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SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE MARIE, ONT

COURSE OUTLINE

COURSE TITLE: introduction to Thermodynamics_____

CODE NO.: Men 130_____ SEMESTER: three

PROGRAM: Mechanical Technology_____

AUTHOR: Rowling Cheng_____

DATE: June 12_r 1990_____ PREVIOUS OUTLINE DATED: Sept. 1989

APPROVED: _____

L.P. Chazotte
DEAN

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DATE

Intro. Therm. Mch 130
 COURSE NAME CODE NO.

TOTAL CREDIT HOURS three_____

PREREQUISITES) : none

I. PHILOSOPHY/GOALS:

The student will study the fundamental concepts of heat, physics and thermodynamics through lectures, problems and labs. This will provide the prerequisite knowledge base required for subsequent courses in Thermodynamics offered in the Mechanical Technology program.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course, the student will be able to perform the objectives given for the nine topics listed below:

TOPIC 1 : BASIO CONCEPTS

At the end of this topic, the student will be able to:

1. state the three fundamental units.
2. give the English and si units for mass, length and time.
3. define weight, mass, volume, density and pressure.
4. calculate weights, masses, volumes, densities and pressures.

TOPIC 2 s CONCEPTS OF HEAT , TEMPERATURE
AND INTERNAL ENERGY

SPECIFIC OBJECTIVES:

At the end of this topic, the student will be able to:

1. provide a brief description of what is thermodynamics.
2. define heat, temperature and internal energy and to distinguish between them.

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3. sketch the four temperature scales (Celcius, Kelvin, Fahrenheit and Rankine) and to be able to convert from one to the other.

4. state several scientific means for temperature measurement.

TOPIC 3 s CONCEPTS OF ENERGY, WORK AJSTD POWER

At the end of this topic, the student will be able to:

1. define energy, work and power.
2. state the several units for energy measurement and to be able to convert from BTU's to ft-lbs and from Calories to kJ.
3. calculate potential energy and kinetic energy.
4. calculate the work done.
5. solve work, energy and power problems.

TOPIC At CALORIMETRY

At the end of this topic, the student will be able to:

1. define the specific heat of solids and liquids.
2. state the units of specific heat in English and SI systems.
3. state the heat gained = - heat lost principle.
4. solve heat balance problems using tables for specific heat and the heat gained = - heat lost principle.

TOPIC 5 z CHANGES OF PHASE

At the end of this topic, the student will be able to:

1. list and define seven changes of phase (state).
2. state the heat values associated with the above changes of phase for water in the English and SI systems.

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3. solve heat balance problems involving changes of phase.

TOPIC 6: THERMAL EXPANSION

At the end of this topic, the student will be able to:

1. briefly describe the effect of heat on solids.
2. state the equation for thermal expansion of solids.
3. solve problems for thermal expansion of solids.
4. describe the effect of heat on liquids.
5. state the equation for thermal expansion of liquids.
6. solve problems for thermal expansion of liquids.

TOPIC 7: GAS LAWS

At the end of this topic, the student will be able to:

1. state the kinetic molecular theory of matter.
2. describe heat and temperature in the context of the kinetic molecular theory.
3. state the ideal gas law.
4. solve problems involving the ideal gas law.

TOPIC 8: HEAT TRANSFER

1. describe the three modes of heat transfer: conduction, convection and radiation.
2. state Fourier's Law of Conduction.
3. state Newton's Law of Cooling.
4. solve problems involving the above.

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TOPIC 9 z HEAT ENGINES

1. sketch a schematic of a heat engine.
2. define a working substance.
3. give examples of common heat engines and sketch their working cycles.

III. TOPICS TO BE COVERED:

The nine topics listed above.

VI. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

Students must attend all classes and complete all homework that is assigned. Punctuality, good behavior and respect is mandatory in the labs and in the classroom.

Three tests will be conducted during the semester. The tests will be done one week after the completion of topics #s, #6 and #9. Each test is worth 25%.

In addition , the performance of labs will be observed and evaluated. Also, unannounced quizzes will be given to encourage homework completion and attendance. No marks will be awarded for missed quizzes under any circumstances. Quizzes and labs make up 25 % of your total mark.

The following list indicates the relationship between numerical mark and the letter grades:

A+	90 - 100
A	80 - 89
B	70 - 79
C	60 - 69
R	less than 59

One complete course re-write will be given to those students who attained greater than 50%, have attended classes regularly and completed all assignments.

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V. REQUIRED STUDENT RESOURCES:

Teacher's Notes on Mchl30
Sault College A/V
Campus Book Store