



POLYTECHNIC INSTITUTION

School of: Manufacturing Electronics and Industrial Processes
Program: Mechanical Engineering Technology
Option: First Year Core

MECH 1120
Energy Systems

Start Date:	September 2006	End Date:	December 2006
Total Hours:	45	Total Weeks:	15
Hours/Week:	3	Term/Level:	1
Lecture:	2	Course Credits:	3.0
Lab:	1	Shop:	
		Seminar:	
		Other:	

Prerequisites:

Course No.	Course Name
	None

MECH 1120 is a prerequisite for:

Course No.	Course Name
MECH 3320	Thermal Engineering
MECH 3325	Fluid Mechanics

■ Course Description

This course covers basic thermal and fluid systems, processes and cycles. Topics covered include: pumps, compressors, engines, heaters, and coolers, energy transfer, fluid flow and the conversion of energy.

Evaluation

Assignments	10 %	Comments: Exams are closed book. A formula sheet will be provided by the instructor and students are permitted to bring in a Sharp EL520 Calculator to the exam. No other books, notes or aids will be permitted into the examination.
Quizzes	5 %	
Midterm Examination #1	17.5 %	
Midterm Examination #2	17.5 %	
Final Exam	50 %	
TOTAL	100 %	

■ Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

- Calculate dimensions and units, work, power and energy and basic fluid properties.
- Understand basics of fluid in motion, continuity equation, steady flow energy equation.
- Apply the Bernoulli equation for fluid processes.
- Apply Ideal Gas laws and the First law of thermodynamics.
- Understand heat engine and compression cycles, refrigeration and heat pump cycles, and basic system equipment.
- Solve basic problems in both fluid and thermal systems.
- Apply principles of energy systems to mechanical engineering applications.

■ Verification

I verify that the content of this course outline is current.



Authoring Instructor

August 30, 2006

Date

I verify that this course outline has been reviewed.



Program Head/Chief Instructor

AUGUST 30, 2006

Date

I verify that this course outline complies with BCIT policy.



Dean/Associate Dean

2006/09/01

Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

Instructors:

Taco Niet	Office Location:	SW9-205	Office Phone:	604-456-8032
	Office Hours:	As posted	e-Mail Address:	tniet@my.bcit.ca
Henk Rienks	Office Location:	SW9-205	Office Phone:	604-432-8854
	Office Hours:	By Appointment	e-Mail Address:	hrienks1@my.bcit.ca

■ Learning Resources

Required:

Cheung, J. and Rienks, H. MECH 1120 – Energy Systems Lecture Notes.

Recommended:

Fluid dynamics and thermodynamics textbooks (check out the BCIT library)

■ Information for Students

Note: Please refer to BCIT policy number 5002, Student Regulations Policy, for additional information. Policies are available at <http://www.bcit.ca/about/administration/policies.shtml>.

Ethics: BCIT assumes that all students attending the institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam or project for all parties involved and/or expulsion from the course.

Assignments: Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor. Late assignments, lab reports or projects will NOT be accepted without documented medical reasons or extenuating circumstances.

Assignment Drop Box: The instructors drop box for assignments and labs is located under the stairs in the lobby of building SW9. Students are responsible for ensuring labs and assignments are submitted to the correct box and on time.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Attendance: The attendance policy as outlined in BCIT Policy 5002 will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: If you miss an evaluation such as an assignment, quiz, exam, or project, or you miss 3 or more consecutive days of class, you must provide the department with a BCIT Student Medical Certificate (available at <http://www.bcit.ca/admission/downloads.shtml>). You may be asked to complete the work that you missed or the course evaluation may be adjusted to reflect the missed component(s).

Attempts: Students must successfully complete a course within a maximum of three attempts. Students with two attempts in a single course must get written permission from the Associate Dean to attempt the course for the third time. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the program.

Advancement: Students who fail three or more courses in a term cannot advance to the next term and may be asked to discontinue from the program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

Schedule

Week of/ Number	Outcome/Material Covered	Reference/ Reading	Assignment
Week 1	Introduction - Course outline Units and Dimensions (S.I. and US equivalents)	Module 1	
Week 2	Basic Fluid Mechanics, Gauge Pressure and Absolute Pressure	Module 2	Unit and Conversion
Week 3	Work, Power & Energy	Module 3	Pressure
Week 4	Fluids in Motion	Module 4	Work, Power and Energy
Week 5	Steady Flow Energy Equation, Midterm Review	Module 5	
Week 6	MIDTERM EXAMINATION #1 Application of Bernoulli's Equation	Module 6	Continuity Equation
Week 7	Application of Bernoulli's Equation (con't)	Module 6	Pitot-Tube Experiment
Week 8	Ideal Gas Laws	Module 7	Bernoulli's Equation
Week 9	Basic Thermodynamics, Midterm Review	Module 8	
Week 10	MIDTERM EXAMINATION #2 Applications of the First Law of Thermodynamics	Module 9	Ideal Gas Laws
Week 11	Applications of the First Law of Thermodynamics (con't)	Module 9	Basic Thermodynamics
Week 12	Thermodynamic Cycles	Module 10	Thermodynamic Cycles
Week 13	Refrigeration and Heat Pumps	Module 10	Refrigeration and Heat Pumps
Week 14	Review for final Examination		
Week 15	FINAL EXAM		