CAMOSUN COLLEGE
MECHANICAL ENGINEERING DEPARTMENT
COURSE OUTLINE

Calendar Description

MECH 262 Thermodynamics 2

This Course will investigate combustion analysis as applied to heat engines and the Brayton-Rankine cycles utilizing open and closed feedwater heaters. The three modes of heat transfer: conduction, Convection, and radiation as applied to heat exchange systems will also be examined.

OFFERED:	3rd Academic Quarter
CREDIT:	4
IN-CLASS WORKLOAD:	5 hours lecture, 2 hours lab
OUT-OF-CLASS WORKLOAD	7 hours
PREREQUISITES	MECH 261

OBJECTIVES

To successfully complete this course a leaner is expected to:

1. Analyze a complete non-ideal Brayton-Rankine cycle.
2. Perform various forms of Entropy Analysis on a variety of thermodynamic systems and establish what the operating limits are and establish if a proposed thermodynamic system is even possible.
3. Perform analysis on insulated and un-insulated systems and establish: the overall thermal resistance of the heat transfer barriers, the rate of heat transfer, and the rate at which the system changes temperature. Examples will include external and internal flow in pipes, finned cooling in electronics, partially buried tanks, and many other specific situations.
4. Analyze the combustion of a wide variety of solid, liquid and gaseous fuels in air, establish the energy released during combustion, and determine the mass of each of the combustion products.
5. Take part in a variety of laboratory experiments and guided tutorial sessions.

OUTLINE

1. Rankine Cycle and real two-phase processes.
    a. Simple ideal Rankine cycle
    b. Rankine cycles with various forms of reheat, open and closed feedwater heaters, multi-stage turbines.
    c. Non-ideal Rankine cycle: isentropic efficiencies, component heat and pressure losses.
    d. Brayton-Rankine System analysis.
2. Entropy Analysis: the second law of thermodynamics and placing limits on processes (entropy production, open and closed systems).
3. Heat Transfer.
    a. Introduction: Heat transfer at an atomic scale.
    b. Conductive heat transfer: Materials, establish overall thermal resistance.
    c. Convective heat transfer: forced and natural convection, fin cooling, enhancing heat transfer.
    d. Introduction to radiant heat transfer.
4. Combustion.
    a. Balancing a combustion equation.
    b. Establish the ideal amount of oxygen.
    c. Combustion products.
    d. Energy generated.
    e. Environmental implications.

Instructor:
Will Spaulding, P.Eng., spaulding@camosun.bc.ca, http://fireflylabs.com/disted

Department of Mechanical Engineering Technology

Student Evaluation System

COURSE:	Thermodynamics II	ACADEMIC TERM:	Quarter 3
COURSE #:	Mech 262	SECTION #:	
INSTRUCTOR:	Will Spaulding	YEAR:	2012

COMPONENTS			COMMENTS
Assignments	10	%	
Quizzes		%	
Labs	20	%	
Projects/Labs		%	
Report(s)		%	
Instr. Assessment		%	
Midterm Exam(s)	30	%	
Final Exam	40	%	
Other		%	
TOTAL	100	%	

- A weighted average of 50% must be attained on tests/examinations and a 50% must be attained on the final examination, otherwise an F will be awarded.
- All labwork/assignments must be submitted prior to the student sitting the final examination. Late assignments will have marks deducted; if handed in after assignments have been returned to the class, no mark will be given - but all assignments must be submitted in order to qualify to write the final exam.
- Full attendance at Labs is mandatory.

GRADING SYSTEM

A+	90 – 100%	B-	70 - 72%
A	85 - 89%	C+	65 - 69%
A-	80 - 84%	C	60 - 64%
B+	77 - 79%	D	50 - 59%
B	73 - 76%	F	< 50%

COMMENTS:

An assignment or project is late if it is submitted after the assignments/projects have been returned to the class. Late assignments/projects will not receive a grade. Submit assignments and projects on time!

SIGNATURE: **DATE:** 2 April 2012