

Syllabus : **SED 4200/5210** (CRN 40775/44181))

## Teaching Secondary Science

Oakland University

2018 Fall Semester : **Wednesday 5:30 – 8:50 : 150 Pawley Hall**

**Instructor:**

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**On Campus Office Hours:**

Monday 12:00 – 4:00  
Thursday 10:00 – 12:00  
Or online, or by appointment

*I'm happy to meet with you!*

### Course Overview

This methods class accompanies your work in schools during the fall semester and it's the last methods course before your internship student teaching experience. Despite being “just” a semester, you will continue to think about methods for teaching for the rest of your career. Good teachers engage the question of how to teach over the entire course of their careers. That is, **good teachers never stop learning**. And because teaching is about learning about how your students are learning—there will be never ending opportunities to learn more about students and thus, about teaching. As you might suspect, teaching science is more truly a journey than a destination. This course will help you learn the practical knowledge you will need in order to keep you moving forward in this journey: this semester we will focus on the skills and practices of teaching science so that you will be able to teach all students well.

To accomplish this, we will be focusing on the development of *High-Leverage Teaching Practices* (HLTPs). High-Leverage Teaching Practices are those that have been shown to provide the greatest impact on student learning in science. You are invited to explore the website from the University of Michigan that details the larger scope of research and development devoted to improving teacher education at [www.TeachingWorks.org](http://www.TeachingWorks.org). This renowned effort is highly influential in the State of Michigan as well as nationally, and it informs our efforts at Oakland University to better prepare teachers in mathematics and science. Our work together this semester will target five HLTPs:

### Targets for the development of High Leverage Teaching Practices

- A. Explaining and modeling content, practices, and strategies
- B. Appraising, choosing, and modifying tasks and texts for a specific learning goal
- C. Eliciting and interpreting individual students' thinking
- D. Selecting and using particular methods to check understanding and monitor student learning (Formative Assessment)
- E. Leading group discussion

*Practice being the kind of learner you want your students to be*

## Course Assignments, Grading and Participation

Because this class is part of your professional preparation for teaching you are expected to meet a higher standard than is perhaps expected in other courses in the university. Specifically, you are expected to complete *all* assignments, to actively participate in *all* course discussions both during class sessions and in online formats, to challenge yourself to do your best and ultimately be the type of learner you want your students to be.

## Attendance Policy

Attendance matters. It matters to me as your instructor and it matters to your peers who count on your support and feedback. Especially because we have only eight students it will be **impossible** not to notice if you're gone. Absence and lack of engagement hurts our learning community—if absent, you aren't able to share in other's insights and you aren't able to contribute your own. Throughout the program, teacher candidates must be present and on time for professional commitments, including classes and field experiences. Teacher candidates must communicate with their instructor, their university supervisors, and their mentor teacher(s) about any absences. Absences for which you have not pre-notified me or absences that we discuss together after the fact but cannot accept as valid become "unreasonable" absences. All absences will have a negative impact on your grade (-3 percentage points), and more than two unreasonable absences may result in a 0.0 grade for the course.

If you know you are going to miss a class, talk with me prior to that time. Help me understand why the absence is necessary. Also, make a plan to get the information from that class. If an emergency occurs, try to call me at the phone numbers above and leave a voice mail message.

## Professional Behaviors Assessment

This instrument will be used to shape a conversation around professional behaviors supported by our program. Your participation in self-assessing using this tool and conversations that are informed by the assessment tool will be an on-going part of the course.

## Academic Integrity

Oakland's academic code of conduct is posted online: <https://www.oakland.edu/deanofstudents/student-code-of-conduct/core-standards-and-behavioral-expectations/>. This code of conduct will be followed in this course and you are encouraged to read it.

I expect each of you to produce your own work that represents your own thinking. That does not mean that you cannot, or should not, speak to other people about assignments. Indeed, the opposite is true: **you can and should discuss your work with others** – your own thinking improves through interaction with others and their ideas. Also, there is much information available on the Internet that I expect you to make use of. This does mean, however, that you distinguish the ideas and words of others and your own. Use appropriate citation. Failure to uphold these standards may result in a 0.0 for both the assignment and the course.

“All members of the academic community at Oakland University are expected to practice and uphold standards of academic integrity and honesty. Academic integrity means representing oneself and one's work honestly. Misrepresentation is cheating since it means the student is claiming credit for ideas or work not actually his or her own and is thereby seeking a grade that is not actually earned. All academic misconduct allegations are forwarded to the Dean of Students Office and adhere to the student judicial system.”

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## Course Readings and Materials

### • Required Texts:

Cartier, Smith, Stein, & Ross (2013). *5 Practices for Orchestrating Task-Based Discussions in Science*. NSTA.

Wiggins, Grant, & McTighe, Jay (2005). *Understanding by design, Expanded 2nd Edition*. Alexandria, VA: Association for Supervision and Curriculum Development. *Should already have from your SED427 course.*

### Texts Available online:

America's Lab Report: Investigations in High School Science (2005). National Academies Press: Washington DC. Available online at: [http://www.nap.edu/catalog.php?record\\_id=11311](http://www.nap.edu/catalog.php?record_id=11311)

Next Generation Science Standards. <http://www.nextgenscience.org>

How Students Learn: History, Mathematics and Science in the Classroom. (2005). National Academies Press: Washington DC. Available online at: <http://www.nap.edu/openbook.php?isbn=0309074339>

National Research Council Framework for K-12 Science Education (2012). National Academies Press: Washington DC. Available online at: [http://www.nap.edu/catalog.php?record\\_id=13165](http://www.nap.edu/catalog.php?record_id=13165)

Taking Science To School: Learning and Teaching Science in Grades K-8 (2007). National Academies Press: Washington DC. Available online at: [http://www.nap.edu/catalog.php?record\\_id=11625](http://www.nap.edu/catalog.php?record_id=11625)

[TeachingWorks.org](http://TeachingWorks.org)

Tools for Ambitious Science Teaching website: <http://tools4teachingscience.org>

### Optional Texts:

Windschitl, M., Thompson, J., & Braaten, M. (2018). *Ambitious Science Teaching*. Harvard Education Press. 8 Story Street First Floor, Cambridge, MA 02138.

## Assignments and Grades

Assignments are listed below. Complete descriptions and specifications will be provided at least a week in advance and discussed as we move through the term. The following total 100%:

- 5% Professional Technology Resource Review & Presentation
- 5% Engineering Task
- 5% Professional Behaviors Assessment and Reflection
- 5% Practice-based Mid-Term
- 10% Participation (both in-class and online)
- 10% Content/HLTP Tasks and Presentations (2)
- 10% Video analysis tasks (2)
- 20% Mini Unit Plan (MUP) & GLTI and GLTII (2)
- 30% High Leverage Teaching Practices: w/STEP Wednesdays (5)

The grading scale:

93.0 - 100.0	A
90.0 - 92.9	A-
87.0 - 89.9	B+
83.0 - 86.9	B
80.0 - 82.9	B-
77.0 - 79.9	C+
73.0 - 76.9	C
70.0 - 72.9	C-
69.9 and below	F

## Learning Technologies

Please bring with you each week a laptop or internet capable device (iPad, iPod Touch, Droid Phone, etc.) if you are able. Because we will be engaging with technology substantively this semester, it will be helpful if you can do so. If you do not have access to such technology—we can certainly find such equipment for you via the SEHS Educational Resources Library or otherwise. Please let me know how I might help.

We will also be making use of video technologies this semester. If you do not have access to digital video recording devices—I can also assist you.

Texas Instrument Graphing Calculators and Vernier Probeware will be used this semester, such as the TI-84 and TI-nSpire graphing calculators.

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## Course Schedule—subject to revision

Date:	Topic:	Reading to be done:	Assignment Due:
9/5	Introduction & Course Overview <i>What's good science teaching?</i> <i>Why should kids learn science?</i>	Video in class: <i>Can We Believe Our Eyes?</i>	
9/12 STEP W 9a-12	High Leverage Teaching Practices (HLTP): Making Content Explicit. Part I	Read: <i>Scientific and Engineering Practices</i>  Read: <i>5 Practices Introduction</i>	• Moodle Discussion on Reading
9/19	HLTP1: Making Content Explicit. Part II	<i>Planning for Engagement Primer</i>	Video Analysis 1
9/26 STEP W 9a-12	HLTP2: Appraising, choosing, and modifying tasks and texts for a specific learning goal. Part I	Read: <i>5 Practices—Chapter One</i>	Engineering Task
10/3	HLTP2: Appraising, choosing, and modifying tasks and texts for a specific learning goal. Part II	<i>5 Practices—Chapter Two</i>	<i>Choose GLT I Content with input from mentor teacher.</i>
10/10 STEP W 9a-12	HLTP3: Eliciting and Interpreting Individual Students' Thinking. Part I	<i>5 Practices—Chapter Three</i>	MUP 1 check
Guided Lead Teaching I (GLTI): <u>Option a: October 15 - 19</u> or <u>Option b: Oct. 22 – Oct. 26</u>			
10/17	HLTP3: Eliciting and Interpreting Individual Students' Thinking. Part II	<i>Discourse Primer</i>	Video Analysis 2
10/24	History & Nature of Science	<i>5 Practices—Chapter Four</i>	MUP 1
10/31 STEP W 9a-12	HLTP4: Selecting and using particular methods to check understanding and monitor student learning. Part I	<i>5 Practices—Chapter Five</i>	Technology Resource Review and Presentations
11/7	HLTP4: Selecting and using particular methods to check understanding and monitor student learning. Part I	<i>5 Practices—Chapter Six</i>	Practice-based Mid-Term
11/14 STEP W	HLTP5: Leading group discussion. Part I	TBD	MUP 2 check

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9a-12			
11/21	HLTP5: Leading group discussion. Part II	online	Draft of portfolio in class review.
Guided Lead Teaching II: <u>Option a: November 26 – 30</u> or <u>Option b: December 3 - 7</u>			
11/28 Sec. Educ. Day	Managing the Laboratory and Safety in the Classroom	5 Practices—Chapter Seven	MUP 2
12/5	Building from a foundation of practices-based learning in teaching science	Teacher Evaluation Frameworks Review	
12/12	<b>STEP Wednesday Final Seminar</b> 7-10 pm as per Registrar Schedule		Final Presentations of Portfolio

Additional notes and comments:

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