



Grande Prairie Regional College

Department: Academic Upgrading

SCIENCE 0100

COURSE OUTLINE – WINTER 2009

SC 0100 Science and Society 5 (5-0-0) HS Time: 75 Hours

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|---------------------|------------------------------|---------------|--------------------|
| Instructor | Nancy Fraser | Phone | 539 – 2980 |
| Office | J – 216 | E-mail | nfraser@gprc.ab.ca |
| Office Hours | As posted on my office door. | | |

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.

Corequisite(s): EN 0090 and MA 0090 or consent of instructor.

Delivery Mode(s): Lecture will be the main method of delivery. There is also a large laboratory component in this course.

Required Text/Resource Materials: Chemistry 0110 Review by N. Fraser
Lab notebook

Course Content

Chemistry

Time: 3 weeks

Unit 1: Introduction to Chemistry

On completing this section, you should be able to:

- i) explain the scientific method.
- v) define density, mass, volume and know the formula that relates them. You should also know the units for each variable.
- vi) distinguish between mass and weight
- vii) classify matter as homogeneous, heterogeneous matter, compounds, elements, pure substances &/or solutions.
- viii) define state of matter, and state changes.
- ix) define and distinguish between physical, and chemical properties, and physical and chemical changes

UNIT 2: Atomic Structure:

On completing this section, you should be able to:

- i) define a proton, an electron and a neutron.
- ii) state the historical development of the modern model of an atom. (including Dalton's theory, Thompson model, Millikan's experiment, Rutherford's experiment, Bohr model, Schrodinger model, Chadwick's experiment). You should also be able to state the laws of definite proportions and of multiple proportions.
- iii) define atomic number, atomic mass number
- iv) understand atomic mass units and be able to calculate atomic mass given isotope masses and their abundance in nature.
- v) draw the atomic structure diagrams of atoms or ions for the first 20 elements.

Unit 3: Periodic Table:

On completing this section, you should be able to:

- i) state the chemical symbols for the elements and know the names of the elements. You should also have MEMORIZED the first twenty elements in periodic table format.
- ii) see trends in the periodic table and state the periodic law.
- iii) draw the electron dot diagrams of atoms for the first 20 elements.
- iv) define and distinguish between groups and periods knowing the trends that occur in each.
- v) define, distinguish and state characteristics of metals, nonmetal, and metalloids and be able to find them on the periodic table.

Unit 5: Inorganic Nomenclature:

On completing this section, you should be able to:

- i) Single valence metals
- ii) Two nonmetals
- iii) Variable valence metals

Computer

assignment: There is a website called “FREE RICE”. The website sponsors send the rice you earn to needy people around the world. One of the subject that you can practice on this site is nomenclature. Choose the BASIC CHEMISTRY subject. While you are practising nomenclature you can earn rice for other people. You may use a periodic table. Each day when you are finished print your last page and give it to Natasha. She will keep them and when you have donated **10000** gains of rice bring them to me and I will give you 10% for the chemistry component.

Biology and Ecology

Time: 3 weeks

This part of the course will be covered by Bill Shaw.

Unit 1: Introduction to Geology

On completing this section, you should be able to:

- i) define geology.

Unit 2: Rock and minerals

On completing this section, you should be able to:

- i) define the terms rock, and minerals.
- ii) define igneous, metamorphic, and sedimentary rocks and describe how they are formed.
- iii) distinguish between magma and lava.
- iv) give an example of each type of rock.
- v) draw the rock cycle.
- vi) define weathering, and erosion.

Unit 3: Structure of the Earth

On completing this section, you should be able to:

- i) label layers of the Earth and the atmosphere.
- ii) define plate tectonics.
- iii) define earthquake and state why they occur.
- iv) discuss volcanoes and state how they are formed.

Unit 4: Water Cycle

On completing this section, you should be able to:

- i) list and describe the parts of the water cycle

Astronomy

Time: 2 weeks

Unit 1: Introduction to Astronomy

On completing this section, you should be able to:

- i) define astronomy
- ii) define universe, galaxy, star, comets, meteor, meteoroid and meteorite.

Unit 2: Our Solar System

On completing this section, you should be able to:

- i) label the layers of the sun on a diagram.
- ii) state Ptolemy's model of the solar system. (Geocentric Model)
- iii) state the refinements that Copernicus made to Ptolemy's model. (Heliocentric Model)
- iv) state Galileo's contributions to astronomy.
- v) state Kepler's three laws of planetary motion.
- vi) state the refinements that Kepler made to Copernicus' model.
- vii) state the order of the planets starting from the sun.

Unit 3: The Earth

On completing this section, you should be able to:

- i) name phases of the moon.
- ii) explain how tides are formed.

Unit 4: Whatever topic(s) interest students.

Expectations depend on topics selected by students.

- i) discuss fun stuff such as – blockholes, supernovae, red giants, reading star charts.

Physics

Time:2 weeks

Unit 1: Introduction:

On completing this section, you should be able to:

- i) define physics
- ii) become familiar with several instrument for measuring length.

Unit 2: Kinematics:(As time permits.)

On completing this section, you should be able to:

- i) Solve Problems related to distance, speed, time, displacement, velocity, and acceleration.

Unit 3: Light: (As time permits.)

On completing this section, you should be able to:

- i) describe the nature of light.
- ii) state the law of reflection, and draw and label related diagrams.
- iii) explain refraction of light, and draw and label related diagrams.
- iv) describe how holograms are made.

Grading Criteria: Regular attendance is expected of all students, and is crucial to passing this course. Students who miss classes will soon find themselves falling behind and failing. Lateness will **not** be tolerated as it interrupts the instructor and fellow classmates.

As per Department Policy, if you miss more than 10 per semester of classes in any course, you may be debarred from the final exam for that course.

A certificate (a doctor's or a note from the funeral home) will be required to make up the midterm or final exam. Call if you are going to miss a test. There may be a deduction of 10% for test rewrites.

There will be a major test the Friday after the conclusion of each

section. The major test on the last unit will be during the final exam period. This date and time will be set by the registrar's office.

Marking Scheme:

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|----------------------|------------|
| Chemistry component: | 30% |
| Biology component: | 30% |
| Geology component: | 15% |
| Astronomy component: | 15% |
| Physics component | <u>10%</u> |
| | 100% |

| 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 |