Out-of-class workload:	3.5 hours (per week)
Prerequisites:	MATH 250A
Co-requisites:	MATH 250B, MATH 252 and PHYS 295

This course is open only to students in Engineering Bridge programs to UBC.

5. Basis of Student Assessment (Weighting)

(Should be directly linked to learning outcomes.)

(a) Assignments

30%

(b) Midterm

30%

(c) Final Exam

40%

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)
(Mark with "X" in box below to show appropriate approved grading system – see last page of this template.)

[X] Standard Grading System (GPA)

[ ] Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

8. 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.

A. GRADING SYSTEMS

http://camosun.ca/about/policies/index.html

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6

73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at http://camosun.ca/about/policies/index.html for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	*Compulsory Withdrawal*: A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.