Bi/Ch/Geol/Phys 407/507 SEM: TEACHING SCIENCE
CRN 37783/37784/38882/38883/38704/38075/38721/38722
SRRING 2014—202 CAS
Thursday 10-11:50am, 2 credits

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Course Description:
In this course we will read, discuss, and apply a variety of techniques from science education literature. Students will be active participants in the exploration of scientific teaching. Using concepts and information introduced in class, students will develop the curriculum for an activity to be used in an undergraduate science course.

Course Objectives:
The objective of Seminar: Teaching Science is to provide students with an opportunity to practice evidenced-based student-centered scientific teaching pedagogy. By the end of the course students will be able to:

- Identify and implement the elements of backward design creating goals, objectives, assessment, activities for a teaching tidbit
- Define evidence-based students-centered scientific teaching and describe how it can be implemented in a science classroom
- Plan a class lesson including the first day of the term
- Identify the diversity of student backgrounds in university courses and describe how to create an inclusive classroom environment
- Write course and activity goals and learning objectives
- Present non-lecture activity that teaches students content with clear metrics for proficiency

RATIONALE:
Many students will be employed in positions that require them to teach. However, few graduate and undergraduate students have an opportunity to learn instructional methods during their college careers. To help students become more employable, and to help them become successful in their first positions, they need skills and experience in teaching. Following this class, it is hoped that students will implement (under faculty guidance) the instructional activities developed during the course.

PREREQUISITES:
None. This course is designed especially for graduate and undergraduate students who wish to have teaching as part of their future career, but is open to other interested in learning about scientific teaching.

COURSE MATERIALS:
All of the course assignments and readings are available at our course Blackboard site, which you can access at http://blackboard.uoregon.edu. Use your UO username and password to log into Blackboard.

REQUIREMENTS:
ATTENDANCE AND PARTICIPATION—Your presence and participation are necessary to make this course successful for you and for the class community. Personal circumstances may prevent you from attending a class meeting, but keep in mind that each class meeting represents a big portion of the overall course. If you have difficulties getting to class, whatever the reason, ***please let us know as soon as reasonably possible (preferably before class)***. You are responsible for any missed work and information.

PARTICIPATION—is more than sitting as a warm body in the class. You should come to class prepared to participate in self reflection, group work, and class discussions. Participation includes respect for your fellow classmates and instructors by coming to class on time, turning off cell phones, and paying attention during class.

BLOG—assignments will be submitted online in Blackboard before each class session based on reflections on a reading and/or video.

PRESENTATIONS—are designed to provide you with opportunities to practice creating an activity or assessment for an undergraduate science courses. We will build pieces of this activity throughout the term, and you will present the activity to your classmates during the final week of the term.

REQUIREMENTS AND GRADING:

This is a one-credit, pass/no pass course. Your presentation will receive feedback that includes an overall assessment in one of the following categories: *exceeds expectations (EE), meets expectations (ME), approaches expectations (AE),* or *does not meet expectations (DNME).* If your overall assessment is *approaches expectations* or *does not meet expectations*, you will need to revise your assignment for resubmission. **To pass the course, you must submit your presentation on time, *meet* or *exceed* expectations on your presentation, miss no more than two class meetings, and submit all journal entries on time.**

"PRACTICE MAKES PERFECT"

We'll spend time in class discussing evidence-based teaching pedagogy and then you will have the opportunity to read more outside of class as you develop a course activity. The more effort you put towards your practice of ideas the easier it will be to incorporate them into a complete class.

DIVERSITY

Open inquiry, freedom of expression, and respect for difference are fundamental to a comprehensive and dynamic education. We are committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities.

ACADEMIC INTEGRITY

All students are expected to complete assignments in a manner consistent with academic integrity. Students must produce their own work and properly acknowledge and document all sources (ideas, quotations, paraphrases). Students can find more complete information about the University of Oregon's Policy on Academic Dishonesty in the University of Oregon *Student Handbook*.

STUDENTS WITH DISABILITIES

The University of Oregon is working to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify me as soon as possible. You are also welcome to contact the Accessible Education Center (AEC) in 164 Oregon Hall at 346-1155 or uoaec@uoregon.edu.

If you are not a student with a documented disability through AEC, but you would like for me to know about class issues that will impact your ability to learn, I encourage you to come visit with me during my office hours so that we can strategize how you can get the most out of this course.

IMPORTANT NOTE

We are interested in working with you individually to help you learn in the way that best suits you. Please let us know if you have concerns about particular aspects of the course or your ability to succeed in the class.

COURSE OUTLINE: (ALWAYS A TENTATIVE SCHEDULE)

Week	Topic	Homework
1	Introductions What is a learner-centered classroom? Who are we?	
2	Who are your students?	**Readings and blog questions on blackboard** Lang, JM. 2008. On Course. Harvard University Press, Cambridge. *The First Day of Class.* AND Rovick, AA*, et al.* 1999. How accurate are our assumptions about our students' background knowledge? Am. J. Physiol. 276(Adv. Physiol. Educ): S93-101.
3	What are learning objectives?	**Readings and blog questions on blackboard** Handelsman, J. S.Miller, and C. Pfund. 2007. Scientific Teaching,. Chapter 5 "A Framework for Constructing a Teachable Unit" AND Ambrose SA, Bridges MW, DiPietro M, Lovett MC, Norman MK. 2010. How Learning Works: 7 Research-Based Principles for Smart Learning. Appendix D-What are learning objectives and how can we use them? Jossey-Bass, San Francisco, CA.
4	How is class time spent?	**Readings and blog questions on blackboard** Moravec, M., A. Williams, N. Aguilar-Roca, and D.K. O'Dowd. 2010. Learn before Lecture: A Strategy That Improves Learning Outcomes in a Large Introductory Biology Class. CBE Life Science Education 9: 473–481. AND Silverthorn, D.U. 2006. Teaching and learning in the interactive classroom. *Advances in Physiology Education*, *30*(4): 135–140.
5	How is class time spent?	**Group activity, readings, and blog questions on blackboard** Allen, D. and K. Tanner. 2005. Infusing active learning into the large-enrollment biology class: seven strategies, from the simplex to complex. Cell Biology Education 4: 262-268 AND McClanahan, E. B.; McClanahan, L. L. 2002. Active learning in a non-majors biology class. College Teaching Summer: 92-96.
6	How do we know if/what students are learning?	**Midterm feedback, readings, and blog questions on blackboard** Gormally, C., Brickman, P., and Lutz, M. 2012. Developing a Test of Scientific Literacy Skills (TOSLS): Measuring Undergraduates' Evaluation of Scientific Information and Arguments. CBE Life Sciences Education, 11(4), 364–377.

7	How do we create an inclusive classroom environment?	**Implicit Assumptions Test, readings and blog questions on blackboard** McIntosh, P. 1990. White Privilege: Unpacking the Invisible Knapsack AND Smith, JL, KL Lewis, L Hawthrone, SD Hodges. 2013. When trying hard isn't natural: women's belonging with and motivation for male-dominated STEM fields as a function of effort expenditure concerns. Pers Soc Psychol Bull 39:131-143. AND Moss-Racusin, C., J.F. Dovidio, V.L. Brescoll, M.J. Graham, and J. Handelsman. 2012. Science Faculty's Subtle Gender Biases Favor Male Students. PNAS 109(41): 16474-16479. AND Sandberg, S. 2013. Lean In. Chapter 10. **Assignment:** Meet with Mark and Elly outside of class about your presentation.
8	How can we incorporate appropriate technology in the classroom?	**Readings and blog questions on blackboard** Johnny Lee demos Wii Remote Hacks AND Teaching 2.0: Is Tech in the Classroom Worth the Cost? (NPR) AND TED-Ed Tour
9	Final preparation for classroom activities	**Journal:** hooks, b. 1994. Teaching to Transgress. Chapter 1: Engaged Pedagogy and Chapter 14: Ecstasy—Teaching and Learning Without Limits.
10	Presentations of classroom activities	**Teaching Assignment:** Engage the class in a 10-minute learning activity. In class you will provide feedback to your classmates. **Assignment:** Teaching Tidbit Reflection