COURSE OUTLINE
FALL 2018

	Date	Initials
Prepared by Instructor	5-Sep-18	KJ
Approved by Head	6-Sep-18	AM

1. Calendar Information

ENGG 311
Engineering Thermodynamics

Energy, thermodynamic systems, properties and state, temperature and the zeroth law, equilibrium, properties of the pure substance, equations of state. Work, reversibility, heat, first law, specific heats, enthalpy, ideal gas, flow systems. Entropy and the second law, Carnot cycle, thermodynamic temperature scale, process efficiencies, cycles, calculation of entropy change, exergy analysis.

Course Hours: 3 units; H(3-1.5T-3/2)
Academic Credit: 3
Calendar Reference: http://www.ucalgary.ca/pubs/calendar/current/engineering.html#10165

2. Learning Outcomes

At the end of this course, you will be able to:

1. Determine the state of a pure substance and the corresponding thermodynamic properties: specific volume, internal energy, enthalpy, entropy and specific heat capacity.
2. Apply the first law of thermodynamics to perform an energy balance on open or closed systems relating the change in energy to the amount of work and heat, using thermodynamic properties.
3. Apply the second law of thermodynamics to perform an entropy balance on open or closed systems to determine the loss of useful energy when an energy transfer occurs and the operational limits of heat engines and refrigeration cycles.
4. Use the first and second laws to compute the performance of unit operations such as pumps, compressors, turbines, pistons, and throttle valves.
5. Build a Stirling Engine. Calculate heat transfer, work and efficiency for a functioning Stirling engine.

3. Timetable

Section	Day(s) of the Week	Time	Location
LEC 01	MWF	11:00-11:50	CHC 105
TUT T01	M	17:00-18:15	ENG 024
LEC 02	MWF	11:00-11:50	SB 144
TUT T02	M	15:30-16:45	ENG 124
LAB B02	W	12:00-14:50	ENG 024
LAB B04	R	14:00-16:50	ENG 024
LAB B99	TBA	TBA	

4. Course Instructors

Course Coordinator

Section	First Name	Family Name	Phone	Office	Email
L01	Kim	Johnston	403-220-5230	ENB 204K	johnstka@ucalgary.ca
L02	Robert Gordon	Moore	403-220-7217	CCIT 106	moore@ucalgary.ca

Other Instructors

Section	First Name	Family Name	Phone	Office	Email

Teaching Assistants

Section	First Name	Family Name	Phone	Office	Email

5. Examinations

The following examinations will be held in this course:

• Midterm: 90 min, Monday, Oct 22 from 5 - 6:30 location to be announced in class (closed book, closed notes. Students are permitted to bring Steam Tables and one 8x10 formula sheet).
• Final: 3 h, to be scheduled by the registrar (closed book, closed notes. Students are permitted to bring Steam Tables and one 8x10 formula sheet).
• In-class quizzes (closed book, closed notes. Students are permitted to bring Steam Tables and one 8x10 formula sheet): There will be four quizzes to be held at the tutorials. See tentative schedule for details.

There will be NO deferred quizzes or midterms. Students who have an excused absence (you must contact the instructor several weeks in advance regarding a conflict, or provide a doctor's note) for a quiz or midterm will have the final grade reweighted accordingly. Please fill out the "Absence from coursework" form on D2L and send to Course Instructor

Note: The timetable for Registrar Scheduled exams can be found at the University's Enrolment Services website, http://www.ucalgary.ca/registrar/.

6. Use of Calculators in Examinations

A Shulich School of Engineering approved calculator (Casio 260 fx Solar, Casio 300 MS or TI30XIIS) may be used during examinations.

7. Final Grade Determination

The final grade in this course will be based on the following components:

Component	Learning Outcome(s) Evaluated	Weight
Laboratory	5,6	20%
Quizzes	1-5	10%
Midterm Examination	1-5	25%
Final Examination	1-4	45%

Total:	100%

Notes:
a) It is not necessary to earn a passing grade on the final exam in order to pass the course as a whole.

b) Conversion from a score out of 100 to a letter grade will be done using the conversion chart shown below. This grading scale can only be changed during the term if the grades will not be lowered.

Letter Grade	Total Mark (T)
A+	$T \geq 97.0\%$
A	$92.0\% \leq T < 97.0\%$
A-	$87.0\% \leq T < 92.0\%$
B+	$82.0\% \leq T < 87.0\%$
B	$77.0\% \leq T < 82.0\%$
B-	$72.0\% \leq T < 77.0\%$
C+	$68.0\% \leq T < 72.0\%$
C	$65.0\% \leq T < 68.0\%$
C-	$62.0\% \leq T < 65.0\%$
D+	$57.0\% \leq T < 62.0\%$
D	$50.0\% \leq T < 57.0\%$
F	$T < 50.0\%$

8. Textbook

The following textbook(s) is required for this course: (digital copy is aavailable)

Title	Fundamentals of Engineering Thermodynamics
Author(s)	Moran, Shapiro, Boettner, Bailey
Edition, Year	Ninth Edition in SI Units, 2018
Publisher	John Wiley & Sons, Inc.

Title	Engineering Thermodynamics Steam Tables
Author(s)	Moran

Edition, Year	
Publisher	Wiley Custom Learning solutions

The following textbook(s) is recommended for this course:

Title	
Author(s)	
Edition, Year	
Publisher	

9. Course Policies

Advising Syllabus

All Schulich School of Engineering students and instructors have a responsibility to familiarize themselves with the policies described in the Schulich School of Engineering Advising Syllabus available at:

http://schulich.ucalgary.ca/undergraduate/advising

Emergency Evacuation/Assembly Points

In the event of an alarm sounding, all classrooms and labs must be evacuated immediately. Please respond to alarms promptly by leaving the building by the closest available exit. Faculty and students must remain outside the building until the 'all clear' has been given by a Fire Marshall. In case of emergency, call 220-5333.

Assembly Points have been identified across campus. These areas have been selected as they are large enough to hold a significant number of people and will provide an evacuated population access to washroom facilities and protection from the elements. More information on assembly points can be found at

http://www.ucalgary.ca/emergencyplan/assemblypoints.

WELLNESS AND MENTAL HEALTH RESOURCES

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, https://www.ucalgary.ca/wellnesscentre/services/mental-health-services) and the Campus Mental Health Strategy website (http://www.ucalgary.ca/mentalhealth/).

10. Additional Course Information