Grande Prairie Regional College

School of Business

Department: Academic Upgrading

COURSE OUTLINE – WINTER 2006

SC 0100 5(5-0-0) – Science and Society

Instructor	William Shaw	**Phone**	539-2713 (office) 539-7670(home)
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Office Hours	Tuesday and Thursday 10:00 – 11:00 am or by appointment		

Corequisites:

EN0090 MA0090

Text Book: No recommended text book. Tests and exams will be based on class notes.

Course Description: This course is meant to increase the pre-high school student's understanding of connections between science, technology and society. You will be introduced to basic ideas about science, technology, biology, chemistry, physics, ecology, scientific method, along with related social issues.

Course Delivery: It is basically a lecture course with a great emphasis on in-class discussion. 10% of the final grade will be based on attendance and participation. Students with more than 10% unexcused absences will receive a zero mark for participation.

Attendance and Lateness: Regular attendance is expected of all students as it is crucial to passing the course especially because there is no recommended text book. Students missing more than 25% of lectures may be required to withdraw from the course, and/or may be given a failing grade. Lateness will not be permitted as it disrupts the class.

Credit/Contact Hours: This is a 5 credit course with 4 lectures per week. Students are expected to attend all lectures.

Tests and Exams: All tests and exams MUST be written at the schedule times, unless PRIOR arrangements have been made with the instructor(s). A **missed test or exam will result in a mark of zero for that test/exam.**

Course Objectives: To provide a learning environment for the students to gain enough knowledge so that they develop appreciation for science, and are prepared to enroll in any of the science courses at 0110 level offered by the Department.

The following is the minimum list of objectives which must be achieved by the student over the semester. More objectives may be added later if time permits.

UNIT 1: SCIENTIFIC METHOD and CHEMISTRY

On completing this unit you should be able to

(a)   Define science giving examples, and be able to list its major branches
(b)   Explain scientific method (how science develops), and be able to define and distinguish between hypothesis, theory and law
(c)   Explain technology, and the relationship between science and technology. Given a process, be able to identify whether it is a technological application or not
(d)   Define chemistry and list its various branches
(e)   Define, and classify matter into various categories
(f)   Define elements, compounds and mixtures, and be able to classify a given substance into one of the above categories
(g)   Give the symbols of the most common elements
(h)   Identify whether a given symbol (or a formula) represents an element or a compound
(i)   Identify an element if its symbol is given
(j)   Write formulas for simple inorganic compounds, and be able to identify the compound if its formula is given
(k)   Define atoms and molecules
1.   Define the three fundamental particles (electrons, protons, and neutrons) which make up atoms giving their relative masses and charges
(m)   Define atomic and mass numbers. Be able to determine the number of electrons, protons, neutrons, atomic number and mass number of an element if enough information is provided
(n)   Define isotopes. Given the number of electrons (or protons) and the neutrons in two or more elements, be able to identify if there are any isotopes in the list.
(n)   Define solutions, and distinguish between homogeneous and heterogeneous solutions
(o)   Give examples of solutions in which any of the three states of matter - solid, liquid and gas - functions as the solvent and the other two as the

solutes. Identify the solvent and the solute in a given solution
- (p) List the factors that affect the solubility of a solid in a liquid
- (q) Define saturated and unsaturated solutions, and discuss how a saturated solution can be converted into an unsaturated solution and vice versa
- (r) Define density of a substance, and solve problems involving density
- (s) Define a chemical equation, and identify reactants and products
- (t) Define physical and chemical properties giving examples. Given a property, be able to classify it as physical or chemical
- (u) Define physical and chemical changes giving examples. Given a change, be able to classify it as physical or chemical

WRITE UNIT I TEST

UNIT 2. <u>PHYSICS</u>

On completing this unit the student should be able to

- (a) Define significant digits (S.D.), and identify the number of S.D. in a given number
- (b) Round off numbers to the desired number of S.D., and express the result in scientific notation.
- (c) Explain the rules of reporting results to the appropriate number of S.D. during simple mathematical operations, and be able to apply those rules when solving simple mathematical calculations
- (d) Distinguish between fundamental and derived units, and be able to identify a given unit as fundamental or derived
- (e) Define scalar and vector quantities giving examples, and be able to identify a given quantity as being scalar or vector
- (f) Given two sides of a right triangle, be able to calculate the third
- (g) Define and explain the following quantities giving examples: distance, displacement, speed, velocity, average and instantaneous speed, and average and instantaneous velocity
- (h) Give the units of each of the above quantities; and given units be able to identify the quantity which the units represent
- (i) Solve simple problems relating the above quantities
- (j) Define acceleration and deceleration, and give their units
- (k) Solve simple related problems

WRITE UNIT 2 TEST

UNIT 3: <u>Ecology and Ecosystems</u>

(a)   Define ecology and discuss how organisms are adapted to their
          environments.
(b)   Define ecosystem, list abiotic and biotic components and their
           interactions
          and interdependence.
(c)   Outline trophic levels , define and give examples of autotrophs and
          heterotrophs, ecological food chains, food webs and ecological
    pyramids.
(d)   Develop a basic understanding of photosynthesis and respiration.
(e)   Explain the movement of energy and matter through the ecosystem.
(f)   Define biogeochemical cycles and discuss the water cycle, carbon cycle,
          and nitrogen cycle.
(g)   Define and discuss renewable and non renewable resources.
(h)   Discuss how the ecosystem is impacted by greenhouse effect, global
          warming, acid rain and ozone depletion.

WRITE UNIT 3 TEST

UNIT 4: <u>Biology</u>

(a)   Explain the cell as the basic unit of life.
(b)   Name major organelles.
(c)   Define and describe differences and similarities in prokaryotic and
          eukaryotic cells.
(d)   Discuss the differences between multicellular and unicellular organisms.
(e)   Define DNA, discuss its structural make-up and replication.
(f)   Define and discuss mitosis, chromosomes, genes and the genetic code.
(g)   Distinguish between genotype and phenotype, sexual and asexual
          reproduction.
(h   Understand basic concepts of haploidy, diploidy, reproduction,
          inheritance and mutations.
(i)   Discuss biotechnology: human genome project, genetic engineering,
          genetically modified organisms, cloning and their impact on society.

WRITE UNIT 4 TEST

Grading Criteria: : The final grade will be based on the following components as per the scheme below.

Test unit 1. (Scientific method and chemistry)	= 28%
Test unit 2. (Physics)	= 22%
Test unit 3. (Ecology)	= 20%
Test unit 4. (Biology)	= 20%
Attendance and participation.	= 10%
Total	= 100%

Grades will be assigned on the Letter Grading System.

Business Administration and Commerce Department

Grading Conversion Chart

Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A⁺	4	90 – 100	EXCELLENT
A	4	85 – 89	
A⁻	3.7	80 – 84	FIRST CLASS STANDING
B⁺	3.3	76 – 79	
B	3	73 – 75	GOOD
B⁻	2.7	70 – 72	
C⁺	2.3	67 – 69	SATISFACTORY
C	2	64 – 66	
C⁻	1.7	60 – 63	
D⁺	1.3	55 – 59	MINIMAL PASS
D	1	50 – 54	
F	0	0 – 49	FAIL