

# ESS 492: Education in the Earth Sciences (NW)

Autumn 2018

## Instructor Info

Instructor: Terry Swanson

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Office Hours: M 10:30-11:20 am and W 9:30-10:30 am (or by appointment)

## Course Overview

The objective of this seminar and practical laboratory teaching assistance is to help undergraduate students within the Department of Earth and Space Sciences develop teaching skills so that they are properly prepared to meet future teaching responsibilities if they decide to pursue graduate school or a career in teaching. Learning to teach effectively is a lifelong process and will not be learned in any single seminar or laboratory classroom, but this course will introduce our undergraduate students to the logistics, teaching methods, laboratory classroom experience and field trip experience.

## Format

Students will participate in a weekly teaching seminar and will assist a qualified instructor in planning and teaching of laboratory and field coursework in earth sciences disciplinary settings.

## Prerequisites

One of the following: ESS 101, 210, 211, 212, 213. Students must be ESS Majors of junior standing or higher.

## Course Expectations & Responsibilities

It is important that all students in this class have access to the full range of learning experiences. At the University of Washington, it is the policy and practice to create inclusive and accessible learning environments consistent with federal and state law.

### **Full participation in this course requires the following types of engagement:**

**Seminar:** the ability to participate in one weekly seminar of 50 minutes with instructors and other undergraduate students participating in the seminar and teaching laboratory. Each week we will review the subsequent week's laboratory setup and discuss pedagogy, logistics, and how to effectively teach the laboratory.

**Laboratory:** the ability to assist in instructing at least one weekly laboratory session (2 hours) for 15-25 non-major undergraduate students enrolled in the laboratory section.

**Field Trips:** the physical conditioning and ability to hike 2 miles on steep trails with regular stops/breaks over the course of 2 hours; the ability to lead and instruct at least one weekend field trip for 30-40 students. If you have any concerns about the physical requirements for this course, please notify the instructor as soon as possible.

**Access and Accommodations:** Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or [uwdrs@uw.edu](mailto:uwdrs@uw.edu) or [disability.uw.edu](http://disability.uw.edu). DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

## **Academic Integrity**

At the University level, you must do your own scholarly work. Presenting anyone else's scholarly work (which can include written material, exam answers, graphics or other images, and even ideas) as your own, without proper attribution, is considered academic misconduct.

Plagiarism, cheating, and other misconduct are serious violations of the University of Washington [Student Conduct Code \(WAC 478-120\)](#). We expect that you will know and follow the university's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the College of the Environment [Academic Misconduct Policy](#) and the University of Washington [Community Standards and Student Conduct website](#).

## **Learning Objectives and Goals**

Students participating in this course will learn about the logistics, preparation and teaching methods used to instruct an introductory geology laboratory class through weekly seminar meetings and participating as a laboratory instructional assistant in at least one weekly laboratory section. This course will provide an important foundation to preparing earth sciences undergraduate majors for future teaching/instructional responsibilities that they may encounter in graduate programs or their professional careers.

## Text and Readings

1. *Physical Geology* by Steven Earle (open source textbook) under CC-BY 4.0 international license.
2. *How Students Learn: Science in the Classroom* by M. Suzanne Donovan and John D. Bransford, Editors; Committee on How People Learn: A Targeted Report for Teachers; National Research Council (The National Academies Press 2005)
3. *Structure Matters: Twenty-One Teaching Strategies to Promote Student Engagement and Cultivate Classroom Equity* by Kimberly D. Tanner (*CBE--Life Sciences Education* 2013 12:322-331)
4. *Equity Issues in Science Education* by Dale Rose Baker: Understanding Girls: Quantitative and Qualitative Research: Chapter 6 (Sense Publishers, 2016)
5. On line laboratory exercises and field trip guides used to teach ESS 101

## Grades

Your grade will be determined based on active participation in the seminar and laboratory components of this course. To receive credit, you must complete an end-of-quarter teaching reflection plus earn at least 70/100 points from the assignments below:

5 points: Active participation in seminar discussion and completion of assigned reading.

5 points: Active participation in laboratory setting teaching practicum.

45 points: Submission of 3 post-lab session reflections (15 points each). Reflections must integrate key concepts highlighted in at least one of the assigned readings numbered 2-4 above.

45 points: Lead field setting lesson.

## Assignments

1. *Post-Lab Sessions Reflections (3 total, 15 points each)*: Three short (~350-500 words) reflections based on your experiences with students in course lab sessions. The reflection should include:
  - One thing you learned about the teaching science students
  - One experience you had with a student in a classroom, lab, or field session
  - How your experience is related to or informed by one of the three assigned readings about education (Donnovan & Bransford, Tanner, or Baker)
2. *Field Setting Lesson (45 points)*: Under supervision of a graduate student and the course instructor, design and lead a field trip for course participants.
3. *End-of-quarter Teaching Reflection (required to receive credit for the course)*: To demonstrate participation and engagement, each student must submit a reflection paper that includes material from the three required readings and includes experiences from at least three classroom, lab, or field sessions.
  - Students may choose the weeks/topics to which they include.

- Responses must be typed, double-spaced, and 2-3 pages (~750 words) in length.
- Clarity, accuracy, and editing (spelling, grammar, etc.) will count.

Responses must demonstrate that you have thoughtfully engaged with course materials and classroom, lab, and field setting instruction. This may include some restatement of the material but must primarily consist of your original thinking and writing in response to the topics discussed. For example, what is something new you learned? What did you find most interesting? What questions does this raise? Was there anything you agreed or disagreed with? What are the most significant implications of the material discussed or experiences you had? Make sure to include a substantive explanation of your response and questions.

## Student Assistance

My office hours are given above; however, if you are unable to make either of the above times, then **make an appointment with me** for a time that does not conflict with your schedule.

## Field Trips

A program of 8-9 **optional** field trips will be offered to students on weekend days during the quarter. ESS 492 students will be expected to assist the instructor lead on at least one field trip offered during the quarter. All field trips leave from the “round-a-bout” northwest of Johnson Hall. A field trip schedule will be provided at the start of the quarter.

## Seminar Schedule

Week	Reading	Topic
Week 1	Laboratory 1	Review course logistics; Review Laboratory 1 (Geologic Techniques) & weekly fieldtrips
Week 2	Laboratory 2; Donovan & Bransford	Review Laboratory 2 (Plate Tectonics); <i>How Students Learn: Science in the Classroom</i>
Week 3	Laboratory 3	Review Laboratory 3 (Minerals)
Week 4	Laboratory 4; Tanner	Review Laboratory 4 (Igneous Rocks and Processes); <i>Structure Matters: Twenty-One Teaching Strategies to Promote Student Engagement and Cultivate Classroom Equity</i>
Week 5	Laboratory 5	Review Laboratory 5 (Sedimentary Rocks and Processes)
Week 6	Laboratory 6	Review Laboratory 6 (Metamorphic Rocks and Processes)
Week 7	Laboratory 7; Baker	Review Laboratory 7 (Geologic Time); <i>Equity Iss Science Education</i>
Week 8	Laboratory 8	Review debate logistics and subject matter on hydraulic fracking
Week 9	Laboratory 9	Review Laboratory 9 (Geological Hazards)
Week 10	Synopsis	Reflection of teaching experience