



DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE –WINTER 2011

PHYSICS 0110 – GRADE 10 EQUIVALENT

INSTRUCTOR: Alan Iwaskow **PHONE:** 780-539-2713

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OFFICE HOURS: 11:00 – 12:00 Monday, Wednesday and Friday

PREREQUISITE(S)/COREQUISITE:

SC0110 or permission of the Department

REQUIRED TEXT/RESOURCE MATERIALS:

Science 10 by Sandner, L., Schaeffer, H.,

Lacy, D., Sosnowski, C. (2004)

Published by Addison Wesley

CALENDAR DESCRIPTION:

The major concepts to be covered include linear motion, force, work, energy, power, and heat.

CREDIT/CONTACT HOURS:

PC 0110-Physics Grade 10 Equivalent; 3 (3-0-0.5) HS

Time: 52 Hours

DELIVERY MODE(S):

This course is a lecture and lab course which requires student participation. The course is divided into four weighted units. Each unit includes one or more assignments, regular homework checking, a unit test, and/or lab.

The key to success is to ask questions whenever you have difficulty understanding instructions, the examples, or the exercises. **Do not hesitate to ask for help.** It is expected that students do the homework exercises in a neat, organized, and orderly manner. Homework exercises will be regularly checked and will count 5% towards the final grade. After each section, you must write a test. When writing a test, be sure to show all of your work on your test paper. Marks are given for your work as well as the final answer. 3-4 labs will be done during the course to emphasize the concepts learned the course. A three-hour final exam covering all four sections will be conducted at the end of the course.

COURSE GOALS:

- To provide knowledge and skills in selected topics in physics.
- To develop an appreciation of the importance of physics in modern society and in day-to-day life.
- To develop problem-solving skills.

OBJECTIVES:

Please see attached syllabus

GRADING CRITERIA: Your final mark is determined by:

4 unit tests	30%
Homework/Notes Checks	5%
Assignments	30%
Labs	15%
Final Exam	20%
Total	100%

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A ⁺	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A ⁻	3.7	80 – 84	FIRST CLASS STANDING
B ⁺	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B ⁻	2.7	70 – 72	
C ⁺	2.3	67 – 69	SATISFACTORY
C	2.0	63 – 66	
C ⁻	1.7	60 – 62	
D ⁺	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0.0	0 – 49	FAIL
WF	0.0	0	FAIL, withdrawal after the deadline

TRANSFERABILITY:

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability

STUDENT WORK:

Homework exercises, assignments, labs, tests, and exams **MUST** be completed on time.

A missed exam will result in a score of zero unless **PRIOR** arrangements have been made with the Instructor for valid reasons to write the exam at some other time.

All homework exercises and lab reports **MUST** be handed in at the beginning of class on the due date. Late work, if accepted, will be subject to a 10% penalty.

Labs: There will only be a few labs in the course, and attendance is compulsory. A missed lab will result in a mark of zero.

STUDENT RESPONSIBILITIES:

Supplies: Binder with lined loose paper, plain and graphing paper and two transparent folders for assignments and lab reports. Colored pens or pencils or markers, ruler, scientific calculator

Electronic devices: (phones and MP3 players) are prohibited in class

Attendance: Regular attendance is expected of all students. Success in education is directly linked to attendance. Attendance will be taken during class. Verbal or written communication is suggested in case of missing a class. Any student **missing more than 10 classes may be debarred from writing the final exam.**

Students are responsible for obtaining notes and making up missed work.

Lateness: Lateness is highly disruptive to a class. Please be considerate. Enter and find a seat with as little distraction as possible.

STATEMENT ON PLAGIARISM AND CHEATING:

Please use the following link regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

<http://www.gprc.ab.ca/downloads/documents/Student%20Misconduct%20Plagiarism%20and%20Cheating.pdf>

PC0110 Course Syllabus:

Unit 1: Kinematics - motion

Approximately 10 days

On completing this unit, you should be able to:

- Define and distinguish between distance and displacement giving examples.
- Define and identify scalar and vector quantities, giving examples
- Define force as a push or a pull
- Define and explain speed and velocity; average and instantaneous. State their units.
- Define acceleration and state its units.
- Explain why time appears twice in the acceleration unit.
- Draw distance-time, and velocity-time graphs. Determine velocity and acceleration from the slopes of the respective graph. Determine displacement from the area under a velocity-time graph.
- Interpret distance-time, velocity-time and acceleration-time graphs: be able to sketch one given another
- Apply the following formulas in relevant situations to solve problems.

$$d = vt \quad v_{av} = \frac{v_0 + v_f}{2} \quad d = \left(\frac{v_0 + v_f}{2} \right) t \quad a = \frac{\Delta v}{\Delta t}$$

Use the international sign conventions for positive and negative directions

- Define acceleration due to gravity, “g”, and state its value. Also be able to explain the dependency of the value of “g” on different locations.
- Distinguish between mass and weight, and state their units.
- Solve problems involving “g”.

Write Test # 1

Unit 2: Force and Newton's Laws of Motion **Approximately 10 days**

On completing this unit, you should be able to:

- Define and explain force, and state its units
- Calculate net force given 2 or more forces (in 2 dimensions)
- State and explain Newton's First Law of Motion giving examples. Explain inertia and its relation to the First Law.
- State and explain Newton's Second Law of Motion and derive the expression $F=ma$ from the Second Law.
- Explain the force of friction, and incorporate it in problems involving force.
- Solve problems based on the Second Law.
- State and explain Newton's Third Law of Motion, and apply it to relevant situations.
- Solve problems based on the Third Law.

Write Test # 2

Unit 3: Work, Energy transformation and Power **Approximately 12 days**

On completing this unit, you should be able to:

- Define and explain energy and state its units
- Name different forms of energy, and explain the principle of conservation of energy.
- Explain kinetic and potential energies, and using the principles of conservation of energy, describe situations where kinetic energy is converted into potential energy, and vice-versa.
- Calculate potential energy using $E_p = mgh$
- Calculate kinetic energy using $E_k = \frac{1}{2}mv^2$
- Define and explain work done by a force, and state units of work.
- Identify situations in which a force does not do any work.
- Calculate work done in different situations using $W = Fd$
- Explain the relation between work and energy, and using the relation, convert one into the other. Solve related problems.
- Define and explain power, and state its units. Solve related problems using $P = \frac{W}{t}$ and $P = Fv$

- Solve problems using combinations of the energy, work and power formulas
- Explain the working of a simple machines; the pulley, the wheel and axle and lever. Explain mechanical advantage and efficiency of simple machines, and how they are calculated.
- Use $IMA = \frac{d_e}{d_r}$ to calculate ideal mechanical advantage
- Solve problems based on the above three simple machines.
- Define electrical energy as the work done by moving charges
- Use Ohm's Law and $V = IR$ to describe the relationship between voltage and current
- Draw a simple parallel and series circuit diagram

Write Test # 3

Unit 4: Thermal Energy Approximately 11 days

- Describe enthalpy as thermal energy, and state its units.
- Define temperature, and distinguish between enthalpy and temperature.
- Explain the Celsius and Kelvin (Absolute) scales of temperature, and convert one into the other.
- Define and explain specific heat capacity (or heat capacity) c , and state its units.
- Discuss the implications of the high heat capacity of water, and how it modifies the climate of coastal areas.
- State the relation between the mass of a substance and its heat capacity, amount of heat and temperature change. Solve related problems using $Q = mc\Delta t$
- Define change of state, define and explain enthalpy of fusion and enthalpy of vaporization. State their units.
- Use the enthalpy of fusion and heat of vaporization to calculate the amount of thermal energy absorbed or released when substances undergo phase changes.
- State the principle of thermal equilibrium and that of thermal energy transfer and use the principle to solve related problems.

Write Test # 4

Write the Final Exam