SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE. ON

CX3URSE OUTLINE

COURSE TITLE: PHYSICS

CODE NO.: PHY100-4 **SEMESTER: ONE**

PROGRAMS WATER RESOURCES, ENVIRONMENTAL, PULP & PAPER, CIVIL and CONSTRUCTION TECHNICIAN/TECHNOLOGIES

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DATE: SEPTEMBER, 1998 **PREVIOUS OUTLINE: NONE**

APPROVED: ^ *iQj^f A...\jy* *(l^J.* *^9/9^*
KITtV DEROSARIO, DEAN */^* **DATE "**
SCHOOL OF TECHNOLOGY & **^**
TRADES

TOTAL CREDITS: 3

PREREQUISrrE(S): NONE

LENGTH OF COURSE: 4 HOURS/WEEK FOR 16 WEEKS. TOTAL CREDIT HOURS: 48

I. COURSE DESCRIPTION: This course introduces the student to a number of fundamental concepts of physics which should prove useful to students in the Civii, Water Resources. Environmental and Pulp & Paper Engineering programs. Topics to be covered include; units of measurement, vectors, forces, accelerated motion, work, energy and power, momentum, properties of solids, liquids and gases, fluid statics and dynamics, temperature, heat and heat transfer, thermal expansion and contraction, and the gas laws and thermodynamics.

The assumption is that many of the students will be seeing these concepts for the first time. Because of the number of topics and the potential for difficulties in some of the more complicated areas, the emphasis will be placed on *introducing* the student to the *concepts* **rather than** a *rigorous matt)ematical analysis* of the topics.

iI. LEARNING **OUTCOMES AND ELEMENTS** OF PERFORMANCE:
(Generic Skills Learning Outcomes placement on the course outline will be determined at a later date)

A. Learning Outcomes:

1) Write definitions for the concepts introduced, preferably in the students own words.

2) Answer questions requiring a knowledge of the concepts presented in class.

3) Respond to questions requiring extrapolation of the course content

4) Solve mathematical based problems requiring an understanding of the course theory.

5) Apply the knowledge learned in this course to other courses which are **'physics based'.**

B. Topics To Be Covered: **Approximate Time Frames (Optional)**

I) Units of Measurement

II) Motion

III) Force and Acceleration

IV) Momentum

V) Vectors and Trigonometry

VI) Work, Energy and Power

VII) Properties of Solids, Uquids and Gases

VIII) Fluid Statics and Dynamics

IX) Temperature and Heat

X) Thermal Expansion and Contraction

XI) The Gas Laws

C. Learning Outcomes and Elements of the Perfonnance:

Upon successful completion of this course the student will demonstrate the ability to:

n UNITS OF MEASUREMENT

a) three systems of units

1) List the three most commonly used systems of units in use in science and engineering.

b) 'base' quantities and 'base' units

1) Define **base'* quantity and list the 7 base quantities.

2) List the 3 "most common" base quantities.

3) State the units and the proper abbreviations for each of the 3 most common base quantities in each of the three systems of units of a-1 above.

c) 'derived' quantities and ^derived' units

1) Define 'den'v^'quantities and list at least a dozen examples of denved quantities. For each of these examples write the proper units along with the proper abbreviations in both the S.I. metric system and the Imperial system.

d) S.I, prefixes and their abbreviations

1) List the S.i. metric prefixes along with their proper abbreviations and mathematical meanings in descending order from 'tera' to 'femto'.

2) Set up tables of metric length measurement, area measurement, "dry" volume measurement, fluid" volume measurement, and mass measurement. Each table will illustrate the unit, its abbreviation and meaning for the prefixes from •kilo' to 'milli'.

3) State 2 conversion factors used to convert from "dry" volume measurement to "fluid" volume measurement in the S.I. metric system.

e) conversion of units of measurement

1) Given access to the proper conversion factors convert units of measurement in the S.I. metric, C.G.S. metric and the Imperial systems of measurement. Recall the method of conversion of units that involves multiplying by ratios equal to 1.

f) significant digits and g) 'accuracy' and 'precision'

1) Explain what is meant by an *'exact' number.*

2) Explain what is meant by an *'approximate' number.*

3) Explain what is meant by the term 'accuracy' of a measurement.

4) Explain what is meant by the term *'precision'of* a measurement.

5) Discuss the difference between the two terms 'precision' and 'accuracy and give examples of measurements having various degrees and combinations of accuracy and precision.

6) List the 6 oiles for determining whether a digit in a measurement is *significant* or not.

7) Determine the accuracy and the precision of any given measurement.

8) State the rule used to detemiine the accuracy of the *product* or *quotient* of measurements which are multiplied or divided.

9) State the rule used to determine the precision of the *sum* or *difference* of measurements which are added or subtracted.

h) scientific notatiofi

1) Review the mles used to express numt>ers and measurements given in *'standard' notation* and *'scientific' notation.*

2) Given a number or measurement in 'standard' notation express it in 'scientific' notation.

3) Given a numk>er or measurement in 'sdentific' notation express it in 'standard' notation.

I) the distinction between 'mass' and 'weight*

1) Write a definition for the concept of *'n)ass'.*

2) Write a definitron for the concept of *'weighf.*

3) Identify clearly the distinction between the two quantities *'mass'* and *'weight.*

j) standard gravitational acceleration

1) Explain how the *'acceleration due to gravity* \s dependant upon the size, mass and *'density* of a body in the presence of air resistance and demonstrate how the *terminal velocity'* of a given body may be altered.

2) State the value for the acceleration due to gravity in the absence of air resistance in each of the S.I. metric and the Imperial systems of measurement.

3) Write the equation that relates the *mass* of a body to its *weight.*

4) Write consistent units for the equation I-j-3 above in each of the S.I. metric. C.G.S. metric and Imperial systems of units.

5) Given the mass of a body in either the S.I. metric system or the Imperial system, calculate its weight.

6) Given the weight of a body in either the S.i. metric or the Imperial system, calculate its nrass.

k) unit analysis

1) Write the two conditions an equation must satisfy in order to be *'dimensionall/ correct*

2) Given an equation and the meaning of each of its variables, determine whether or not the equation is *dimensionaify correct.*

3) Read chapter 1 of the reference text.

4) Answer the questions and solve the problems as assigned from chapter 1 of the reference text.

in **MOTION**

a) **vector** and scalar **quantities**

1) Explain what is meant by a *'scalar' quantity.*

2) List at least 10 examples of scalar quantities.

3) Explain what is meant by a *"vector" quantity.*

4) List 6 examples of vector quantities.

5) Write a definition for 'force' incorporating *Newton's first law of motion* to expand upon the definition.

6) Recall that *force* is a vecfor quantity.

7) Write a definition for *'resultant force'.*

8) By means of the *'parallelogram method'of* vector addition, detennine the *resultant of t/i/o* vectors using both a graphical and a mathematical approach.

9) By means of the *'polygon method'* of vector addition, detemiine the *resultant* of two or more vectors.

b) 'distance' **and** 'dispiacemenf

1) Write a definition for the *term 'distance'.*

2) Write a definition for the term *'displacement.*

3) Recall that 'distance' is an example of a *'scalar" quantity vA^We* 'displacement is an example of a *'vector" quantity.*

c) 'speed' and Velocity'

1) Write a definition for the term *'speed'.*

2) Write a definition for the term *'velocity'.*

3) Recall that 'speed' is an example of a *'scalar" quantity v/hWe* 'velocity' is an example of a *'vector" quantiy.*

4) Solve problems that illustrate the distinction between the terms 'distance' and 'displacement' and the terms 'speed' and 'velocit/.

5) Explain what is meant by the temi *'uniform motion'.*

6) Explain what is meant by the term *'non-uniform motion',*

7) Write the equations for *'average speed'* and *'average velocity'.* Illustrate how each may be determined given a *'displacement versus time'cun/e.*

d) acceleration

1) Write a definition for the term *'acceleration'.*

2) For *'uniform acceleration'* indicate how the acceleration may be detennined from a given *'velocity versus time' curve.*

e) equations **for** 'uniformly accelerated motion'

1) List the 4 equations for *'uniformly accelerated motion'.*

2) Solve sample problems dealing with uniformly accelerated motion as Introduced in class.

f) **the 'acceteration due to gravity' - free fair**

1) Explain how the acceleration due to gravity is dependent upon the size, mass and density of a body in the presence of air resistance and demonstrate how the 'terminal velocity' of a given tx>dy may be altered.

2) State the values for the *'acce^ratlon due to gravity'* in the absence of air resistance in each of the S.I. metric, C.G.S. metric and Imperial systems of measure.

3) Read chapter 3 of the reference text.

4) Answer the questions and sove the problems as presented from chapter 3 of the reference text.

III) FORCE AND ACCELERATION

a) Newton's first law of motion - the law of inertia

1) Write a verbal statement of' *Newton's first law of motion'* and demonstrate an understanding of the law by applying it to examples as presented in class.

b) Newton's second law of motion

1) Write a verbal statement of *'Newton's* second *law of motion'.*

2) Write a mathematical statement (an equation) of *'Ne*/ton's second law of motion'.* Indicate the proper units for each of the variables involved in each of the S.I. metric, C.G.S. metric and Imperial systems of measure.

3) Write a mathematical statenr>ent (an equation) of Newton's second law of motion as it pertains to the force known as *'weight'* or more specifically, *We force of gravrt/.*

c) **Newton's third law of motion - the law of *'action'* and *'reaction'***

1) Write a verbal statement of *Newton's third law of motion'* and demonstrate an understanding of the law by applying it to examples as presented in class.

IV> MOMENTUM

1) Write a definition for the concept of *'momentum'*.

2) Write a mathematical staten^nt (an equation) for the concept of *'momentum'* indicating clearly the meaning of each of the terms in the equation.

3) Solve the problems as presented in class dealing with momentum.

4) Read chapter 4 of the reference text.

5) Answer the questions and solve the problems as presented from chapter 4 of the reference text

V) VECTORS AND TRIGONOMETRY

a) Right-Triangle Trigonometry

1) For any right-angled triangle, indicate clearly the meaning of the *'hypotenuse',* and for a given angle in the triangle, the meaning of the *'side adjacent'* and the *'side opposite'.*

2) Write equations for the six trigonometric functions and explain the meanings of these functions making reference to a given angle in a given right-angled triangle.

3) Write a verbal statement for the *'Pythagorean theorem'.*

4) Write a mathematical statement (i.e. an equation) for the *'Pythagorean theorem'.*

b) components of a vector

1) Explain what is meant by a vector being in *'standard positJon'.*

2) Given a vector in any position in any of the four *'quadrants',* resolve the vector into its 'x *and y components'.*

3) By means of the *'method of components'* calculate the *'resultant'* of two or more vector quantities.

4) Read chapter 5 of the reference text.

5) Answer the questions and solve the problems as presented from chapter 5 of the reference text.

Vn WORK. ENERGY AND POWER

a) Work

1) Write a definition for the concept of *"work'.*

2) Recall the equation for *'work'* in its most general form.

b) Energy

1) Write a definition for the concept of *'energ/.*

2) List the proper units of *'work'* and *'energ/* in eac^ of the S.I. metric and Imperial systems of measure.

c) Kinetic Energy

1) Write a definition for the concept of *'kinetic energy^.*

2) Recall the equation for *'kinetic energy,*

d) gravitational potential energy

1) Write a definition for the term *'gravitational potential energy'.*

2) Recall the two equations for *'gravitational potential energy^.*

e) conseryation of energy

1) Write verbal statements for each of the *7*aw *of conservation ofenerg/* and the *'law of conservation of mechanical energy',*

fl power

1) Write a definition for the temn *'power".*

2) Recall two equations for calculating *'power".*

3) List the proper units of power In each of the S.i. metric and Imperial systems of measure.

4) State the relationship between the unit known as the *'horsepower"* and the Imperial unit of power.

5) State the relationship between the unit known as the *'horsepower'* and the *'watt'* and the *'kilowatt'.*

6) Solve example problems as presented in class cteaiing with 'work','kinetic energy', 'gravitational potential energy', the 'law of conservation of mechanical energy' and 'power*

7) Read chapter 7 in the reference text.

8) Answer the questions and solve the problems as assigned from chapter 7.

WW) **PROPERTIES OF SOLIDS. UQUIDS AND GASES**

a) mass density

1) Write a definition for the term *'mass density'.*

2) Write the equation for the term *'mass density".*

3) List the proper units for mass density In each of the S.I. metric, C.G.S. metric and Imperial system of units.

b) **weight densttv**

1) Write the definition for the term *'weigtit densit/.*

2) Write the equation for the term *'weight densit/.*

3) List the proper units for weight density in each of the S.I. metric, C.G.S metric and Imperial system of units.

4) Write the equation that relates mathematically *'mass densit/and "weight densit/,*

c) **specific gravity**

1) Write a definition for the term *'specific gravit/.*

2) Write the equation for the term *'specific gravit/.*

3) List the values for the mass density, the weight density and the specific gravity of pure water at its temperature of maximum density.

d) Properties of Solids

1) List the characteristics of solids that distinguish them from the other states of matter.

2) Explain what is meant by the terms *'adhesion', 'cohesion', 'tensile strength', 'hardne$s\ 'ductility', 'maifeabHit/* and *'elasticit/* - terms which are used to express certain mechanical characteristics of solitds.

e) Properties of Liquids

1) List the characteristics of liquids that distinguish them from the other states of matter.

2) Explain what Is meant by the terms *'cohesion'* and *'adhesion', 'surface tension', 'viscosity'* and *'capillary action'*- tenms which are used to describe certain mechanical characteristics of liquids.

f) Properties of Gases

1) List the characteristics of gases that distinguish them from the other states of matter.

2) Read chapter 11 of the reference text.

3) Answer the questions and solve the problems as assigned from chapter 11 of the reference text.

VIII) FLUID STATICS AND DYNAMICS

a) pressure

1) Write the general equation for the tenm *'pressure'.*

2) List the units used to measure pressure in the S.I. metric and the Imperial system of measurement.

3) Identify the relationships that exist among the various units of pressure measurement including: pounds per square inch, kiiopascals, newtons per square metre, atmospheres, millibars, inches of mercury, centimetres of mercury, millimetres of mercury, feet of water and metres of water.

b) Pressure at a depth in a liquid

1) Write the two equations used to detennine the pressure exerted by a column of liquid of known density and depth beneath the surface.

2) Discuss the relationship that exists, if it exists at all, between the pressure at a given depth in a given liquid and the shape of the containing vessel.

c) Pascal's law

1) Write a verbal statement of Pascal's law and demonstrate an understanding of the law by applying it to examples presented in class.

2) Solve example problems as presented in class involving applications of Pascal's law to hydraulic presses, hydraulic jacks, hydraulic brakes, etc..

d) Archimedes' principle

1) Demonstrate an understanding of the cause of the force of buoy^cy. Do so by developing the relationship that exists between the buoyant force acting on an object, either submerged or floating, and the weight of the displaced liquid.

2) Write a verbal statement of *'Archimedes' principle'* and demonstrate an understanding of the principle by applying it to examples as presented in class.

e) fluid flow

1) Discuss what is meant by the terms *'laminar flow'* and *turbulent 1k>w'.*

2) Write the equations for *'volumetric flow rate', 'mass flow rate'* and *weight flow rate'* and indicate clearly the meaning of each of the terms in each of the equations.

3) Write a verbal statement for *'Bernoulli's prir)ciple' ar\6* discuss several applications of Bernoulli's principle including the automobile carburetor, an aircraft wing and a baseball pitcher's "cun/e ball".

4) Read chapter 12 of the reference text.

5) Answer the questions and solve the problems as assigned from chapter 12 of the reference text.

IX) TEMPERATURE AND HEAT

a) temperature

1) Read the handout titied 'Historical Sketch on the Nature of Heaf.

2) Discuss what is meant by the tenm *thermal energy*,*

3) Write 2 definitions for the concept of *temperature',*

b) temperature scales and c) absolute temperature scales

1) List the four most commonly used temperature scales along with the proper abbreviations for each of the *'units of temperature'on* each scale.

2) On each of the temperature scales above, recall the value of each of the following temperatures: the *'boiling point'* of water, the *freezing point'* of water, and the temperature known as *'absoiute zero*\

3) State the mathematical relationships that exist between (i) the *Celsius* and the Fa/)ren/)e/Memperature scales; (it) the *Celsius* and the *Kelvir)* temperature scales; and (iii) the *Fahrenheit* and the *Rankirje* temperature scales.

4) Explain what is meant by the concept of *'absolute zero'* making reference to the terms *'temperature'and 'thermal energ/in your exp\anaX\on.*

5) Given a temperature on any one of the four temperature scales of learning activity IX-b-1 convert this temperature to an equivalent value on each of the remaining three temperature scales.

d) heat

1) Explain the meaning of the concept of *'heat'.*

2) Distinguish clearly between the concept of *'heat* and the concept of *'temperature'* as defined in learning activity !X-a-3.

e) methods of heat transfer

1) Describe in detail the processes involved with each of the three methods of heat transfer, namely: *'corjduction', 'convection'an6 'radiation'.*

2) List the factors that determine the rate at which heat will flow by conduction through a surface.

3) Write the equation used to calculate the amount of heat transfen^ed by conduction through a surface of given surface area and thickness, subjected to a given temperature difference for a given period of time.

4) Describe what is meant by the term *'R value'* and write the equation that relates the R value to the *thermal conductivity o^* a material.

fl specific heat capacitv

1) Explain the meaning of the temn *'specific heat capacit/.*

2) Write an equation for the term *'specific heat capacity'.*

3) List the units of specific heat capacity in the S.I. metric, C.G.S metric, "old" M.K.S. metric and Imperial systems of measure.

4) Write a definition for the concept of *'sensible heat'.*

5) Write the equation used to determine the *'quantity of sensible heat'.*

6) State the value for the specific heat capacity of water in each of the systems of measure listed in learning activity !X-f-3.

g) changes of state

1) Explain clearly what is meant by a *'change of state'.*

2) Write the proper term for and discuss the processes that occur for each of the following changes of state: from solid to liquid; from liquid to solid; from liquid to gas; from gas to liquid; from solid to gas; from gas to solid.

h) specific latent heat of fusion

1) Explain the meaning of the term *'specific latent heat effusion'*

2) Write an equation for the term *'specific latent heat of fusion'.*

3) List the units of specific latent heat of fusion in the S.I. metric, C.G.S. metric, "old" M.K.S. metric and Imperial systems of measure.

4) State the value of the specific latent heat of fusion for water in each of the systems of measure listed in learning activity IX-h-3 above.

i) specific latent heat of vapourization

1) Explain the meaning of the term *'specific latent heat of vapourization'.*

2) Write an equation for the term *'specific latent heat of vapourization'.*

3) List the units of specific latent heat of vapourization in the S.I. metric, C.G.S metric, "old" M.K.S. metric and Imperial systems of measure.

4) State the value of the specific latent heat of vapourization for water in each of the systems of measure listed in learning activity IX-i-3 above.

i) method of mixtures

1) Explain what is meant by the concept of *'method of mixtures'.*

2) Write the main equation used to solve problems involving the *'method of mixtures'.*

3) Solve *the* example problems as presented in class dealing with *'sensible heat', 'latent heat of fusion', 'latent heat of vapourization'* and *'heat loss/heat gain'.*

X) THERMAL EXPANSION AND CONTRACTION

a) linear expansion of solids

1) List the 3 factors that determine the amount of *'linear expansion'oi* a solid.

2) Explain clearly the meaning of the temfi *'coefficient of linear expansion'.*

3) Write the equation used to determine the amount of linear expansion for a solid subjected to a temperature change.

4) Solve the example problems as presented in class dealing with linear expansion of solids.

b) area expansion of solids

1) List the 3 factors that determine the amount of *'area expansion'* of a solid.

2) Explain clearly the meaning of the term *'coefficient of area expansion'.*

3) Write the equation used to determine the amount of area expansion for a solid subjected to a change in temperature.

4) Discuss the relationship that exists between the *'coefficient of area expansion'for* a solid and the corresponding *'coeffident of linear expansion'.*

5) Solve the example problems as presented in class dealing with area expansion of solids.

c) volume expansion of solids

1) List the 3 factors that determine the amount of *'volume expansion'of* a solid.

2) Explain clearly the meaning of the term *'coefficient of volume expansion'.*

3) Discuss the relationship that exists between the *'coefficient of volume expansion'* for a solid and the corresponding *'coefficient of linear expansion'.*

4) Write the equation used to determine the amount of volume expansion for a solid subjected to a change in temperature.

5} Solve tie *exampke* probiems as presented in class dealing with volume expansion of solids.

d) volume expansion of liquids

1) Indicate how one would detennine or where one would find the *'coefficients of volume expansion'for* liquids.

2) Discuss in detail the unusual behaviour of water with regard to its volume and density as a function of temperature. Explain how it is that small northern lakes do not freeze solid during the winter months and as a result are able to support aquatic life both in plant and animal fomi.

3) Read chapter 13 of the reference text.

4) Answer the questions and solve the problems as assigned from chapter 13 of the reference text.

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XI) THE GAS LAWS

a) Bovie's gas law

1) Write a verbal statement of *'Boyle's gas law'.*

2) Write a mathematical statement (an equation) of *'Boyle's gas law'.*

3) Explain what is meant by the terms *'gauge pressure'an6 'absolute pressure'.*

4) Write the equation that interrelates the terms *'gauge pressure', 'absolute pressure'an6 'atmospheric pressure'.*

5) List at least a half dozen equivalent expressions for what is known as *'standard atmospheric pressure'.*

6) Solve the example problems as presented in class deaiing with the relationships between volume and pressure for a gas at constant pressure.

b) Charles' gas law

1) Write a verbal statement of *'Charles' gas law'.*

2) Write a mathematical statement (an equation) for *'Charles'gas law'.*

3) Recall from teaming activity IX-c-3 above the relationship that exists between the Celsius and the Celsius absolute temperature scale known as the Kelvin scale and the relationship that exists between the Fahrenheit and the Fahrenheit absolute temperature scale knovm as the Rankine scale.

4) Solve the example problems presented in class dealing v^th the relationships that exist between the volume and the temperature for a gas held at a constant pressure.

c) Gav-Lussac's gas law

1) Write a verbal statement of *'Gay-Lussac's gas law'.*

2) Write a mathematical statement (an equation) for *'Gay-Lussac's gas law:*

3) Solve the example problems as presented in dass dealing with the relationships that exist between the pressure and the temperature of a gas held at a constant volume.

d) the general gas law

1) Write an equation for the *'general gas law'* indicating dearly the meaning of all terms.

2) Solve the example problems presented in dass dealing with the relationships between the volume, temperature and pressure for a gas of constant mass.

3) Read chapter 14 of the reference text.

4) Answer the questions and solve the problems as assigned from chapter 14 of the reference text.

Method of Assessment:

Your final grade in PHY100 will be determined on the basis of four tests to be administerec during the semester. Each test wilt examine your knowledge of a number of topics and wiii be administered within one week of completing those topics. The topics covered in each of t^e four unit tests are as follows:

Test #1——Topic Number I
Topic Number II

Test #2——Topic Number ill
Topic Number IV
Topic Number V

Test #3——Topic Number VI
Topic Number VI!
Topic Number VIII

Test #4——Topic Number IX
Topic Number X
Topic Number XI

The four tests are of equal weight (i.e. Each of the four tests is worth 25% of your final grade.) As a result, *provided you have received a oassina grade* on *each of the unit tests,* your final grade will simply be an average of your four test results. In order to obtain your letter grade the following percentage-letter grade equivalents will be used:

A+ : 90% -100% (Consistently outstanding achievement)

A : 76% - 89% (Outstanding achievement)

B : 66% - 75% (Above average achievement)

C : 55% - 65% (Satisfactory or acceptable achievement)

X or R: 0% - 54% (Incomplete or Repeat)

if your final average is below 55%, or if you have received a falling grade in one or more of the unit tests, whether you receive an 'X' (Incomplete) or an 'R' (Repeat) grade Is entirely at the teacher's discretion. The decision will be based upon your final average (e.g., A grade such as 32% would result in an 'R' grade while an average such as 50% might result in an 'X' gracte.); your attendance during the semester; your attitude while in the dassroom; your perceived level of effort during the semester, etc..

In any case, should you find yourself with an 'X' grade at the end of the semester, in order to upgrade your mark to a passing grade you will be required to write a *make-up examination covering the entire course content!* Should you receive a passing grade on the make-up examination (55% or higher) your 'X' grade will be upgraded. The best you can do after receiving an X grade as a result of a failing average is a *'C.* If you were required to write the make-up examination as a result of having failed or missed one test, you may substitute the exam result for this test result.

Prior to administering any test, you will be notified a full week in advance. Should you. for any reason, not be able to be in attendance on a day for which a test has been scheduled, it is your responsibility to notify the teacher prior to the test! *If your reasons are acceptable,* a date will be set during which you may write a *substitute* test for the one you have missed.

Notes to Students:

a) **Attendance** and **participation** are **critical** to the student's success in this course.

b) The course outline as detailed on pages 3 to 18 and summarized on page 3 lists the sub-topics to be covered under each of the eleven main topic headings. Some sub-topics may be deleted from the outline at the discretion of the teacher and/or others may be introduced. In other words, ***your instructor reserves the right to modify the course as he/she deems necessary in order to meet the needs of the students!***

PRIMARY RESOURCES

Ewen. Nelson and Schurter, **PHYSICS FOR CAREER EDUCATION. Sixth edition.** Regents/Prentice Hall Publishing Company, 1998. ISBN 0-13-692823-4

ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY

Book Section

You will find the college's collection of physics books on the second floor of the college library. They are located on the shelves under the Call Number QC.

Periodical **Section**

Audiovisual Section

PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the teacher.

SPECIAL NOTES:

Students with special needs (eg. physical limitations, visual impainments, hearing impaimnents, learning disabilities, etc.) are encouraged to discuss required accommodations confidentially with the instructor.