EDUC 267C: CURRICULUM & INSTRUCTION IN SCIENCE
WINTER QUARTER 2023
CLASS SYLLABUS

Course Information

Curriculum and Instruction in Science Education
Tuesdays
3:15pm - 6:00pm

Course Website: http://canvas.stanford.edu
Class Location: CERAS 308

Instructor Information

Matt Wilsey
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mwilsey@stanford.edu
Office Hours: by appointment

Course Description

In the Summer quarter, we discussed the importance of knowing your content, your context, and your students. As Dr. Brown mentioned, “You don’t teach science; you teach students science.” In the Fall quarter, we began to build goal-driven and iterative lesson segments and lesson plans, and considered the tenets of social justice science lessons. Collectively, these two quarters have helped establish the foundation for how to teach science effectively for your specific students.

The Winter quarter of Curriculum and Instruction in Science will extend on these themes and work from and build upon four main perspectives:

1. Your Context: What are the specific issues to your own teaching context that shape your teaching and help your students in your school make progress and achieve in science?
2. The Big Questions of Science Education: “Why science education?” We’ll discuss how this question relates to your classroom but we’ll also challenge you to consider national – and international – arguments about why we teach science and what it should look like in secondary classrooms.
3. Your Science Story: Whether you recognize it or not, your lessons and units tell a story. In the design of your course, what story are you telling about science?
4. **Sensemaking with Science Ideas & Practices**: What opportunities exist for your students to engage in sensemaking about science? How do you integrate the Science and Engineering Practices into your planning, instruction, and assessment?

**Course Goals**

The above perspectives manifest as several course goals for the Winter quarter.

<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>Assessment of Course Outcomes</th>
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<tr>
<td>SWBAT plan a coherent and effective unit plan, which supports students in making sense of an anchoring phenomenon.</td>
<td>Unit Plan Development</td>
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<tr>
<td>SWBAT design and use both formative and summative assessments, including an analysis of results, to improve curriculum, instruction, and assessment.</td>
<td>Unit Plan Development</td>
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<tr>
<td>SWBAT engage students in lessons that emphasize the NGSS practices.</td>
<td>Unit Plan Development</td>
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<tr>
<td>SWBAT explain how the ideas from science education research inform effective instructional and assessment practices.</td>
<td>NGSS Practice: Planning and NGSS Practice: Artifact (Parts A &amp; B)</td>
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<tr>
<td>SWBAT reflect meaningfully on their planning, instruction, and assessment to better realize their vision of science education for their students.</td>
<td>Vision of Science Education (Parts A &amp; B)</td>
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**Our Course Sessions**

In order to achieve the course outcomes, our sessions will highlight a particular aspect of science teaching, with a specific emphasis on unit planning. Collectively, we will explore the theory underlying and supporting this aspect and discuss strategies you can use in your placements (and beyond). Over the course of the quarter, you will develop a unit plan that follows the principles of Understanding by Design (Wiggins and
McTighe, 2005) and supports students in using the science and engineering practices to make sense of an anchoring phenomenon.

As part of this process, we will explore the Scientific and Engineering Practices. These practices are:
1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

In addition to unpacking the practices, discussing what they might look like in your classroom, our science time will be used to model an example of both how lessons might flow together and how a specific NGSS practice could be modified.

Finally, I believe that you become a better teacher by becoming a reflective practitioner (see Schön, 1987). Reflective practice is enhanced by sharing your challenges with others, reflecting on them, and learning from your mistakes. Not only will you be able to share your individual work, but collectively, we will also reflect on the shared example during science time.

With these aims in mind, most sessions will follow the same basic routine:
- Discuss a specific element of unit planning;
- Explore one of the NGSS practices, including reflecting on a shared example, as well as your own efforts towards implementing the NGSS practices;
- Examine a strategy that might better support the implementation of the NGSS practices;
- Design parts of your own NGSS-aligned unit plan; and
- Compare and contrast your vision of science education with current literature on science teaching and learning.

**Course Expectations**

*What do I expect of you?*

My goal is for this course to be a collegial space where we can all learn from and with each other. To that end, I expect that you will be present in class and that you will come prepared to engage in discussions with curiosity, actively challenge your own
understandings, and be respectful of the diversity of experiences and identities expressed by your colleagues. There are three expectations that I want to highlight:

- **Participation:** Our collective engagement in class is essential for your learning and the learning of others. While participation will look and sound different for each of you, I expect for everyone to monitor their airtime, stepping back to create space for others or speaking up to share your ideas.

- **Communication:** We live in an unpredictable world; things happen. Please communicate with me via email (mwilsey@stanford.edu) if you need to be late or absent before the session if possible.

- **Digital Tools:** We live in a digital world. We’ll use digital tools in class to support our learning (in fact, there is an assignment about digital tools!). When these tools are not central to our learning, I ask that you set them aside, including your personal devices.

**What can you expect of me?**

You can expect that I will work to get to know you as a student and, more importantly, as a human. I will strive to create a collaborative and equitable learning environment where each of you feels comfortable sharing what you’ve learned, challenging other’s ideas, and wrestling through your own uncertainties. I will work to build trust with you and amongst our community of learners. I will provide you with timely feedback and will do my best to be available to meet with you when you need it. I will do my best to be responsive to your needs.

**Support**

Students who may need academic accommodation based on the impact of a disability must initiate the request with the Student Disability Resource Center (SDRC) located within the Office of Accessible Education (OAE). SDRC staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the SDRC as soon as possible since timely notice is needed to coordinate accommodations.

**Preferred Name & Preferred Gender Pronouns**

Class rosters are provided to the instructors with the student’s legal name and gender designation; these records might not correspond to the name and gender pronouns you use. We will gladly honor your request to address you by your preferred name and pronouns. Please also let us know if these change at any point.
STANFORD HONOR CODE

You are expected to follow the Stanford Honor Code. If you have any questions about how it applies to a particular assignment, please ask.

For an explanation of the Honor Code, please go to:
https://communitystandards.stanford.edu/policies-and-guidance/honor-code

GRADING

My philosophy is to prioritize timely and specific feedback. This acknowledges that:
- You are each here to gain as much understanding and skill as you can;
- You learn at different rates and in different chunks; and
- You will have each gained at least the fundamental understandings and skills that we intend by course end.

The grade for the course will be assigned on the basis of assignments as detailed below. If you are adhering to the above expectations and making sincere efforts to fully participate in assigned tasks during and outside of class, you can expect an A.

ASSIGNMENTS - OVERVIEW

Unless otherwise noted, assignments should be submitted to Canvas and are due before class begins.

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<tr>
<th>#</th>
<th>NAME</th>
<th>DESCRIPTION</th>
<th>EVAL. TYPE</th>
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<th>DUE DATE(S)</th>
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| 1 | Readings and Reading Summary | **Readings:** Each week there will be assigned reading(s). It is your responsibility to come to class prepared to discuss these readings.  
**Summary:** For one of the week’s readings, you will be responsible for summarizing the big ideas of the article(s). Additionally, you will be asked to identify: 1) the part of the paper that resonates most strongly with your teaching; and 2) a lingering question.  
Each summary will be added to a shared class document. | Credit/ No Credit | 10% | Ongoing |