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- I. COURSE DESCRIPTION:** This course introduces the student to a number of fundamental concepts of physics. It is designed to satisfy the needs of students who are interested in an *overview* of the *concepts* rather than a *rigorous mathematical analysis* of the topics as might be encountered in a traditional engineering level course in physics.

Topics to be covered include: units of measurement and the metric system, motion, forces, work, energy and power, simple machines, properties of solids, liquids and gases, temperature and heat, basic electricity and magnetism, and the nature of light.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. in his/her own words write basic definitions for the concepts introduced. The definition will demonstrate a fundamental understanding of the concept.
2. answer questions requiring an understanding of the concepts presented.
3. respond to questions requiring some extrapolation of the course content.
4. solve basic mathematical problems requiring an essential understanding of the course theory.
5. develop an appreciation for physics as a science and its broad impact on the world as we now know it. This impact includes both the technological applications that are a result of the science and a fundamental understanding of our universe made possible by the science.

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Code No.**III. TOPICS TO BE COVERED:****Approximate Time
Frames (Optional)**

1. MEASUREMENT AND THE METRIC SYSTEM
2. MOTION
3. FORCES, WORK, ENERGY, POWER and SIMPLE MACHINES
4. PROPERTIES OF MATTER: SOLIDS, LIQUIDS and GASES
5. TEMPERATURE AND HEAT
6. BASIC ELECTRICITY and MAGNETISM

IV. LEARNING ACTIVITIES**I MEASUREMENT AND THE METRIC SYSTEM****a) units of measurement**

- 1) List the three most commonly used systems of units in use in science and engineering:
 - i) the *S.I. metric system*;
 - ii) the “old” *C.G.S. metric system*;
 - iii) the *Imperial system of units* (the *British Engineering system* and the *United States Customary system*).
- 2) State the units and the proper abbreviation for the 3 most common *base quantities* in each of the three systems of units of I – a) – 1) above.
- 3) Define ‘*derived quantities*’ and list at least a dozen examples of *derived quantities*.

b) S.I. metric 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 proper abbreviation and its meaning for the prefixes from ‘*kilo*’ to ‘*milli*’.

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

c) **conversion of units of measure**

- 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 that involves ‘multiplying by ratios equal to 1’.
- 2) Read chapter 1 of the reference text and answer any questions that may be given out in class.

II **MOTION**

a) **‘distance’ and ‘displacement’**

- 1) Explain the difference between the two terms ‘distance’ and ‘displacement’.

b) **‘speed’ and ‘velocity’**

- 1) Explain the difference between the two terms ‘speed’ and ‘velocity’.
- 2) Write the equations for ‘average speed’ and ‘average velocity’.
- 3) Solve problems that illustrate the distinction between the terms ‘distance’ and ‘displacement’ and the terms ‘speed’ and ‘velocity’.

c) **acceleration**

- 1) Write a definition for the term ‘acceleration’.
- 2) Write the equation for *acceleration* in its most basic sense.

d) **equations for ‘uniformly accelerated motion’**

- 1) List the 4 equations for ‘uniformly accelerated motion’.
- 2) Solve the sample problems dealing with *uniformly accelerated motion* as introduced in class.

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Code No.**e) the ‘acceleration due to gravity’ – “free fall”**

- 1) Explain how the ‘*acceleration due to gravity*’ is dependant upon the *size, mass, ‘density’* and shape of a body in the presence of air resistance and demonstrate how the ‘*terminal velocity*’ of a given body falling in air may be altered.
- 2) State the values for the *acceleration due to gravity in the absence of air resistance* in each of the *S.I. metric* and *Imperial systems* of measure.
- 3) Solve example problems as presented in class dealing with the *acceleration due to gravity*.
- 4) Read chapter 3 of the reference text.
- 5) Answer the questions and solve the problems as presented from chapter 3 of the text book.

III FORCES, WORK, ENERGY, POWER and SIMPLE MACHINES**a) forces**

- 1) Explain what is meant by a ‘*force*’.
- 2) State the units of *force* in each of the *S.I. metric* and *Imperial systems* and write the proper abbreviations for each.
- 3) Explain what is meant by the term ‘*mass*’ of a body.
- 4) State the units of *mass* in each of the *S.I. metric* and *Imperial systems* and write the proper abbreviations for each.
- 5) Explain what is meant by the ‘*weight*’ of a body.
- 6) State the units of *weight* in each of the *S.I. metric* and *Imperial systems* and write the proper abbreviations for each.
- 7) Explain the fundamental difference between the *mass* of a body and its *weight*.
- 8) Knowing the *mass* of a body explain how one would determine its *weight* and vice versa.

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- 9) Given the *mass* of a body determine its *weight* on the surface of the Earth.
 - 10) Given the *mass* of a body on the Earth's surface determine its *mass* at any other location in the universe.
 - 11) Given the *weight* of a body on the Earth's surface, determine the *mass* of the body on the Earth's surface and at any other location in the universe.
- b) 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 presented in class.
 - 2) Read chapter 2 of the reference text and answer any questions and problems that might be assigned from the chapter.
- c) 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 '*Newton's second law of motion*'. Indicate the proper units for each of the variables involved in each of the *S.I. metric* and *Imperial systems* of measure.
 - 3) Discuss the force known as '*friction*'. Include in your discussion: the causes of friction, the benefits of friction, the negative effects of friction and the direction of the force of friction.
 - 4) Read chapter 4 of the reference text and answer any questions and problems that might be assigned from the chapter.
- d) Newton's third law of motion**
- 1) Write a verbal statement of '*Newton's third law of motion*' and demonstrate an understanding of the law by applying it to examples presented in class.
 - 2) Read chapter 5 of the reference text and answer any questions and problems that might be assigned from the chapter.

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Code No.**e) work**

- 1) Write a definition for the concept of '*work*'.
- 2) State the equation for *work* in it's most general form.
- 3) Write a definition for the concept of '*energy*'.
- 4) List the proper units of *work* and *energy* in each of the *S.I. metric* and *Imperial systems* of measure.

f) kinetic energy

- 1) Write a definition for the concept of '*kinetic energy*'.
- 2) Recall the equation for '*kinetic energy*'.

g) gravitational potential energy

- 1) Write a definition for the term '*gravitational potential energy*'.
- 2) Recall an equation for '*gravitational potential energy*'.

h) conservation of mechanical energy

- 1) Write a verbal statement for the '*law of conservation of mechanical energy*'.
- 2) Solve example problems as presented in class dealing with *work*, *kinetic energy*, *gravitational potential energy* and the *law of conservation of mechanical energy*.

i) power

- 1) Write a definition for the term '*power*'.
- 2) Write an equation 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.

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- 5) State the relationship between the unit known as the '*horsepower*' and the '*watt*' and the '*kilowatt*'.
- 6) Solve the example problems as presented in class dealing with *power*.
- 7) Write a verbal statement of the '*law of conservation of energy*'.
- 8) Explain briefly the relationship that exists between *mass* and *energy*.

j) simple machines

- 1) Explain with the aid of a diagram what is meant by the concept of a '*simple machine*'.
- 2) Explain with the aid of a diagram what is meant by the term '*efficiency*'.
- 3) Write a generalized equation for the term '*efficiency*'.
- 4) Read chapter 7 of the reference text and answer any questions and problems that may be assigned from the chapter.

IV PROPERTIES OF MATTER: SOLIDS, LIQUIDS & 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* and *Imperial systems* of units.

b) weight density

- 1) Write a definition for the term '*weight density*'.
- 2) Write the equation for the term '*weight density*'.
- 3) List the proper units for '*weight density*' in each of the *S.I. metric* and *Imperial systems* of units.

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- 4) Write the equation that relates mathematically '*mass density*' and '*weight density*'.

c) **specific gravity**

- 1) Write a definition for the term '*specific gravity*'.
- 2) Write the equation for the term '*specific gravity*'.
- 3) List the values of the '*mass density*', '*weight density*' and '*specific gravity*' of *pure water* at its temperature of maximum density.
- 4) Read chapter 12 of the reference text and answer any questions and solve any problems that may be assigned from the chapter.

d) **pressure**

- 1) Write the *general equation* for the term '*pressure*'.

e) **units of pressure measurement**

- 1) List the units used to measure pressure in each of the *S.I. metric* and *Imperial systems* of measure.

f) **pressure at a depth in a liquid**

- 1) Write the two equations used to determine the pressure exerted by a column of liquid.
- 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*.

g) **Archimedes' principle**

- 1) Demonstrate an understanding of the cause of the '*force of buoyancy*'. Do so by looking at the relationship that exists between the '*buoyant force*' acting on an object, either submerged or floating, and the *weight of the displaced fluid*.
- 2) Write a verbal statement of *Archimedes' principle* and demonstrate an understanding of the principle by applying it to examples as presented in class.

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Code No.**h) 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.

i) the hydraulic press

- 1) Recall from learning activity III – j) – 1) that a '*hydraulic jack*' is an example of a '*simple machine*'.
- 2) Solve the example problems as presented in class involving applications of *Pascal's law* to *hydraulic presses*, *hydraulic jacks*, *hydraulic brakes*, etc..

V TEMPERATURE AND HEAT**a) temperature**

- 1) Discuss what is meant by the term '*thermal energy*'.
- 2) 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 abbreviation 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 at standard atmospheric pressure, the '*freezing point*' of water at standard atmospheric pressure, and the temperature known as '*absolute zero*'.
- 3) State the mathematical relationships that exist between: (i) the '*Celsius*' and the '*Fahrenheit temperature scales*'; (ii) the '*Celsius*' and the '*Kelvin temperature scales*'; and (iii) the '*Fahrenheit*' and the '*Rankin temperature scales*'.
- 4) Explain what is meant by the concept of '*absolute zero*' making reference to the terms '*temperature*' and '*thermal energy*' in your explanation.

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- 5) Given a temperature on any of the four temperature scales of learning activity V – 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 V – a) – 2).

e) thermal linear expansion of solids

- 1) List the 3 factors that determine the amount of '*thermal linear expansion*' for a solid.
- 2) Explain clearly the meaning of the term '*coefficient of linear expansion*'.
- 3) Write the equation used to determine the amount of *linear expansion* for a solid subjected to a change in temperature.
- 4) Solve the example problems as presented in class dealing with *linear thermal expansion of solids*.

f) thermal area expansion of solids

- 1) List the 3 factors that determine the amount of '*thermal area expansion*' for 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 '*coefficient of linear expansion*'.
- 5) Solve the example problems as presented in class dealing with *thermal area expansion of solids*.

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Code No.**g) thermal volume expansion of solids**

- 1) List the 3 factors that determine the amount of '*thermal volume expansion*' a solid subjected to a temperature change experiences.
- 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 thermal volume expansion* experienced by a solid subjected to a change in temperature.
- 5) Solve the example problems as presented in class dealing with *thermal volume expansion of solids*.

h) thermal volume expansion of liquids

- 1) Indicate how one would determine or where one would find the '*coefficients of volume expansion*' for liquids.
- 2) Discuss 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 plant, fish and animal life.

i) units of heat measurement

- 1) List the various units used to measure '*heat content*'.

j) specific heat capacity

- 1) Explain the meaning of the term '*specific heat capacity*'.
- 2) Write an equation for the term '*specific heat capacity*'.
- 3) List the units of '*specific heat capacity*' in each of: 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*'.

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- 5) Write the equation used to determine the '*quantity of sensible heat*'.
- 6) Read chapter 15 of the reference text and answer any questions and problems that may be assigned from the chapter.

k) changes of state

- 1) Explain clearly what is meant by a '*change of state*'.
- 2) Write the proper terms 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*.
- 3) Explain what is meant by the *state* known as a '*plasma*'.

l) specific latent heat of fusion

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

m) 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) 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*".
- 5) Write the main equation that is used to solve *calorimetry problems*.
- 6) Read chapter 17 of the reference text and answer any questions and problems that may be assigned from the chapter.

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Code No.**n) methods of heat transfer**

- 1) Describe the processes involved with each of the three ‘*methods of heat transfer*’, namely: ‘*convection*’, ‘*conduction*’ and ‘*radiation*’.
- 2) List the factors that determine the ‘*rate at which heat will flow by conduction*’ through a given surface.
- 3) Describe what is meant by the term ‘*R-value*’ and write the equation that relates the *R-value* to the ‘*thermal conductivity*’ of a material.
- 4) Explain what is meant by the concept of an ‘*ideal blackbody*’.
- 5) Describe several applications that either use *heat transfer methods* to advantage or try to limit the transfer of heat by these methods.
- 6) Read chapter 16 of the reference text and answer any questions and solve any problems that may be assigned from the chapter.

VI) BASIC ELECTRICITY and MAGNETISM**(a) electric charges**

- 1) List the *three major components* of the ‘*atom*’ and indicate the relative *mass* and the ‘*charge*’ carried by each.
- 2) Describe the model of the *atom* known as the ‘*planetary model*’. Be certain to include in your description the terms ‘*nucleus*’ and ‘*orbits*’.
- 3) Describe how it is possible to charge a *pith ball* with a ‘*positive charge*’ by ‘*conduction*’.
- 4) Describe how it is possible to charge a *pith ball* with a ‘*negative charge*’ by ‘*conduction*’.
- 5) Describe how it is possible to charge a ‘*gold leaf electroscope*’ with a ‘*negative charge*’ by the process known as ‘*induction*’.
- 6) Describe how it is possible to charge a ‘*gold leaf electroscope*’ with a ‘*positive charge*’ by the process known as ‘*induction*’.
- 7) Write the law describing the “*attraction*” and “*repulsion*” of “*like*” and “*unlike charges*”.

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8) Describe the operation of the “*van de Graaff generator*”.

(b) Coulomb’s law

- 1) Explain what is meant by the *unit of electrical charge* known as a ‘*coulomb*’.
- 2) Write a verbal statement of ‘*Coulomb’s Law of Electrostatics*’.
- 3) Write a mathematical statement (an equation) of ‘*Coulomb’s Law of Electrostatics*’.

(c) electric fields

- 1) Describe what is meant by and give several examples of ‘*electric fields*’.
- 2) Briefly explain some of the many practical applications of electric fields as used in electronics and elsewhere. Some examples might include, for example: an ink-jet printer, a television picture tube and a capacitor.
- 3) Read chapter 22 of the reference text and answer any questions and solve any problems that may be assigned from the chapter.

(d) simple circuits

- 1) Describe, in basic terms, what is meant by the term ‘*direct current*’ as opposed to ‘*alternating current*’.
- 2) Explain what is meant by an ‘*electric circuit*’. Included in your explanation should be the terms ‘*source*’, ‘*load*’ and ‘*conductor*’.
- 3) Explain what is meant by the terms ‘*electric potential energy*’, ‘*difference in potential*’, ‘*electromotive force*’ and ‘*voltage*’.
- 4) List several examples of sources of ‘*potential difference*’.
- 5) State the unit of ‘*emf*’ and describe what it is in terms of the unit of ‘*work*’ (the ‘*joule*’) and the unit of ‘*charge*’ (the ‘*coulomb*’).
- 6) Explain what is meant by the term ‘*electric current*’.

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- 7) State the unit of '*electric current*' and describe what it is in terms of the unit of '*charge*' (the '*coulomb*') and the unit of '*time*' (the '*second*').
- 8) Explain what is meant by the term '*electrical resistance*'.
- 9) State the unit of '*electrical resistance*'.

(e) Ohm's Law

- 1) Write a verbal statement of '*Ohm's law*'.
- 2) Write a mathematical statement (an equation) for '*Ohm's law*'. Indicate the proper abbreviations for each of the quantities and the proper units for each of the quantities in the equation.
- 3) Solve problems as assigned in class dealing with *Ohm's law*.

(f) Series Circuits

- 1) Describe what is meant by a '*series circuit*'.
- 2) Write the equations which are used to determine (i) the '*current*', (ii) the '*emf*' and (iii) the '*total resistance*' for a simple '*series circuit*'.
- 3) Solve example problems as introduced in class dealing with simple *series circuits*.

(g) Parallel Circuits

- 1) Describe what is meant by a '*parallel circuit*'.
- 2) Write the equations which are used to determine (i) the '*total current*', (ii) the '*voltage*' across each resistor, (iii) the '*emf*' and (iv) the '*total resistance*' for a simple '*parallel circuit*'.
- 3) Solve the example problems as introduced in class dealing with simple *parallel circuits*.
- 4) Explain how it is that parallel circuits can be dangerous if misused by the process known as '*overloading*'.

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- 5) Describe the operation of and explain the importance of ‘*safety fuses*’ in reducing the incidences of tragedy resulting from *overloading* in a *parallel circuit*.

(h) electrical power

- 1) Write the three equations for ‘*electrical power*’ in terms of: ‘*voltage*’ and ‘*current*’; ‘*voltage*’ and ‘*resistance*’; and ‘*current*’ and ‘*resistance*’.
- 2) Write the unit most commonly used to express the amount of ‘*electrical energy*’ consumed by a household or industry and billed by the power company. Explain how this unit of *electrical energy*, the ‘*kilowatt hour*’, is related to the metric unit of *power*, the ‘*joule*’ and the unit of *time*, the ‘*second*’.
- 3) Solve the example problems as introduced in class dealing with ‘*electrical power*’ and ‘*electrical energy*’ consumed.
- 4) Read chapter 23 of the reference text and answer any questions and solve any problems that may be assigned from the chapter.

(i) magnetism

- 1) Describe what is meant by a ‘*magnetic force*’.
- 2) Explain what is meant by the ‘*poles*’ of a magnet and describe what is meant by the ‘*north pole*’ of a magnet as compared to the ‘*south pole*’ of the magnet.
- 3) Write the law that pertains to the *attractive force* versus the *repulsive force* for the *poles* of a pair of magnets.
- 4) Explain what is meant by a ‘*magnetic field*’ and describe how one would detect and examine magnetic field patterns.
- 5) Describe the *magnetic field patterns* produced by: a single *bar magnet*; a pair of *bar magnets* with opposite poles facing each other; a pair of *bar magnets* with like poles facing each other; and, a *horseshoe magnet*.

(j) electromagnetism

- 1) Describe how one could detect the *magnetic field* surrounding a straight piece of wire carrying an electric current in one direction.

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- 2) Describe how one could determine the direction of the *magnetic field* surrounding a length of straight wire carrying an electric current in one direction.
- 3) Describe what happens to the direction of the *magnetic field* when the direction of the electric current in a length of straight wire changes its direction of flow.
- 4) Illustrate how a current carrying conductor wrapped around a soft iron core can be configured into what is known as an '*electromagnet*'.
- 5) Demonstrate how, by the process known as '*electromagnetic induction*', an electrical current can be generated by moving an electrical conductor such as a piece of wire through a stationary magnetic field.
- 6) Demonstrate how, by the process known as '*electromagnetic induction*', an electrical current can be generated by moving a magnetic field across a stationary electrical conductor wound into a coil.
- 7) Read chapters 24 and 25 of the reference text and answer any questions and solve any problems that may be assigned from the chapters.

V. REQUIRED RESOURCES/TEXTS/MATERIALS:

Paul G. Hewitt, CONCEPTUAL PHYSICS, ninth edition. Addison Wesley Publishers, Toronto. 2002. ISBN 0-321-05202-1

VI. 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*.

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Periodical Section

Audiovisual Section

VII. EVALUATION PROCESS/GRADING SYSTEM:

The following semester grades will be assigned to students in post secondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	4.00
A	80 – 89%	3.75
B	70 – 79%	3.00
C	60 – 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual – Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

GRADE REQUIREMENTS

Your final grade in PHY 1150 will be determined on the basis of a number of quiz tests to be administered during the semester combined with the results of your laboratory experiment reports.

Each test will examine your knowledge of a topic and will be administered within one week of completing that topic. Final mark will be awarded based on the composite score of lab and quiz tests as follows:

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Quiz tests	60%
Lab Work	40%

NOTES: If your final average is below 60%, whether you receive an X grade (*Incomplete*) or an R grade (*Repeat*) is entirely at the professor's discretion. The decision will be based upon *your final average* (e.g. 32% **would** result in an R grade while 58% **might** result in an X grade.); *your attendance* during the semester; *your attitude* while in the classroom; *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** and/or redo one or more of your laboratory experiments. Which of the two, or both, you will be required to do will depend upon the reason you were given the 'X' grade. Prior to administering any test you will be notified a full week in advance. Should you, for any reason (*within reason of course*), not be able to be in attendance on a day for which a test has been scheduled it is **your responsibility** to notify the professor **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.

VIII. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations confidentially with your professor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post secondary institutions.

Modification of course outlines:

Professor reserves the right to modify the course, as he/she deems necessary depending on the needs of the student and the availability of resources and time.

Substitute course information is available in the Registrar's office.

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Code No.**IX. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in this course should consult with the professor. Credit for prior learning will be given upon successful completion of the following:

- 1) A discussion with the professor will determine if the course that the student has previously taken at another *post secondary institution* is sufficiently close in content to warrant consideration.
- 2) Given that step (1) above is granted, the student will need to bring the professor an **official** *course outline* for the course in question to verify step (1). See **X Direct Credit Transfers** below.
- 3) The student will be required to have available in the registrar's office an **official** *transcript* from the *post secondary institution* in question. This transcript will contain the final grade of the course which is being presented to obtain a credit for this course in physics. See **X Direct Credit Transfers** below.
- 4) Given that the student has obtained at least a 'B' standing in the course in question, a credit for PHY 1150 will be granted. A 'Pass' grade or a 'C' grade will not be accepted for advanced credit standing in this course.

X. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide an *official* transcript (**not a photocopy**) and an *official* course outline (**not a photocopy**) related to the course in question. Both of these documents must be issued by the university or college at which the course was taken by the student.