

SCIE 030A, Science 30*5 Credits, 6 hours lecture*

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; the principles of heredity and genetics; and immune and circulatory systems.

Prerequisites: Science 010

Co-requisites: MATH20-1, MATH20-2 or MATH20-3 or permission from the program Chair

Instructor

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Office Hours

Tuesday	4:00	–	4:50 pm
Wednesday	11:00 am	–	12:50 pm
Thursday	12:00	–	12:50 pm
Friday	9:00	–	9:50 am

Hours of Instruction

Monday lectures	10:00 – 11:50 am	Room S207
Wednesday lectures	8:00 – 9:50 am	Room S207
Friday lectures	1:00 – 2:50 pm	Room S207

Required Resources

Science 30 text, Alberta Education, ISBN 978-0-7741-2891-9 (bookstore)

Science 030 Student Manual & Slide Notes (bookstore)

Scientific Calculator– (must have log functions)

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- Identify the parts and functions of the heart and circulatory system
- Explain the flow of blood through the body
- Identify parts of blood and their makeup
- Explain the immune response and specific roles of B-cells, T-cells
- Discuss diseases and disorders of the circulatory and immune system

- Apply the principles of heredity and molecular genetics to explain: how human diseases can arise from inherited traits, the risks and benefits of genetic technology, and the need for ethical considerations in the application of scientific knowledge
- Describe properties of acids and bases
- Calculate pH & pOH and hydronium/hydroxide concentrations
- Write Brønsted Lowry equations
- Identify an appropriate indicator for analysis
- Understand how to perform a titration
- Analyze data from a titration, given the chemical equation
- Discuss effects of acids and bases on the environment (acid rain, erosion, acid deposition)
- Name and draw organic compounds (aliphatics, aromatics, alcohols, halides, acids and esters)
- Identify how organic compounds impact society (fossil fuels, combustion, pesticides)
- Explain what fields are and how they apply to magnets
- Explain how motors and AC/ DC generators work
- Write and draw series and parallel circuits
- Determine how power is calculated
- Explain how energy is moved along a transformer
- Describe the EMR spectrum
- Explain what non-renewable and renewable energies are available
- Discuss nuclear energy in terms of fission and fusion, and their by-products of (alpha, beta and gamma radiation)
- Discuss sources of renewable energy (wind, solar, photovoltaic, biomass, biofuel, tidal, geothermal)
- Analyze the impacts of the renewable energies in everyday life (pros and cons)

Evaluation

Assignments	10 %
Quizzes	10 %
Lab Activities / Projects	20 %
Midterm Exam (Circulation / Immunity, Genetics, Acids & Bases)	30 %
Final Exam (Organic Compounds, Physics & Energy Units C & D)	30 %
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Total	100 %

The minimum pre-requisite for progression is 1.7 (refer to Grading System below)

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	60 – 64
Poor	1.3	55 – 59
Minimum Pass	1.0	50 – 54
Failure	0.0	0 – 49

Proposed Schedule of 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 on Moodle, course notes and textbook for detailed outlines and descriptions of each section.

Unit 1-Circulatory System, Blood & Immune System

- Parts of the heart & circulatory system
- Types of blood cells and their functions
- Flow of blood
- Inflammatory & Immune response
- Vaccinations
- Diseases & Disorders of the circulatory & immune systems

Unit 2-Genetics

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

Unit 3- Acids & Bases

- Empirical properties of acids & bases
- pH & pOH calculations
- hydronium & hydroxide problems
- Brønsted Lowry predicting
- 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 (Physics)

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

Unit 6- Limitless & Sustainable Energy (Physics)

- 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

Calendar of Important Events

Dates on the following calendar are tentative; shaded areas indicate no Science 030 classes.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Jan 8 Introduction (First day of classes)	9	10 Circulatory System	11	12 Circulatory System Virtual Lab
2	15 Quiz Class Activity: How much does heart pump?	16	17 Immunity Role-Play Project	18	19 Genetics
3	22 Quiz Genetics Lab	23	24 Finish Genetics/Start Chem Review	25	26 Chemistry Review
4	29 Immunity Role-Play Presentations	30	31 Chemistry Review	Feb 1	2 Acid/Base Intro
5	5 Acid/Base Bronsted-Lowry Predicting	6	7 Acid/Base B-L predict	8	9 Acid/Base pH
6	12 Quiz Acid/Base pH	13	14 pH problems	15	16 pH problems
7	19 Family Day Holiday College Closed	20 Reading Day— No Classes	21 Reading Day— No Classes	22 Reading Day— No Classes	23 Reading Day— No Classes
8	26 MIDTERM EXAM	27	28 Organic Chemistry/alkanes	Mar 1	2 Organic Chemistry/alkanes
9	5 Alkenes/Alkynes	6	7 Organic Quiz 1 Hydrocarbon Derivatives	8	9 Hydrocarbon Derivatives
10	12 Organic Quiz 2 Energy Sources	13	14 Energy Sources	15	16 Renewable Energy ALT ENERGY PROJECT
11	19 Radiation	20	21 Electricity	22	23 Electricity
12	26 Electricity	27	28 Fields, Motors, Generators	29	30 Good Friday Holiday College Closed
13	Apr 2 Easter Monday College Closed	3	4 ELECTRICITY VIRTUAL LAB CC267	5	6 Magnetism/Motors Generator Lab ALT ENERGY PROJECT DUE
14	9 Magnetism/Motors GENERATOR LAB DUE	10	11 Electromagnetic Radiation	12	13 Last Day of Classes Review/Exam Hints
15	16 Final Exams	17 Final Exams	18 Final Exams	19 Final Exams	20 Final Exams

Please Note:

Date and time allotted to each topic is subject to change.

***Final exam dates are scheduled by the College. Do not book travel before April 21, 2018.**

Course Specific Policies

1. Attendance Policy:

Science 030 Section A is designed as a **face-to-face course**, so success is improved by being on time and regularly attending. Extended or frequent absences *for any reason cannot* be accommodated and can impact your overall mark. *Some suggestions for handling occasional lecture absences include:*

- a. checking the Calendar of Events, [News Forum](#) and slide notes by logging into ilearn.keyano.ca
- b. finding a “classroom buddy” whom you can contact for details regarding what you have missed. I do not use ilearn to post exact slides and daily homework, or worked solutions from the lectures.
- c. **check your Keyano email frequently**; notices posted to the ilearn forum automatically go there.

2. Electronic devices policy:

- a. Texting and personal web browsing in **NOT** permitted during class time.
- b. Some students find usage of tablets and laptops to follow slides very helpful during lectures, so you are welcomed to bring these to class **for instructional purposes only**.
- c. Sounds on all cell phones should be turned off during class and if you need to take an important call please leave the room to avoid disrupting others. **Please note that using electronic devices to record the class in any way (audio, video, photos, etc.) is not permitted.**

3. Late Work Policy: assigned work must be received in hard copy and in person. It will receive

- a. full marks when received in person on the due date.
- b. the earned grade, minus 20%, for each day late.
- c. a mark of zero if received after I have returned work, posted answer keys on ilearn, or reviewed answers during class. I do not accept work pushed under my office door.
- d. No late work will be accepted for Practice Problems or Completion Checks.

4. Other Course Policies and Procedures:

- a. **work submitted by non-attending students may not be marked.**
- 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. in-class quizzes cannot usually be rewritten, as these are meant to give you immediate feedback on your progress.
- d. a missed exam 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.
- e. ***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.**

Should you have trouble logging into ilearn.keyano.ca, please contact Keyano College Information and Technology Services (its.helpdesk@keyano.ca or 780-791-4965).

Performance Requirements

Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

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
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

Specialized Supports**Counselling and Accessibility 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.