

# Scientific Teaching and Outreach Workshop

BSC 6926

Spring 2017

February 13<sup>th</sup> – February 24<sup>th</sup>

9 am – 12 pm MTWThF

## Instructor:

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### Sarah Eddy

Email: [seddy@fiu.edu](mailto:seddy@fiu.edu)

Office: OE 215

Office Hours: 3 – 5 pm daily

### Workshop Location:

Feb 13: WC 130

Feb 14: PC 439

Feb 15: WC 130

Feb 16: PC 439

Feb 17: HLS 216 & 416

Feb 20 – Feb 24: WC 130

## Workshop Description:

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Course Purpose: In this course we will explore what research has shown to be effective teaching techniques in the sciences. Using this knowledge, we will work in cooperative groups to develop a teachable unit that encourage student curiosity, engagement, and learning.

### Course Promises:

Through this course (assuming you fulfill the expectations outlined in the syllabus), you will:

1. Explore and apply research-based best practices for teaching, learning, and designing curriculum in the sciences.
2. Create a 45 minute teachable unit and assessment on a topic and for an age group of your choice.

## Expectations/Evaluation:

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Grades will be based on three components: preparedness/participation, contribution to peer reviews and completion of a teachable unit.

### *Preparedness/Participation/Reflection Assignments:* 40% of final grade

This workshop is a collaborative effort and it is only through thoughtful and constructive contributions from all of us that we will be successful. Everyone is expected to come to the workshop on time everyday and prepared to participate in discussions and activities.

Specific assignments will be listed on Blackboard and will be presented in class.

### *Completed Teachable Unit:* 40% of final grade

Each group will e-mail Sarah a completed teachable unit by Friday March 3<sup>rd</sup>, 2017. These teachable units should be in pdf format. Use CourseSource Article Template for Lessons (<http://www.coursesource.org/for-authors>) excluding the Teaching Discussion section.

### *Peer Reviews:* 20% of final grade

Each team will review and critique two other teams teachable units. Teachable units will be evaluated on the using the CourseSource Lesson Review Rubric (<http://www.coursesource.org/for-authors>).

## Classroom Etiquette:

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**The ways in which we treat one another matters.** In order to learn, every person must both be and feel safe enough to express themselves. As members of a learning community, we should strive to create a constructive learning environment for the entire class. Specifically:

- Show respect and consideration for those speaking in class. For instance, avoid talking when a classmate or instructor is speaking to others in your group or the class as a whole.
- Be as actively engaged in the class activities and discussions as you can. You can facilitate this by coming to workshop on time, and turning all electronic devices to silent or vibrate so they don't distract you or the learners around you. Also avoid accessing materials not related to the discussion during class time.
- Be prepared to contribute to the learning of your group. Share potential answers or questions you have and solicit questions and potential answers from all your group members. This makes sure that no one remains confused at the end of the activity and that you all benefit from each other's knowledge.

Research on education has shown that some of the best ways for people to learn are through discussion and teaching (Handelsman et al. 2007). To facilitate these opportunities for this type of learning, we will devote class time to small group discussions and peer-to-peer instruction. Therefore, it is essential for your education to create a space where everyone feels comfortable learning and sharing ideas. To create this environment you will need to respect your group mates, make time for everyone to express their ideas and make sure that by the end of the activity everyone understands the group conclusion. If someone is struggling with a concept that you understand, help them. Explaining something to a peer increases your own ability to remember it into the future (McKeachie and Svinicki 2006).

Equity in Learning: This class will be conducted in an environment that is open, welcoming, and safe to all students. The instructors are willing and committed to providing an atmosphere of support and affirmation for all people. **Do not display disrespectful behavior toward any individual** based upon age, ability, race/color/ethnicity, religious/spiritual, political affiliation, socioeconomic, immigration, marital, military/veteran status, gender identity/expressions, sexual/affectional orientations, relationship status, and/or anything that is likely to be perceived as disrespectful to someone's background, culture, or identity. For instance, some derogatory, but commonly used language includes "that's gay" or "that's retarded." Unprofessional, derogatory, and/or offensive behavior may result in disciplinary action.

## Course Schedule and Workshop Focus:

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### Day 1 (Feb 13):

Topics Introduced: **What is scientific teaching? How do we begin designing a teachable unit?**

Workshop Focus: decide groups; brainstorm ideas for teachable unit; determine learning outcomes

### Day 2 (Feb 14):

Topics Introduced: **How do we engage students?**

Workshop Focus: Determine how to structure your unit to encourage student engagement.

### Day 3 (Feb 15):

Topics Introduced: **Exploring the diversity of ways today's students learn.**

Workshop Focus: Continue structuring your unit and incorporate work that engages students with various learning styles.

### Day 4 (Feb 16):

Topics Introduced: **How can we encourage scientific thinking in our students?**

Workshop Focus: Determine how to incorporate opportunities for creative and critical thinking in your unit.

### Day 5 (Feb 17):

*Working session*

### Day 6 (Feb 20):

First Peer Review Session

**Workshop Benchmark:** Come prepared to walk peers through your teachable unit and to give feedback to other groups on theirs. As much as you can let them experience the unit like a participant actually would so they can provide you feedback on what is working or not working. Your teachable unit does not need to be finalized. This is an opportunity to get help with aspects you are struggling with and/or get feedback on your developing ideas.

### Day 7 (Feb 21):

Topics Introduced: **How do we create robust assessments that can document whether our teachable unit is accomplishing what we want?**

Workshop Focus: Incorporating opportunities for formative assessment in the lab and develop your summative assessment for the unit.

### Day 8 (Feb 22):

Topic Introduced: **How can we create a space where all students can engage in learning?**

Workshop Focus: Review activity and look for ways to encourage the participation of all students.

**Workshop Benchmark:** Send Sarah a draft of the teachable unit by noon. You will receive two teachable units to read and evaluate using the CourseSource Rubric. Come to class ready to share your constructive feedback

### Day 9 (Feb 23):

**Final Peer Review Session:** Each group will have present their unit and 15 minutes to receive feedback.

### Day 10 (Feb 24):

Topics Introduced: **How do we scale what we've learned?**

**Final Assignment (due March 3):** Turn in your final teachable unit lesson plan.

### Available Resources:

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#### College Level or Biology Teaching Journals:

<i>CBE Life Sciences Education:</i>	<a href="http://lifescied.org/">http://lifescied.org/</a>
<i>American Biology Teacher:</i>	<a href="http://www.nabt.org">http://www.nabt.org</a>
<i>Evolution Education and Outreach:</i>	<a href="http://www.evolverzone.com/?p=296">http://www.evolverzone.com/?p=296</a>
<i>Journal of College Science Teaching:</i>	<a href="http://www.nsta.org/college/">http://www.nsta.org/college/</a>
<i>Science Education:</i>	<a href="http://www3.interscience.wiley.com/journal/32122/home">http://www3.interscience.wiley.com/journal/32122/home</a>
<i>Biochemistry and Molecular Biology Education</i>	<a href="http://www.bambled.org/">http://www.bambled.org/</a>

*A list of science teaching journals* <http://homepages.wmich.edu/~rudged/journals.html>

*Database to find Teaching Articles:* ERIC (Education resource information center); Google Scholar

#### Sample Curriculum (i.e. resources to adapt or model):

<i>Understanding Science</i>	<a href="http://undsci.berkeley.edu/">http://undsci.berkeley.edu/</a>
<i>Understanding Evolution</i>	<a href="http://evolution.berkeley.edu/">http://evolution.berkeley.edu/</a>
<i>Evolution and the Nature of Science Institutes</i>	<a href="http://www.indiana.edu/~ensiweb/home.html">http://www.indiana.edu/~ensiweb/home.html</a>
<i>National Center for Case Study Teaching in Science- Case Study Collection</i>	<a href="http://ublib.buffalo.edu/libraries/projects/cases">http://ublib.buffalo.edu/libraries/projects/cases</a>
<i>Wisconsin Program for Scientific Teaching</i>	<a href="http://scientificteaching.wisc.edu/index.htm">http://scientificteaching.wisc.edu/index.htm</a>
<i>They Why Files: The science behind the news</i>	<a href="http://whyfiles.org/">http://whyfiles.org/</a>
<i>Inquiry-Based Curriculum</i>	<a href="http://www.bio.indiana.edu/~summerresearch/ice/activities.html">http://www.bio.indiana.edu/~summerresearch/ice/activities.html</a>
<i>The Biology Corner</i>	<a href="http://www.biologycorner.com/">http://www.biologycorner.com/</a>
<i>National Science Education Teaching Standards</i>	<a href="http://www.nap.edu/openbook.php?record_id=4962">http://www.nap.edu/openbook.php?record_id=4962</a>
<i>National Science Teachers Assoc.</i>	<a href="http://www.nsta.org/">http://www.nsta.org/</a>

#### Books:

Handelsman, Miller and Pfund. 2007. Scientific Teaching. Freeman Press: New York.