

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.

Alberta Education Course Equivalency: Science 30

Prerequisites: SCIE 010; one of BIOL 025, CHEM 025, PHYS 025, SCIE 020; and MATH 20-1 or MATH 20-2, or permission from the program chair

Instructor

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Office Hours

Mondays	1:00 – 1:50 PM
Wednesdays	12:00 – 12:50 PM
Thursdays	3:00 – 4:50 PM
Fridays	3:00 – 3:50 PM

Hours of Instruction

Tuesday:	3:00 PM – 4:50 PM	CC283
Thursday:	1:00 PM – 2:50 PM	CC283
Friday:	1:00 PM – 2:50 PM	CC283

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
- Explain 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
- Explain the effects of acids and bases on the environment (acid rain, erosion, acid deposition)
- Name and draw organic compounds (aliphatics, aromatics, alcohols, halides, acids, 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 %

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	1.7
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
- Transformers
- 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	January 6	7 Introduction	8	9 Circulatory System	10 Circulatory System
2	13	14 Circulatory System Lab Activity	15	16 Immunity / Role Play Project	17 Class Activity: How much does the heart pump?
3	20	21 Genetics	22	23 Genetics	24 Genetics Lab Activity
4	27	28 ROLE PLAY PRESENTATIONS	29	30 Chemistry Review	31 Acid Deposition Intro
5	February 3	4 Bronsted-Lowry Predicting	5	6 B-L Predicting / Indicators	7 Acid / Base pH
6	10	11 Acid / Base Titrations	12	13 Acid / Base Titrations and Buffers	14 Effects of acid deposition on the Environment / Review
7	17 Family Day College Closed	18 Reading Week – No Classes	19 Reading Week – No Classes	20 Reading Week – No Classes	21 Reading Week – No Classes
8	24	25 MIDTERM EXAM	26	27 Organic Chemistry / Alkanes	28 Organic Chemistry / Alkanes
9	March 2	3 Alkenes / Alkynes	4	5 Hydrocarbon Derivatives	6 HC Derivatives / Impacts of Organic Compounds on Environment
10	9	10 Energy Sources	11	12 Energy Sources / Radiation	13 Renewable Energy / ALT ENERGY PROJECT
11	16	17 Fields, Motors, Generators	18	19 Magnetism / Motors Generator Lab	20 Magnetism / Motors Generator Lab Due
12	23	24 Electricity	25	26 Electricity	27 Electricity
13	30	31 Electrical Circuits Virtual Lab Rm TBA	April 1	2 Transformers Electrical Lab Due	3 Electromagnetic Spectrum
14	6	7 ALT ENERGY PRESENTATIONS	8	9 Last Day of Class Review	10 Good Friday – College Closed
15	13 Easter Monday – College Closed	14 Final Exams	15 Final Exams	16 Final Exams	17 Final Exams
16	20 Final Exams	21 Final Exams	22 Final Exams	23	24

Please Note:

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

Final exams are scheduled by the College. Do not book travel until APRIL 23rd.

Please note that deferred exams will **NOT be approved for travel**, even if the travel was booked prior to enrolling in the course.

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 is **NOT permitted** during class lecture 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 10%, for each day late.
- c. a mark of zero if received after I have returned work. I do not accept work pushed under my office door.
- d. no late work will be accepted once keys are posted or marked assignments are returned.

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. A quiz can be omitted with valid medical documentation only.
- 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.

Laboratory Safety

In the science laboratories, safety is important and therefore students must complete the *WHMIS for Students* online training course on Moodle (ilearn.keyano.ca) 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.

Before entering the lab, students are responsible reviewing the lab manual and relevant Safety Data Sheets for the purpose of evaluating risks associated to health. Some hazards used in the laboratory may have additional risks to those with pre-existing medical conditions.

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.

Specialized Supports

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre, Wellness Services and Student Life Department work together to support student success at Keyano College.

Accessibility Services (CC167) supports student success through group and individualized instruction of learning, study and test taking strategies, and adaptive technologies. Students with documented disabilities, or who suspect a disability, can meet with the Learning Strategists to discuss accommodation of the learning barriers that they may be experiencing. Students who have accessed accommodations in the past are encouraged to visit our office at their earliest opportunity to discuss the availability of accommodations in their current courses. Individual appointments can be made by calling 780-791-8934.

Skill Centre (CC119) provides a learning space where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff. Students visiting the centre have access to one-to-one or group tutoring, facilitated study groups, and assistance in academic writing. The Skill Centre's Peer Tutor program provides paid employment opportunities for students who have demonstrated academic success and want to share what they have learned. Tutoring is available free to any students registered at Keyano College on a drop in basis, from 8:30 am to 5:00 pm Monday through Friday. Additional evening hours are subject to tutor availability and are posted in the Skill Centre.

Wellness Services (CC260) offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. The Mindfulness Room in CC260 is available as a quiet space for students to relax during regular office hours. Wellness Service welcomes students to participate in any of the group sessions offered throughout the academic year addressing such topics as Mindfulness and Test Anxiety. Individual appointments can be made by calling 780-791-8934.

Student Life Department (CC210) is a place for students to go when they don't know who else can answer their questions. The staff will help students navigate barriers to success and if they don't know the answer, they will find it out. Student success is directly affected by how connected a student feels to their college. The student life department is there to help students get connected.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.