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 og 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 FOR EACH STUDENT	**Lecture**	**60**	**hrs**	**Student Directed Learning**		**hrs**
	Laboratory		**hrs**	**Other - specify:**		
	Seminar		**hrs**			**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

Curriculum Committee

Department Head: T. Cooper **Dean**: K. Wayne Welsh

PAC: Approval in Principle _____ **PAC: Final Approval**: December 13, 2000

(Date) **(Date)**

Physics 231
NAME & NUMBER OF COURSE

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:

1. R Serway, Physics for Scientists and Engineers, 2nd Ed., Hold Rinehart Winston, 1986.
2. Ohanian, Physics, W.W. Norton & Company, 1985.
3. Crawford, Waves, (Berkeley Physics Course - Volume 3), McGraw-Hill, 1968.
4. Hecht/Zajac, Optics, Addison Wesley, 1974.
5. Huang, Engineering Thermodynamics, 2nd Ed., Macmillan, 1988.

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.

Physics 231
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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:

Assignments	20%
Mid-term	30%
Final Exam	50%

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-Bottzmann law