

SCIENCE 30 (SCIE 030)

5 Credits, 16 weeks, 6 hours lecture

COURSE DESCRIPTION: Science 030 provides students an opportunity to investigate and analyze topics in the area of Biology, Chemistry and Physics, with a particular focus on environmental interactions. Topics include: electromagnetic field theory and its application in motors, generators and transformers; the impacts of acids and bases, organic compounds and air pollutants on aquatic and terrestrial ecosystems; and the principles of heredity and genetics and immune and circulatory system

ALBERTA EDUCATION COURSE EQUIVALENCY: Science 30

PREREQUISITES: Science 010

COREQUISITES: Math 20-1, Math 20-2 or Math 20-3

INSTRUCTOR

Gillian Whalen
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OFFICE HOURS

Monday 11:00 – 12:00, 1:00 – 2:00
Tuesday 4:00 – 5:00
Wednesday 11:00 – 12:00
Thursday 11:00 – 12:00

HOURS OF INSTRUCTION

Monday 2:00 – 3:50
Tuesday 11:00 – 12:50
Thursday 3:00 – 4:50

REQUIRED TEXTBOOKS AND SUPPLIES

1. **Science 030 Student Manual** (available at the bookstore)
2. **Scientific Calculator**—does not have to be a graphing calculator

COURSE OUTCOMES

Upon successful completion of this course, students will be able to:

1. Identify the parts and functions of the heart and circulatory system
2. Explain the flow of blood through the body
3. Identify parts of blood and their makeup
4. Explain the immune response and specific roles of B-cells, T-cells
5. Discuss diseases and disorders of the circulatory and immune system
6. Describe properties of acids and bases
7. Calculate pH & pOH and hydronium/hydroxide concentrations
8. Write Bronsted Lowry equations
9. Identify an appropriate indicator for analysis
10. Understand how to perform a titration
11. Analyze data from a titration, given the chemical equation
12. Discuss effects of acids and bases on the environment (acid rain, erosion, acid deposition)
13. Name and draw organic compounds (aliphatics, aromatics, alcohols, halides, acids and esters)
14. Identify how organic compounds impact society (fossil fuels, combustion, pesticides)
15. Explain what fields are and how they apply to magnets
16. Explain how motors and AC/ DC generators work
17. Write and draw series and parallel circuits
18. Determine how power is calculated
19. Explain how energy is moved along a transformer
20. Describe the EMR spectrum
21. Explain what non-renewable and renewable energies are available
22. Discuss nuclear energy in terms of fission and fusion, and their by-products of (alpha, beta and gamma radiation)
23. Discuss sources of renewable energy (wind, solar, photovoltaic, biomass, biofuel, tidal, geothermal)
24. Analyze the impacts of the renewable energies in everyday life (pros and cons)

EVALUATION

Daily Work, assignments & quizzes	15%
Labs & Investigations	25%
Projects	40%
Tests	20%

The minimum pre-requisite for progression is 1.7 (refer to Grading System on following page)

GRADING SYSTEM

Descriptor	4.0 Scale	Percent
Excellent	4.0	96 – 100
	4.0	90 – 95
	3.7	85 – 89
Good	3.3	81 – 84
	3.0	77 – 80
	2.7	73 – 76
Satisfactory	2.3	69 – 72
	2.0	65 – 68
Minimum Prerequisite	1.7	60 – 64
Poor	1.3	55 – 59
Minimum Pass	1.0	50 – 54
Failure	0.0	0 – 49

PROPOSED TOPICS

The material will be studied in the order below. Most topics will be covered in class; however, students will be required to learn some of the material through self-study and/or by completing assignments.

Please refer to the [Science 030 Course Slides](#) and [course notes](#) for detailed outlines and descriptions of each section.

Unit 1 – Circulatory System, Blood & Immune System

- Parts of the heart & circulatory system
- Parts and function of blood cells
- Flow of blood
- Inflammatory & Immune response
- Vaccinations
- Diseases & Disorders of the circulatory & immune system

Unit 2– Genetics

- Mitosis & Meiosis
- Karyotypes
- Mendel's experiments
- Punnett Squares to explain probability of phenotypes & genotypes
- DNA and its makeup and mutations
- Genetic Disorders

Unit 3– Acids & Bases

- Empirical properties of acids & bases
- pH & pOH calculations
- hydronium & hydroxide calculations
- Bronsted Lowry prediction
- pH indicators
- Titrations & titration analysis
- Environmental impacts: acid deposition, acid rain

Unit 4 – Organic Compounds

- Naming and drawing hydrocarbons
 - Aliphatics, aromatics, alcohols, halides, acids & esters
- Building models of hydrocarbons
- Pesticides and other hydrocarbons used in the environment

Unit 5– Fields, Motors, Generators & Circuits

- Fields(magnetic & gravitational)
- Motors
- AC/DC Generators
- Circuits – series & parallel
- Power & cost of electricity

Unit 6– Limitless & Sustainable Energy

- Non-renewable sources of energy – oil, fossil fuels
- Renewable sources of energy – solar, wind, geothermal, biofuels, biomass, tidal, nuclear
- Determining sustainability
- Global energy demands and trends

Several labs and projects for each unit have been identified to help students gain a better understanding of the 6 units.

Labs are one of three types:

1. Activities – students will be required to complete a hands-on type lab to learn more about a concept
2. Investigations – students will use the internet and provided video/data to investigate a concept
3. Simulations – a computer simulation of a lab environment where students will set up the experiment and obtain data to analyze

Projects are often research based and allows students some flexibility and choice in the given unit. Projects can be in the form of:

1. Research paper
2. Power Point presentation

Performance Requirements

1. SCIE 030 students are required to attend via Adobe Connect for **each** class, so success is improved by regular attendance. Extended or frequent absences cannot easily be accommodated and could impact your overall mark. Some suggestions for handling occasional absences include:
 - a. Checking the Calendar of Events and PowerPoint slides covered in each chapter by logging into **ilearn Keyano** (<http://ilearn.keyano.ca>)*.*.
 - b. Finding a “classroom buddy” who you can contact for details regarding what you have missed, because exact slides and daily homework will **not** be recorded on **ilearn**. Classes that have been recorded will be available on the course calendar to view.
 - c. Keeping in touch with me via email. Office hours which are online, are for you to seek extra help and to see me with concerns about the course.
2. To ensure that everyone is evaluated fairly, and that you receive your marks and feedback in a timely fashion, assigned work will receive:
 - a. Full marks when received on the due date. Students will need to scan and email assignments by the **end of the scheduled class** to be considered on time. All assignments must be scanned in PDF form.
 - b. A mark of zero, if received after I have returned them ...
3. To ensure that it is your learning, your thoughts, and your work that is being evaluated,
 - a. Work submitted by non-attending students may not be marked, so please keep in touch!
 - b. Any work showing evidence of copying or plagiarism will receive a mark of zero (see “Student Rights and Responsibilities” in the Credit Calendar).
 - c. A missed exam (midterm) may be written at an alternate time only under certain exceptional circumstances, at the instructor’s discretion. The instructor must be contacted within 24 hours of the scheduled exam, and documentation (e.g. a doctor’s note) provided.
 - d. The final exam will be written on the date scheduled by the College; otherwise, the procedure for “Deferred Final Examination” in the Credit Calendar is to be followed. If you are unable to write on the scheduled date, contact must be made within 48 hours with the chairperson to determine eligibility for special examinations or deferred examinations (appropriate documentation is required).

Should you have trouble logging into **ilearn Keyano, please contact any member of the library staff, or email Keyano Information and Technology Services (ITShelpdesk@keyano.ca) during business hours.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment

Penalties for academic offences range from a verbal reprimand to dismissal from the College, and in certain circumstances may involve legal action.

Specialized Supports**Counselling and Disability Services**

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

SKILL Centre

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.

Authorization

This course outline has been reviewed and approved by the Program Chair.



Gillian, Whalen, Instructor

Lisa Turner, Chair

Date Authorized

Guy Harmer, Dean

Date Authorized