ENVS 4201 - Environmental Research Methods
3 credits, 6 hours contact time

Under the supervision of a faculty member, students will complete independent research projects of particular topics in environmental science, involving laboratory and fieldwork, where appropriate. Students will acquire skills in formulating hypotheses, experimental design, practical skills, data collection and interpretation, scientific writing and oral communication.

Prerequisites and/or co-requisites
ENVS 3307 and ENVS 3333, or consent of the department.

Instructor

Dr. Marie-France Jones
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Office Hours

Tuesday: 12-2 pm
Wednesday: 5-6 pm
Thursday: 4-6 pm

Hours of Instruction

Lecture:	Tuesday/Thursday	2 - 3:20 pm, in CC 267
Lab:	Wednesday	1 - 3:50 pm, in CC 234

Required Resources

There are no required textbooks for this course.

Primary scientific literature, best-practices guidelines, websites and NGO publications will be identified, applied and/or provided, as required during the course.

Other supplies and requirements

1. Hard copy of completed current WHMIS course certificate for first lab (online resource)

2. Hard copy of completed, signed plagiarism course certificate. No assignments will be accepted until this requirement is met.

3. Dedicated lab coat (full lab coats that go to the knees) for Biology lab (CC 234)

4. Moodle (http://ilearn.keyano.ca). The course outline, lecture notes and other resources will be made available on Moodle.

Course Outcomes

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

- Carry out a bibliographical review of research topics, including primary scientific literature and professional reports
- Develop topic introductions that identify contexts for projects
- Formulate project aims and objectives
- Develop experimental designs that are statistically valid and directly address research priorities
- Develop budgets for proposed research projects
- Develop risk assessments for proposed research projects
- Demonstrate practical proficiency and understanding of theoretical underpinnings of technical laboratory skills used for research projects
- Adaptively manage tasks to meet project goals on time and on budget
- Communicate complex scientific techniques in writing and orally
- Collect, analyze and interpret research data
- Communicate scientific findings in writing and orally

Evaluation

Item	Percent	Due Date
Research Proposal	20%	Feb 13, 2020
Poster (Abstract & Printed Poster)	15%	March 20, 2020
Written Scientific Report	30%	April 8, 2020
Presentation	15%	April 8, 2020
Leadership / Group Assessment	20%	
Total	*100%*	

Note: there is no final exam in this course

A grade of C- or better is required for progression or transfer.

Schedule of Topics

Seminars Date	Topic
Jan 7 / 9	- Experimental design theory and terminology. - How to design a well-defined hypothesis.
Jan 14 / 16	- Experiment sampling and repetition. - What to sample and how.
Jan 21 / 23	- Types of experimental design. - Proper scientific report writing.
Lab Dates	**Topics**
Jan 15, 22, 29	Developing bibliographical review and research proposal.
Feb 5, 12, 26, March 4, 11	Conducting Experiment: experiment methodology and results (compiling, analyzing and presenting).
March 18, 25, April 1	Report Writing
April 8	Oral Presentation and Written Report Submission

Research project activities will be arranged between students and the instructor. Students will be involved in preparing the proposal, posters, written report and oral presentation of their research, conducted within the allocated lab and seminar time.

Grading System

Descriptor	Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
Excellent	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
Good	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
Satisfactory	C	2.0	64 – 66.9	
Progression	C-	1.7	60 – 63.9	
Poor	D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
Minimum Pass	D	1.0	50 – 54.9	
Failure	F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

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 before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course. 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 students' 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.

Please note that students who miss two or more labs, for any reason, automatically fail this course because too much material will have been missed. There are no 'make-up labs' in ENVS 4201.

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

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre and Wellness Services, 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 9:00 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.

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