



Oregon State University

Course Name: Inquiry in Science and Science Education

Course Number: SED 413

Course Credits: 3

Term/Year Offered: Winter 2023

Instructor Name:

Instructor Email:

Course Description

Investigates inquiry and the nature of inquiry in science as it relates to science education. Examines issues relating to integrating scientific understandings and practice into K-12 instruction.

Prerequisites and/or Corequisites: None

Time Expectations

This course combines approximately 90 hours of instruction, in-person class meetings, online activities, and assignments for 3 credits.”

Class Meeting Days and Times

Tuesday and Thursday 10:00-11:20

Prerequisites and/or Corequisites: None

Statement on Diversity, Equity, and Inclusion

In the College of Education, our efforts toward equity are a work in progress. We acknowledge that in our history and present we have made mistakes, but we commit to engage in anti-racism work to better serve the needs of Black, Indigenous and People of Color (BIPOC) in our community. This includes an examination of this course and syllabus for non-bias and inclusive practices. <https://education.oregonstate.edu/>

Learning Resources

- [Key resource](#)
 - The Next Generation Science Standards (NGSS) (<http://www.nextgenscience.org>).

Required Textbook(s)

- There are no required textbooks for the course. Any required readings will be made available on Canvas. We will be making frequent use of the Next Generation Science Standards (NGSS) (<http://www.nextgenscience.org>).

Note: Check with the OSU Beaver Store for up-to-date information for the term you enroll ([OSU Beaver Store website](#) or 800-595-0357). If you purchase course materials from other sources, be very careful to obtain the correct ISBN.

Technical Assistance

If you experience any errors or problems while in your online course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the [IS Service Desk](#) online.

Measurable Student Learning Outcomes

Learning Outcomes	Performance Indicators aligned to INTASC standards	Evidence/Assignments
1. Write a science teaching philosophy aligned with contemporary perspectives	9.1	Teaching philosophy paper Personal science experience reflection Reading Reflections
2. Examine students' existing understandings and design experiences that expand those understandings in science.	1.1, 2.1	Conceptual change interview assignment Final: video analysis Assignment Reading Reflections
3. Develop practices and core ideas that engage learners and families in science and/or engineering activities	4.2, 4.1	Eight practices resource assignment & teaching experience Develop a model used in science
4. Analyze lessons and units that align with the NGSS standards	7.2	NGSS three dimensional learning reflection Class discussion
5. Compare science and engineering learning experiences to the 8 NGSS Science and Engineering Practices	5.1	Eight practices resource assignment & teaching experience Class discussion NGSS three dimensional learning reflection

6. Develop instructional practices that support equitable access to learning in classroom activities	4.1, 4.2	Final: video analysis Assignment
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Evaluation of Student Performance

Assignments below are tentative and subject to modifications.

Evaluation of Student Performance

Assignments	Points
Teaching philosophy paper	10
NGSS three dimensional learning reflection	5
Personal science experience reflection	5
Eight practices resource assignment & teaching experience	20
Learning progressions interview assignment	20
Create a model used in science	20
Final: video analysis assignment	20
Participation and Discussions	20
Reading Reflections	20
TOTAL	140

Course Evaluation and Grading Scale

A 93-100	B+ 87-89	B- 80-82	C 73-76	D+ 67-69	D- 60-63
A- 90-92	B 83-86	C+ 77-79	C- 70-72	D 64-66	F 59 and below

Course Content

Week	Topics	Reading Assignments	Learning Activities
1	What is science?	<i>Pp 1-22 of <u>A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012)</u></i>	Compare past learning experiences to NGSS standards Unpack what it means to learn science Teaching philosophy paper
2	Intro to NGSS	<i>Pp 23-38 of <u>A Framework for K-12</u></i>	Review NGSS standards

		<u>Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012)</u>	Eight practices resource assignment & teaching experience Class discussion
3	Inquiry based science and the 8 NGSS science and engineering practices	<u>NGSS APPENDIX F – Science and Engineering Practices in the NGSS</u>	NGSS three dimensional learning reflection
4	Developing and using models in science education	<u>MPRES Toolkit for Teachers Conceptual Change – developing and using models</u>	Create a model used in science
5	Learning progressions in science education	Pp 7-24 of <u>Learning Progressions in Science</u>	Class discussion Reading reflection Learning progressions interview assignment
6	Broadening participation in science education	<u>Broadening perspectives on broadening participation in STEM</u>	Personal science experience reflection
7	Engaging in argument from evidence	<u>MPRES Toolkit for Teachers Conceptual Change – Engaging in argument from evidence</u>	Class discussion Reading reflection
8	Defining problems and designing solutions (Engineering design)	<u>Defining your problem: design thinking 101</u>	Reflect and discuss reading
9	Lesson presentations	<u>Pp 217-240 of A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012)</u>	Give or participate in lesson presentations Provide feedback to presentations
10	Lesson presentations	No new readings	Give or participate in lesson presentations provide feedback to presentations

Finals	Final analysis of lessons and concepts in science	No new readings	Final analysis of lessons and concepts in science
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Course Policies

Class Attendance

You are required to attend all class sessions for the full length of the class. Please be on time for each class. If you are unable to attend class because of unavoidable circumstances, it is your responsibility to inform the instructor **before class starts** and to be accountable for all learning expectations. Everyone brings something to offer to class, whether it's personal experience, insight into readings, or a unique perspective. More than two absences may result in an incomplete for the course, unless special circumstances dictate otherwise.

Expectations for Professionalism

- Arrive at the start of class, allowing time (if needed) to get settled and check in with others, so that you are ready to learn when class starts.
- Come to class prepared. Complete all readings before class and assignments on time and be prepared to apply what you have read and learned through discussion and raising questions.
- You are expected to attend all classes. ***If you cannot attend class, let the instructor know before class.*** You are responsible for the material you miss.
- This class involves discussions of readings, engaging in tasks, and reflecting on classroom teaching and observations. Please be generous with comments about teachers' or colleagues' work and carefully consider your comments before reacting. The expectation is to cultivate a classroom community that affords looking deeply into the complex task of teaching and supporting our growing understanding of practice.
- Be generous and help others learn and succeed. Be mindful and proactive if our conversations are being dominated by a few individual voices.
- ***All assignments are due on the announced dates unless other arrangements have been made ahead of time.***
- Written work must be clearly written, organized, and have correct mechanics. That means you will need to carefully proofread before you turn in your work and/or work with someone who can give you writing feedback. If you'd like extra help with writing, please contact the OSU Writing Center (<http://cwl.oregonstate.edu>).

Discussion Participation

All students are required to attend class, participate in discussion and guest speakers. Points will be assigned to in class activities.

Late Work Policy

Students will contact instructor before an assignment is due for any needed extensions. Work can be turned in for half credit for one week after the due date.

Incompletes

A student may request an [incomplete grade](#) for a course that has not been completed if:

- Reasons for the incomplete are acceptable to the instructor;
- Student is passing the course at the time of the request.

It is highly recommended that when an agreement is made to issue an incomplete grade that the instructor and student complete a [Contract for Completion of I Grade](#) to define the terms under which the outstanding coursework will be completed.

Academic Calendar

All students are subject to the registration and refund deadlines as stated in the Academic Calendar: <https://registrar.oregonstate.edu/osu-academic-calendar>

Guidelines for a Productive and Effective Classroom

Students are expected to conduct themselves in the course (e.g., in the classroom, on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this hybrid course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before coming to class and/or participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code (<https://beav.es/codeofconduct>). Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Student Bill of Rights

OSU has twelve established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the course syllabus: <https://asosu.oregonstate.edu/advocacy/rights>.

Academic Integrity

Integrity is a character-driven commitment to honesty, doing what is right, and guiding others to do what is right. Oregon State University Ecampus students and faculty have a responsibility to act with integrity in all of our educational work, and that integrity enables this community of learners to interact in the spirit of trust, honesty, and fairness across the globe.

Academic misconduct, or violations of academic integrity, can fall into seven broad areas, including but not limited to: cheating; plagiarism; falsification; assisting; tampering; multiple submissions of work; and unauthorized recording and use.

It is important that you understand what student actions are defined as academic misconduct at Oregon State University. The OSU Libraries offer a [tutorial on academic misconduct](#), and you can also refer to the [OSU Student Code of Conduct](#) and [the Office of Student Conduct and Community Standard's website](#) for more information. More importantly, if you are unsure if something will violate our academic integrity policy, ask your professors, GTAs, academic advisors, or academic integrity officers.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval, please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)

Student Evaluation of Courses

During Fall, Winter, and Spring term, the online Student Evaluation of Teaching system opens to students the Wednesday of week 8 and closes the Sunday before Finals Week. Students will receive notification, instructions and the link through their ONID email. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the learning experience of future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.

College of Education, Licensure Unit Requirements**Link to Conceptual Framework, Knowledge Base, and National and State Standards**

The Professional Teacher and Counselor Education (PTCE) unit Conceptual Framework is based on four foundational or core values that are listed below. To find out more about how the knowledge base relates to accreditation guidelines, review the Conceptual Framework at the website: <http://education.oregonstate.edu/conceptual-framework>

1. Ethics and Professionalism
2. Reflective Practitioner
3. Lifelong Learners
4. Diversity and Equity