

Syllabus

Online Natural Science Inquiry (NSI)

SCI 201, UNST 286

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Overview of Natural Science Inquiry

Natural Science Inquiry (NSI) is designed to engage you in scientific investigations of problems of the sort you might encounter as an attentive citizen. The course uses no textbook and involves little formal lecture. *The learning you accomplish in this course will take place largely through your own effort and the efforts of those with whom you work.* The use of collaborative inquiry takes account of the fact that the modern sciences, as well as the questions they address, require teamwork both within and between specific disciplines. We wish to create a context within which this sort of teamwork is required to tackle the problems put before you.

As you will see right away, the schedule of events does not look like the listing of lectures and textbook reading assignments that characterize many science courses. Instead, learning in Natural Science Inquiry is accomplished through inquiry-based projects on a variety of topics. The successful completion of these projects requires that you: (1) work independently and collaboratively, (2) conduct literature reviews, (3) design experiments, (4) use computers to analyze and interpret data, and (5) communicate science through writing and a poster.

Student learning in this section of Natural Science Inquiry

As outlined above, this section of Natural Science Inquiry (NSI) relies heavily on student-directed projects and inquiry. **This section of NSI is asynchronous online, which means that we do not have set meeting times.** All the lectures, skills and course projects are online and can be accessed at your convenience. Throughout the term you are expected to work collaboratively on a variety of connected projects that ultimately lead to the design, execution and communication of a natural science experiment. The results of the final project will be communicated to the class and the instructor through a scientific poster.

Course Goals

Students will:

- View science as a process for creating knowledge.
- Be familiar with the basic characteristics of natural science research.
- Distinguish science from pseudoscience.
- Evaluate and critique knowledge claims.
- Recognize and understand scientific literature.
- Examine the role and influence of science in society, in culture and in policy-making.
- Use computers and statistical software (CRAN R) as a research tool.
- Design and conduct a natural science experiment.
- Improve their ability to communicate scientific research through poster presentations.
- Recognize the power and limits of science as a way of creating knowledge.

Course Grading and Evaluations

Evaluation and Grading Categories

Quizzes	5 %
Midterm Exam	10%
Final Exam	20%
Discussions	5 %
Peer Review	5 %
Experiment Proposals	5 %
Experiment Posters and Videos	50 %

Statement on Academic Honesty

Plagiarism or academic dishonesty of any form will not be permitted in this class and will result in a failing grade. For more information, please see Portland State University's Bulletin information on Academic Honesty.

Due Dates and Late Assignments: All Due dates are listed on Canvas. Late assignments will be penalized 15%. The peer review activity and exams cannot be turned in late.

Incompletes: Departmental and university policies dictate that incompletes can be given only for verified medical reasons.

Grading criteria and percentages

C for basic quality, mostly accurate and simply factual, modest conceptual development;
B "above average", accurate with significant integration and conceptual development;
A "superior", high level integration and conceptual development with factual accuracy.

Percent scores and grade break points for letter grades:

A 94 - 100	B+ 87 – 89	C+ 77 – 79	D+ 67 - 69
A- 90 - 93	B 83 – 86	C 73 – 76	D 63 - 66
	B- 80 – 82	C- 70 – 72	D- 60 - 62

Overview of Course Work

A video introduction to the course can be found in the course introduction section on Canvas. This class is divided into multiple learning units. Each learning has a discussion, quiz and or a project associated with it. The due dates for each unit are listed in the schedule and Canvas. This class is organized into groups that you will work with the entire term. Students in each group have been randomly assigned.

Discussions: Most learning units will have an online discussion activity associated with it. To get full credit, students must participate in each discussion for each learning unit.

Quizzes and exams: Course content and skills will be evaluated through quizzes and exams. The quizzes are always open and can be taken an unlimited number of times. Quizzes are due before the corresponding midterm or final exam. Exams are open for 5 days and can be taken twice and must be complete by due dates listed in Canvas. **Exams cannot be taken late, no exceptions.**

Course Experiments: This course requires that your group design and conduct two scientific experiments. Surveys are not allowed. **For your safety, all experiments must be approved by the course instructor before data is collected. Conducting experiments prior to approval will result in a grade of zero for the associated project. In addition, all experiments must include a [video of each dependent sample being collected and measured](#). Experiments without a video or an incorrect video will receive a zero grade.** There are several videos on Canvas that you may use as a model for your video.

Groups: Groups for this class are randomly assigned. You can meet your group members in the “Group Introductions” discussion. All assignments are conducted as a group. Quizzes and exams are individual.

Peer Review: The final course project will be evaluated by other students during an online peer review activity. **The peer review is individual, but you may not participate in the peer review activity until your group has turned in a complete poster. To be fair to all students in the class, the peer review cannot be turned in late. Late peer reviews will receive a grade of zero.**

Posters: Posters describing your group’s natural science experiment will be created by each group using the template provided. Posters will be graded three times: peer review, first draft and final draft.

Data Collection Safety Guidelines: This class requires that you conduct simple experiments in the field.

- All experiments must be approved by the instructor before conducting the experiment.
- For your safety, it's strongly recommended that students travel to field locations during daylight and with another adult.
- For indoor lab work, have a responsible person within shouting distance in the event you need assistance.
- If you travel by car to a field site, the vehicle owner's personal auto insurance is the primary coverage in the event of an accident. Students are expected to follow all applicable laws in the operation of their motor vehicle.

PSU Student Resources

- [Title IX reporting](#)
- [Disability accommodations](#) and the [Disability Resource Center](#)
- [Dean of student life](#)
- [Religious accommodations policy](#)
- [Library](#)
- [Writing Center](#)
- [Food assistance](#)
- [General PSU Policies](#) (e.g., Student Conduct and Responsibility Policy)
- [Student Resources and Centers](#) (e.g., campus public safety, veterans resource center, etc.)
- [Sanctuary campus information and resources](#)
- [DACA](#) resources

Access and Inclusion for Students with Disabilities

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, drc@pdx.edu, <https://www.pdx.edu/drc>.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.
- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.
- Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable.
- For information about emergency preparedness, please go to the Fire and Life Safety webpage (<https://www.pdx.edu/environmental-health-safety/fire-and-life-safety>) for information.

Title IX Reporting

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life.

Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment or sexual violence to a confidential employee who does not have this reporting responsibility, including an Interpersonal Violence

Advocate at the Women's Resource Center or the Queer Resource Center. You may contact a confidential advocate by calling 503-725-5672. This Sexual Misconduct Website provides a complete of those confidential employees and off campus resources. For more information about Title IX please complete the required student module Creating a Safe Campus in your Canvas.

SCI 201/UNST 286 Winter 2024 Schedule (subject to revision)

Week	Learning Unit	Readings and Skills	Discussion Due Dates
Week 1 Jan 8	Course introduction and safety discussion Unit 1: Ways of knowing	Reading 1: What is science? (Orwell) Skill 1: Evaluating a knowledge claim Reading 2: Why we need to understand science. (Sagan)	Group Introduction Discussion Due Friday, Jan 12
Week 2 Jan 15	Unit 2: Science as a Way of knowing Quiz 1	Skill 2: Evaluating a scientific claim Reading 3: The Nature and Logic of Science (Allen and Baker)	Unit 1 Discussion: Deconstructing Claims Due Friday, Jan 19
Week 3 Jan 22	Unit 3: Becoming familiar with scientific literature Quiz 2	Skill 3: Understanding and reading scientific papers	Unit 2 Discussion: Evaluating Science Due Friday, Jan 26
Week 4 Jan 29	Unit 4: Introduction to experimental design Project 1: Temp vs X factor proposal	Skill 4: Understanding and creating boxplots Skill 5: Understanding and creating scatter plots	Unit 3 Discussion: Scientific literature Due Friday, Feb 2
Week 5 Feb 5	Unit 4: Introduction to experimental design Project 2: Temp vs. X factor posters and video. Unit 4 Discussions: Peer review Quiz 3		Unit 4 Discussion: Poster drafts uploaded by Monday, Feb 5 Peer review uploaded by: Wednesday, Feb 7
Week 6 Feb 12	Midterm Exam	Reading 4: Hypothesis Testing (Allen and Baker)	
Week 7 Feb 19	Unit 5: Introduction to natural science inquiry and experimentation Unit 6: Data analysis skills. Project 3: Natural Science Experiment Proposal. Quiz 4	Skill 6: Interpreting boxplots and calculating p-values Skill 7: Interpreting scatterplots and calculating R ² values	
Week 8 Feb 26	Unit 7: Communicating science through posters		
Week 9 March 4		Skill 8: Presenting scientific research posters	
Week 10 March 11	Project 4: Natural Science Experiment Poster and video		Unit 5 Discussion. Poster draft uploaded by: Friday, Mar 8 Peer review uploaded by: Monday, Mar 11
Finals March 18	Final Exam		