

UNIVERSITY OF CALGARY – FACULTY OF SCIENCE
NATURAL SCIENCES PROGRAM
SCIENCE 331 COURSE OUTLINE – WINTER 2013

Course: Science 331, Scientific Explorations

Lecture Section			Room	Instructor	Office	Phone	Email	Office Hours
L01	TuTh	14:00-15:15	ES 920	Wendy Benoit	SB 149D	403-220-3652	wlbenoit@ucalgary.ca	By appointment only

Blackboard Course ID: SCIE 331 L01 – (Winter 2013) – Scientific Explorations (W2013SCIE331L01)

Natural Sciences Program Office: SB 149, 403-220-8367, sciemail@ucalgary.ca

Prerequisites: Registration in the elementary route of the concurrent BEd/BA (Faculty of Arts), BEd/BKin, or BEd/BSc (Faculty of Science) degrees or consent of the Director. Students are responsible to ensure that they meet all pre- and co-requisite requirements, as listed in the Calendar, for each course in which they are registered. **Students who do not meet these requirements will be deleted from the course.** Please see: www.ucalgary.ca/pubs/calendar/current/science.html#6260

Grading: The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Course Component	Weight
Activities Log (total = 15%)	
Entries throughout term	12%
End of term reflection	3%
Question Project (total = 35%)	
Proposal	5%
Progress Report	10%
Final	20%
Midterm examination (Thursday, February 14)	20%
Final examination (in April, scheduled by the Registrar)	30%

Grading Scale							
A+	*	B+	80 – 83.5%	C+	68 – 71.5%	D+	55 – 59.5%
A	> 88%	B	76 – 79.5%	C	64 – 67.5%	D	50 – 54.5%
A-	84 – 87.5%	B-	72 – 75.5%	C-	60 – 63.5%	F	< 50%

* A grade of A+ is reserved for exceptional cases of outstanding performance.

Each component of the course will be assigned a percentage score. The student's average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

Examination Policy: The midterm examination will be held during class time on Thursday, February 14. The final exam will be scheduled by the Registrar's Office. The University policies around examinations and tests are described in [section G](#) of the 2012-2013 Calendar: <http://www.ucalgary.ca/pubs/calendar/current/g.html>

Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: www.ucalgary.ca/pubs/calendar/current/sc-3-6.html. It is the student's responsibility to familiarize himself/herself with these regulations, including those on attendance: www.ucalgary.ca/pubs/calendar/current/e-3.html.

Deferred examinations will only be provided for the Final Examination and then only with the approval of the Associate Dean. In the event that a student misses the midterm due to illness then a medical note will be required. If a student misses the midterm

for other reasons, then analogous documentation would be required. The instructor will need to see the original note and keep it (or a copy of it) for their records. The documentation must be provided to the instructor within 15 days of the date of the midterm in order for an excused absence to be awarded. If such documentation is not provided within this time frame then a grade of zero will be assigned to the midterm.

Course Requirements: This course is focused on key achievements in science and the process used to carry out scientific investigations. To learn the material effectively, attendance and active participation in all classes is key to your success. You are encouraged to meet with your instructor periodically during the semester to discuss your progress. Students are required to have a University of Calgary email address in order to communicate with their instructor and to access Blackboard. In this course, the quality of the student's writing will factor into the evaluation of all assignments (see section [E2 Writing Across the Curriculum](#) in the University Calendar for more details www.ucalgary.ca/pubs/calendar/current/e-2.html). The required course textbook is listed below. A detailed course syllabus for Science 331 is posted on Blackboard.

Textbook: Trefil J, Hazen R. 2013. The Sciences: An Integrated Approach. 7th edition. John Wiley & Sons, Inc. This textbook is required and is available at the University Bookstore. Assigned readings from this text will be posted regularly on Blackboard.

Ethics Statement: If you consent, your course work may be used for research purposed once the course is over. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

Other Important Information for Students:

Academic Misconduct: (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under K. Student Misconduct (www.ucalgary.ca/pubs/calendar/current/k.html) to inform yourself of definitions, processes and penalties

Assembly Points: In case of emergency during class time. Be sure to FAMILIARIZE YOURSELF with the information at www.ucalgary.ca/emergencyplan/assemblypoints.

Academic Accommodation Policy: Students with documentable disabilities are referred to the following links:

Calendar entry on students with disabilities: www.ucalgary.ca/pubs/calendar/current/b-1.html

Disability Resource Centre: www.ucalgary.ca/drc/

Safewalk: Campus Security will escort individuals day or night (www.ucalgary.ca/security/safewalk/). Call **220-5333** for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

Freedom of Information and Privacy: This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). For more information see also www.ucalgary.ca/secretariat/privacy.

Student Union Information: VP Academic Phone: 220-3911, Email: suvpaca@ucalgary.ca.

SU Faculty Rep. Phone: 220-3913, Email: sciencerep@su.ucalgary.ca Website www.su.ucalgary.ca/home/contact.html.

Student Ombudsman: SU Link: www.su.ucalgary.ca/page/quality-education/academic-services/student-rights

Ombudsman's Website: www.ucalgary.ca/provost/students/ombuds

Internet and Electronic Communication Device Information: You can assume that in all classes that you attend, ***your cell phone should be turned off***. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

Program Director's Approval: _____ Original approved by Program Director (C. Graham) _____ Date: _____ January 2013 _____

Associate Dean's Approval for alternate exam arrangements: _____ Original approved by Associate Dean (B. Hicks) _____ Date: _____ January 2013 _____

FACULTY OF SCIENCE — NATURAL SCIENCES PROGRAM
SCIENCE 331: SCIENTIFIC EXPLORATIONS
COURSE SYLLABUS – WINTER 2013

Lecture Section			Room	Instructor	Office	Phone	Email	Office Hours
L01	TuTh	14:00-15:15	ES 920	Wendy Benoit	SB 149D	403-220-3652	wlbenoit@ucalgary.ca	By appointment only

I. Rationale:

Scientific Explorations is a science content course for B.Ed. students offered by the Natural Sciences Program in the Faculty of Science. The overarching goal of this class is to provide a foundation in scientific principles, key scientific findings, and the nature of science that will be useful to (pre-service) elementary teachers.

II. Course Aims and Objectives:**Aims**

During this course, you will explore scientific content through readings, discussions, and hands-on activities. You will keep a record of your progress through an Activities Log, and you will showcase how scientific information can be used to address questions about the natural world through the Question Project. By building your understanding of science in these ways, you will develop essential skills for interpreting and disseminating scientific information in your future career as an elementary educator.

Specific Learning Objectives

By the end of this course, students will develop a set of transferable skills by:

- Reading about and discussing key scientific findings and historical contributions to science
- Identifying questions that can be addressed using the process of science
- Discussing scientific ideas using appropriate scientific vocabulary
- Communicating scientific information from properly referenced sources
- Participating in hands-on activities that illustrate key ideas in science
- Seeking out scientific information and critically analyzing the validity of the information source
- Developing an awareness of major and common misconceptions in science

III. Format and Procedures:

Attendance: Class attendance is necessary as the class discussions and activities are important in developing the skills outlined above. Furthermore, it is essential that you prepare for class by completing assigned readings and homework and come to class prepared to work on this material.

Structure of the course: Throughout the course, class sessions will be a mixture of lectures, activities, and group discussions. To ensure you have the appropriate background information for the planned class activity, you will need to keep up to date with the assigned course readings (see **Class preparations - course readings** described below). In addition to the required readings, you will continually make entries into an Activities Log throughout the term that will allow you to track your progress through the scientific topics and then reflect on your progress in a thoughtful way. Entries in your Activities Log will be submitted several times throughout the term for grading (see **Class assignments - Activities Log** below). Beyond in-class activities, you will have the opportunity to seek out and apply scientific information independently through the Question Project (see **Term Project – Question Project** below). The (midterm and final) examinations will be used to gauge your familiarity with the course content and your ability to use a scientific approach to problem solving.

Class preparations - course readings: The majority of the content of this course has been grouped into one of five main topic areas: Energy, Forces & Motion, Matter, Our Environment, and Plants & Animals. As the course progresses, each of these topic areas will be explored through class activities that you will need to prepare for by doing the assigned readings in the textbook. **Assigned readings will be posted regularly on Blackboard; the following table provides a general guide to which chapters the readings will be drawn from for each topic area.**

Topic Area	Related Textbook Chapters
Overview – Science	Chapter 1 – Science: A Way of Knowing
Energy	Chapter 3 – Energy Chapter 4 – Heat and the Second Law of Thermodynamics Chapter 5 – Electricity and Magnetism Chapter 6 – Waves and Electromagnetic Radiation Chapter 14 – The Stars
Forces & Motion	Chapter 2 – The Ordered Universe Chapter 7 – Albert Einstein and the Theory of Relativity Chapter 9 – Quantum Mechanics (cross-listed with Matter) Chapter 15 – Cosmology Chapter 16 – Earth and Other Planets
Matter	Chapter 8 – The Atom Chapter 9 – Quantum Mechanics (cross-listed with Forces & Motion) Chapter 10 – Atoms in Combination: The Chemical Bond Chapter 11 – Materials and their Properties Chapter 12 – The Nucleus of the Atom Chapter 13 – The Ultimate Structure of Matter
Our Environment	Chapter 17 – Plate Tectonics Chapter 18 – Earth’s Many Cycles Chapter 19 – Ecology, Ecosystems, and the Environment
Plants & Animals	Chapter 20 – Strategies of Life Chapter 21 – The Living Cell Chapter 22 – Molecules of Life Chapter 23 – Classical and Modern Genetics Chapter 24 – The New Science of Life Chapter 25 – Evolution

Class assignments - Activities Log: This log will be a record of the scientific ideas you have studied, the related activities you engaged in, and your reflections on the process. It is intended that this log and your textbook will be resources you can draw upon for the duration of this class and beyond. There will be regular postings on Blackboard to provide further details as the term progresses. Some entries will be completed in class (print-out handout and bring to class) while others will be completed out of class and submitted electronically, depending on the requirements for that entry. Entries in your activities log will be submitted throughout the term for grading and instructor feedback. Each graded entry will be assigned a mark out of 2: a thorough and thoughtful entry will earn 2/2, a partial, unclear, or incomplete entry will earn 1/2, and a missing entry will earn 0/2. It is important to keep your entries for the duration of the term, as you will complete an overall Activities Log Reflection (3%) at the end of term that will require you to review your term work.

Term Project - Question Project: Completing this project will help you build and refine the way you search for and apply scientific information to answer questions about the natural world. The project will be evaluated at three stages: Proposal (5%), Progress Report (10%), and Final (20%). All assignment details and grading rubrics can be found on Blackboard.

IV. Responsibilities and Expectations

As a student in Science 331, you will:

- Come prepared to participate actively in class activities
- Read all material on Blackboard and assigned sections of the textbook
- Complete all assignments to the best of your ability and submit all assignments on time
- Provide thoughtful, well-organized, and critical responses in your Activities Log
- Reflect on feedback you receive from your instructor incorporate these suggestions into your work

What can you expect from your instructor?

Most of this syllabus is directed at giving you information about the structure of the course, grading and assignment information and what I (the instructor) expect from you. However, I also recognize that there are certain expectations that I need to meet in order for you to have a positive learning experience in this class.

Specifically, I will:

- Be respectful of all persons in the class and create an environment where all opinions and comments are heard and valued
- Be available outside of class time to discuss course work or other course concerns
- Provide you with instructional material that will enable you to excel in this class
- Develop activities that encourage you to explore scientific concepts and common misconceptions
- Assess all assignments fairly and provide suggestions and comments for improvement

V. Course Requirements:

1. Class Attendance: It is important that you attend all scheduled Science 331 classes. If you think you will need to miss class, email the instructor ahead of time to find out alternative arrangements. If you are ill, email the instructor as soon as possible and make-up arrangements can be planned.

2. Activities Log Submissions – If you miss class, you will not be able to participate in the class activity planned for that day. It is important that you contact the instructor (see 1. above). Some activities log submissions may be due in-class, whereas others may be due via email or as homework submitted at the beginning of class. Deductions will be made for late or missing submissions without documentation of illness, etc. as discussed under Question Project Submissions below.

3. Question Project Submissions – Valid reasons for missing a submission deadline are the same criteria as those for deferred finals: documented cases of serious family afflictions or illness (a medical note is required). In these cases you will not be penalized **provided that you contact the course instructor within 48 hours** and your overall mark will be prorated to account for this excused deadline.

Late assignments will be subject to point **deductions of 15% of the total possible for each day (up to 24 hours)** dependent on the time the submission is received. It is best to notify the course instructor on the deadline date if your work will be submitted late.

4. Re-grading of Assignments or Exams – If you are concerned about the comments on your assignment/exam or have questions about the grade you have earned, you should email the instructor. If you think the mark earned is not appropriate, you should write an email letter to the instructor to present your argument. You must submit this information to the course instructor within 15 days of the date your mark on this work was made available to you. Please note: Your work may be re-graded by another individual. The mark may go up, it may go down, or it may stay the same.

VI. Grading Procedures

Understanding how your assignments will be graded is key. For all assignments, an assignment details sheet and the grading rubric that outlines the qualities of performance can be found on Blackboard.

In determining the overall grade in the course, the following weights will be used:

Course Component	Weight
Activities Log (total = 15%)	
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A-	84 – 87.5%	B-	72 – 75.5%	C-	60 – 63.5%	F	< 50%

* A grade of A+ is reserved for exceptional cases of outstanding performance.

VII. Academic Integrity

Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. **All work submitted for this class (whether as a draft or for final grading) is held to the strictest standards for intellectual honesty. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero-tolerance policy regarding dishonesty.** Please read section K of the University Calendar under [Student Misconduct](http://www.ucalgary.ca/pubs/calendar/current/k.html) (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) and visit www.ucalgary.ca/honesty

Each student in this course is expected to abide by the University of Calgary code of academic conduct. **Any work submitted by a student in this course for academic credit will be the student's own work.**

You are encouraged to study together and to discuss information and concepts covered in lecture with other students. You can give "consulting" help to or receive "consulting" help from other students. We will discuss plagiarism in class. If you have any questions about what constitutes plagiarism, please talk to your instructor.

VIII. Accommodations for students with disabilities

Students who have academic accommodations from the Disability Resource Centre (DRC) should talk to the course instructor within the first two weeks of classes so that appropriate accommodations can be made. Information about the services provided by the DRC can be accessed at: <http://www.ucalgary.ca/drc/>