DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – FALL 2010

PHYSICS 0110 PC 0110 – GRADE 10 EQUIVALENT

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

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OFFICE HOURS: Tuesday 2:30 – 4:00, Friday 11:30 – 1:00

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 sections. Each unit includes assignment, regular homework checking, 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 to do the homework exercises in a neat, organized, and orderly manner. Homework exercises will be regularly checked and will count 10% 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:

The following are the minimum objectives which must be achieved in the course. More objectives may be added later depending upon the rate of progress.

Unit 1: Kinematics **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 and explain speed and velocity-average and instantaneous. State their units.
- Define and explain 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.

- Derive the following formulas from basic principles:

  $d = Vt$ $\qquad V = \frac{V_o + V_f}{2}$ $\qquad V_f = V_o + at$

  $d = \frac{V_o + V_f}{2} t$

  $d = V_o t + \frac{1}{2} at^2$ $\qquad V_f^2 = V_o^2 + 2ad$

- Use the international sign conventions for directions positive and negative
- Apply the above formulas in relevant situations to solve problems.
- 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.
- Solve problems involving "g".

Write Test # 1

Unit 2: Force and Newton's Laws of Motion Approximately 11 days

On completing this unit, you should be able to:

- Define and explain force, and state its units
- State and explain Newton's First Law of Motion giving examples. Explain inertia and its relation to the First Law.
- Distinguish between mass and weight, and state their units.
- 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, and Power Approximately 10 days

On completing this unit, you should be able to:

- 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.
- 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, convert kinetic energy into potential energy, and vice-versa.
- 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.
- Explain the working of a simple pulley, and that of a wheel and axle as simple machines. Explain mechanical advantage and efficiency of simple machines, and how they are calculated.
- Solve problems based on the above three simple machines.

Write Test # 3

Unit 4: Heat Approximately 11 days

- Describe heat as thermal energy, and state its units.
- Define temperature, and distinguish between heat 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) , 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.
- Define change of state, define and explain heat of fusion and heat of vaporization. State their units.
- Use the heat of fusion and heat of vaporization to calculate the amount of heat absorbed or released when substances undergo phase changes.
- State the principle of thermal equilibrium and that of heat transfer and use the principle to solve related problems.

Write Test # 4

Write the Final Exam

GRADING CRITERIA: Your final mark is determined by:

4 unit tests	**30%**
Office Interview	**5%**
Homework/Notes Checks	**10%**
Assignments	**20%**
Labs	**15%**
Final Exam	**20%**

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**

EXAMINATIONS:

Homework exercises, assignments, 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 test/exam at some other time. All homework exercises **MUST** be handed in by the deadline. **Follow the sample Homework provided by the instructor.**

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. Makeup labs **CANNOT** be guaranteed, and may be permitted only under special circumstances. All labs reports **MUST** be handed in before the deadline. Lab reports will **NOT** be marked if handed in late by more than **two days** unless pre-approval of the instructor has been secured. The report must be written neatly and clearly.

STUDENT RESPONSIBILITIES:

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

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.** Lateness is highly disruptive to a class. Please be considerate.

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.