LIBST 1102A – Controversies in Science
3 credits, 3 hours lecture

This course provides an introduction to scientific knowledge, its role in society, and the relationship between scientific inquiry and mathematics. Students will learn about the scientific method, the role of mathematics and statistics as reasoning tools, and how to research, evaluate, and write about science. Science controversies will be used as case studies with an emphasis on developing critical thinking skills.

Prerequisite/Co-requisite – entrance into Environmental Science program.

Instructor
Dr. Danna Schock
Office: S209c
Phone: (780) 791-4816
Email: danna.schock@keyano.ca

Office Hours
Mondays 10:00 – 11:50 am
Tuesdays 10:00 – 11:50 am
Thursdays 11:00 am – 11:50 am

Hours of Instruction

Lecture
Tuesday 3:00 – 4:50 pm Room CC267
Friday 1:00 – 1:50 am Room CC267

Required Resources

1. Moodle (http://ilearn.keyano.ca). The course outline, lecture notes, required readings and other resources will be made available on Moodle. It is your responsibility to check Moodle frequently and stay informed about resources posted there.

2. Keyano College email address. I will not correspond with students using their personal email addresses.

3. You are not required to purchase a textbook or course pack for this class. Readings will come from a variety of sources including the primary literature, grey literature, websites and books.
Course Outcomes

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

1) Explain how scientific knowledge is developed and the role of science in society by:
   a) Studying the development of a scientific theory – how a theory originates and evolves;
   b) Considering the social, economic, and political impacts of developments in science and technology;
   c) Understanding the roles and responsibilities of scientists;
   d) Recognizing that not all problems have scientific or technological solutions.

2) Explain the scientific process, including the ability to:
   a) Explain how inductive and deductive reasoning are used, including examples;
   b) Differentiate between qualitative and quantitative data;
   c) Demonstrate the importance of reproducibility through the use of examples;
   d) Demonstrate that correlation is not causation through the use of examples;
   e) Distinguish between genuine scientific argument and statements that are not supported by scientific evidence;
   f) Recognize biases in arguments.

3) Apply mathematics and statistics as reasoning tools, including:
   a) Evaluating how statistics are used to present and interpret data, including misrepresentation;
   b) Identifying ways in which surveys can yield unreliable conclusions;
   c) Explaining what probabilistic statements mean;
   d) Demonstrating the importance of time scales, orders of magnitude, and rates of change in comparison to human frames of reference.

4) Research, evaluate, and write about science, including the ability to:
   a) Use information literacy skills to find relevant sources;
   b) Analyze scientific articles from various points of view;
   c) Apply the scientific knowledge and statistical skills acquired in the course;
   d) Use effective oral and written skills to communicate essential information about a reading or topic.

Evaluation

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
<th>Due Date</th>
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</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>15%</td>
<td>Friday 29 Sept</td>
</tr>
<tr>
<td>Case Study 1 research assignment</td>
<td>25%</td>
<td>Friday 20 Oct</td>
</tr>
<tr>
<td>Case Study 2 presentation and paper</td>
<td>30%</td>
<td>Tues 7 Nov</td>
</tr>
<tr>
<td>Case Study 3 research assignment</td>
<td>30%</td>
<td>Thurs 7 Dec</td>
</tr>
</tbody>
</table>

*There is no final exam in LIBST 1102*

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

Attendance will be taken in accord with department policy.

This will be accomplished by sign-in sheets distributed at the beginning of class/lab. Each student must enter their own information on the sign-in sheet. Failure to record your information on the sign-in sheets will be recorded as an absence.

PowerPoint presentations that get posted to Moodle should be thought of as study guides; you must take additional notes in class to do well.

Exams and Assignments

Students who do not complete all the required work should not expect to pass the course.

It is YOUR responsibility to make sure you know when assignments are due, and when exams take place. Major exam dates are listed in this course outline. Assignments will be announced in class/lab.

You will have at least 1 week to complete assignments.

Assignments are due at the start of class on the day they are due. Assignments are automatically late if not handed in when asked for at the start of class.

Late assignments will be penalized 20% per day late and will not be accepted if more than 5 days late.

Do not email any assignments to me. I won’t open them; they will be deleted.

Material presented by guest lecturers and material presented during student presentations will be included on exams.

Students who arrive more than 15 minutes late on presentation days will not be allowed to present and will receive a grade of zero on their presentations. Be on time.

The final exam will be cumulative.

Travel plans are NOT valid excuses for missing a final exam. Do not make plans to travel during the final lecture exam period (11 - 15 Dec). Exams missed under these circumstances will not be accommodated and therefore completion of the course is not possible.

For information on Deferred Exams, Supplemental Exams and other general College-wide policies pertaining to exams, students should consult:
http://www.keyano.ca/Academics/Examinations
## Grading System

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

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTIVITY</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>First Day of Classes Wed 6 Sept, last day of classes Thur 7 Dec</strong></td>
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<tr>
<td>Week of 4 Sept</td>
<td>Course orientation, clarification of expectations</td>
</tr>
<tr>
<td>Week of 11 Sept</td>
<td>The process of science</td>
</tr>
<tr>
<td>Week of 18 Sept</td>
<td>Review of mathematical and statistical concepts and tools</td>
</tr>
<tr>
<td>Week of 25 Sept</td>
<td>Review of mathematical and statistical concepts and tools Mid-term exam (worth 15% of final grade)</td>
</tr>
<tr>
<td>Week of 2 Oct</td>
<td><strong>Case Study 1</strong> – Genetically Modified Organisms (GMO’s): Introduction to topic including key aspects that create controversy, Case Study 1 readings and research assignment (worth 25% of final grade)</td>
</tr>
<tr>
<td>Week of 9 Oct</td>
<td><strong>Case Study 1</strong> – GMO’s cont: examination of primary literature, social media and non-government organization sources for content, intentions, biases, consideration of conflicts of interest, and ramifications.</td>
</tr>
<tr>
<td>Week of 16 Oct</td>
<td><strong>Case Study 1</strong> – GMO’s cont: examination of sources of information cont. GMO Research assignment due 4 pm Friday 20 Oct</td>
</tr>
<tr>
<td>Week of 23 Oct</td>
<td><strong>Case Study 2</strong> – Class’s choice of topic (Topic will be decided by class no later than 15 Sept) Introduction to topic including key aspects that create controversy. Case Study 2 readings and assignment (student-led discussions + papers; 30% of grade)</td>
</tr>
<tr>
<td>Week of 30 Oct</td>
<td><strong>Case Study 2</strong> – Examination of primary literature, social media and non-government organization sources for content, intentions, biases, consideration of conflicts of interest, and ramifications.</td>
</tr>
<tr>
<td>Week of 6 Nov</td>
<td><strong>Case Study 2</strong> – student-led presentations and discussions. No class Fri 10 Nov due to Fall Reading Break</td>
</tr>
<tr>
<td>Week of 13 Nov</td>
<td><strong>Case Study 3</strong> – Traditional Ecological Knowledge and Western Science Introduction to topic including key aspects that create controversy, Case Study 3 readings and research assignment (worth 30% of final grade)</td>
</tr>
<tr>
<td>Week of 20 Nov</td>
<td><strong>Case Study 3</strong> – Examination of primary literature, social media and non-government organization sources for content, intentions, biases, consideration of conflicts of interest, and ramifications.</td>
</tr>
<tr>
<td>Week of 27 Nov</td>
<td><strong>Case Study 3</strong> – Guest lecture, examination of sources of information cont.</td>
</tr>
<tr>
<td>Week of 4 Dec</td>
<td><strong>Case Study 3</strong> – Examination of sources of information cont. TEK/Western Science research assignment due 4 pm Thurs 7 Dec</td>
</tr>
</tbody>
</table>

**Please Note:**

Date and time allotted to each topic is subject to change.
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 and Mount Royal University Credit Calendars.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College and Mount Royal University credit calendars. 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 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.

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 and Mount Royal University credit calendars. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

Keyano College and Mount Royal University take the matter of plagiarism very seriously. All work handed in by a student must be original work that has been done by that individual. It is understood that students use the work and ideas of others as the basis for their own work but those sources must be properly credited. Failure to credit your sources will be considered an act of academic dishonesty - or plagiarism - and can result in an automatic "F" grade for the course and a permanent notation on your transcript.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on Moodle. Once you have successfully completed the course, 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.
Authorization
This course outline has been reviewed and approved by the Program Chair.

Danna Schock, Instructor

Louis Dingley, Chair  Date Authorized

Vincella Thompson, Dean  Date Authorized

Signed copies to be delivered to:
Instructor
Registrar’s Office