



CAMOSUN COLLEGE
School of Trades & Technology
Department Mechanical Engineering

MENG-264
Thermodynamics
W2018

COURSE OUTLINE

The calendar description is available on the web @
<http://camosun.ca/learn/school/trades-technology/technology-programs.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	Ghasem Sam Behfarshad
(b) Office hours	Mon. 11:30am -12:20pm, Thur. 11:30-12:20pm, Rm: TEC-264
(c) Location	Interurban Campus
(d) Phone	250-370-4445 Alternative: _____
(e) E-mail	behfarshadg@camosun.bc.ca

2. Intended Learning Outcomes

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

1. Understand and correctly use thermodynamic terminology.
2. Define the concepts of heat, work, and energy.
3. Explain fundamental thermodynamic properties.
4. Develop the General Energy Equation.
5. Derive and discuss the first law of thermodynamics.
6. Understand the properties and relationships of thermodynamic fluids.
7. Analyze basic thermodynamic cycles.
8. Develop and discuss the second law of thermodynamics.

3. Required Materials

Textbook: Fundamentals of Thermal-Fluid Sciences, 5th Edition
by Yunus A. Cengel,, McGraw Hill, 2016

4. Course Content and Schedule

- Introduction and overview of thermal sciences, dimensions and units,
- Basic concepts of thermodynamics, systems and control volumes, properties of a system, density and specific volume, state and equilibrium, processes and cycles, pressure and pressure measurement devices
- Energy transfer and general energy analysis, forms of energy, energy transfer by heat and work, mechanical forms of work, the first law of thermodynamics
- Properties of pure substances, phase and phase change process of pure substances, property diagrams, property tables, ideal gas relations, compressibility factor
- Energy analysis of closed system, moving boundary work, energy balance for closed system, internal energy, enthalpy, specific heats of ideal gases and liquids
- Mass and energy analysis of control volume, conservation of mass, flow work, energy of a flowing fluid, energy analysis of steady flow
- Second law of Thermodynamics, thermal energy reservoirs, heat engines, reversible and irreversible processes, Carnot cycle
- Entropy, increase of entropy principle, isentropic processes, entropy change of liquids, solids and ideal gases, reversible steady flow work, isentropic efficiencies of steady flow devices
- Power and refrigeration cycles, basic consideration in power cycles, reciprocating engines, Otto, Diesel, Brayton, and Rankine cycles, refrigerators and heat pumps

Course Schedule and Office Hours:

Groups X01A, X01B:

Lectures :

Mon- 8:30-9:20 am, Rm TEC-175

Thur- 3:30– 5:20pm, Rm TEC-175

Lab/Tutorials:

X01A: Tue - 8:30-10:20am, Rm- CBA 217

X01B: Tue - 10:30am-12:20pm, Rm- TEC 110

More Office Hours: Thur. 2:30-3:20pm, Rm: TEC-264

Groups X02A, X02B:

Lectures :

Tue- 3:30 - 4:20pm, Rm CBA-117

Thur- 9:30 – 11:20am, Rm TEC-175

Lab/Tutorials:

X02A: Mon - 3:30 - 5:20pm Rm- TEC 110

X02B: Mon - 09:30-11:20am Rm- CBA 106

More Office Hours: Mon. 2:30 -3:20pm, Rm: TEC-264

Mid-term exam: Thursday Feb 22nd (week 7)

5. Basis of Student Assessment (Weighting)

- | | |
|-------------------|-----|
| (a) Lab reports | 10% |
| (b) Quizzes | 15% |
| (c) Mid-term Exam | 35% |
| (d) Final Exam | 40% |

Note: The final exam must be successfully completed (mark \geq 50%) for a passing grade in the course.

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.)

Standard Grading System (GPA)

Competency Based Grading System

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

Lecture notes, textbook and solving problems at the end of each chapters.

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://www.camosun.bc.ca/policies/policies.php>

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://www.camosun.bc.ca/policies/E-1.5.pdf> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> 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	<i>In progress:</i> 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	<i>Compulsory Withdrawal:</i> 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.