UNIVERSITY COLLEGE OF THE FRASER VALLEY
COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Physics IMPLEMENTATION DATE: Fall 1992

Revised: June 1993

Physics 231 Thermodynamics 4
SUBJECT/NUMBER OF COURSE DESCRIPTIVE TITLE UCFV CREDITS

CALENDAR DESCRIPTION: This course is designed for students who wish to pursue a career in engineering or physical science. This is an introductory course designed to study the fundamentals of heat, energy, and thermodynamics. Topics include temperature, heat, the first and second law of thermodynamics, phase change, and the kinetic theory of gases. To ensure a comprehensive treatment of the above topics, the course will be presented using lectures, tutorials and computer simulations.

RATIONALE:

COURSE PREREQUISITES: Physics 111; Math 111

PRE- OR CO-REQUISITES: Mathematics 112

HOURS PER TERM Lecture 60 hrs Student Directed
FOR EACH Laboratory hrs Learning hrs
STUDENT Seminar hrs Other - specify: hrs
Field Experience hrs
TOTAL 60 HRS

MAXIMUM ENROLMENT: 24

Is transfer credit requested? : Yes 9 No

AUTHORIZATION SIGNATURES:

Course Designer(s): G. McGuire Chairperson: T. Cooper
Department Head: T. Cooper Dean: K. Wayne Welsh

PAC: Approval in Principle PAC: Final Approval: December 13, 2000
(Date) (Date)
SYNONYMOUS COURSES:

(a) replaces ______ N/A ________ (course #)

(b) cannot take ______ N/A ________ for further credit (course #)

SUPPLIES/MATERIALS:

TEXTBOOKS, REFERENCES, MATERIALS  (List reading resources elsewhere)

TEXTBOOKS:

TBA

REFERENCES:


OBJECTIVES:

This course will attempt to broaden, and to deepen the students' present knowledge of thermodynamics. The emphasis will be on applications and problem solving, as this course is designed for students who plan to continue their studies in the applied sciences. After finishing this course, the students should be able to:

1. demonstrate their understanding of thermodynamics by solving appropriate problems;
2. make actual measurements of the quantities discussed in class;
3. appreciate the uses of thermodynamics
4. continue their studies in the applied sciences by successfully taking advanced courses in these fields;
5. understand the importance and beauty of science to all of mankind.
METHODS:
This course will be presented using lectures, tutorials, demonstrations, directed study, computer assisted learning, and appropriate audio-visual aids. Problems will be assigned and marked weekly. Problem solving will emphasize the use of calculus methods and computers (numerical techniques).

STUDENT EVALUATION PROCEDURE:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>20%</th>
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<tbody>
<tr>
<td>Mid-term</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>50%</td>
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COURSE CONTENT

1. Temperature: measuring, temp. and internal energy, temperature scales, thermal expansion
2. Heat and the First Law of Thermodynamics: measuring heat capacity, specific heats, absorption and transfer of heat, the First Law of Thermodynamics
3. Kinetic Theory of Gases: an ideal gas, Avogadro's constant, pressure and temperature, kinetic energy, equipartition of energy
4. Second Law of Thermodynamics: engines, ideal engines, the Carnot Cycle, efficiencies, entropy
5. Statistical Thermodynamics: probability distributions, Maxwell-Boltzmann law