SED 535 Communicating Ocean Sciences to Informal Audiences
3 Credits

Instructors: Dr. Shawn Rowe, HMSC 205 or 204A Furman, 541-867-0190
shawn.rowe@oregonstate.edu

Office Hours: By appointment
Class Time: Tuesdays, 4:30 - 7:30
Room: Furman Hall 404

Course Description:
This course is designed for graduate students interested in improving their ability to communicate their scientific knowledge by helping general public and student audiences learn about ocean sciences in a wide variety of learning settings. The course combines instruction in inquiry-based teaching methods and learning theory with work in student's local informal learning settings like museums, aquariums and libraries.

Learning Resources:
Readings
Readings will be a combination of readings from Surrounded by Science: Learning Science in Informal Environments (2010), and a collection of journal articles. Surrounded by Science can be purchased (~$20) and downloaded from The National Academies Press: http://www.nap.edu/catalog.php?record_id=12614 or can be read online at the above website for free. Other readings will either be available on line – their URLs are listed next to them below (as well as on the class Canvas site) – or in a readings folder on Canvas. You will be responsible for reading the assigned readings for each session BEFORE you come to class. Also, you will be responsible for discussing the readings on the Canvas following the guidelines below.

Canvas
There is a Canvas component of this course where you will find copies of the syllabus as well as tools and resources that will help you follow-up your own interests sparked by the class. You will also find there the assignments that are part of your Activity Plan development. You will also be required to post on the discussion board each week following directions handed out in class and found in the course documents section of the Canvas. The discussion board closes each week on Sunday night so that there is time to review it before class on Tuesday.

Readings:
With the exception of the first week, we expect you to complete each set of readings listed for a particular date **before** attending class each week. Not only will it be impossible to do your Canvas assignments otherwise, the readings also provide the basis and background for much of our discussion in class. Your grade and our work in class will be richer and more
useful to you if you do the readings. In addition, each week, two of you will be assigned to act as moderators for the discussion board which will be based on the readings. Instructions for your roles will be handed out in class the first night.

Learning Outcomes:
This course is designed to model and give you opportunities to practice with the following:
- Promoting discussions with small and large groups
- Effective questioning techniques
- Comparing teaching approaches and what research says regarding how people learn in out of school time
- Identifying and addressing misconceptions
- Assessing free-choice learning in informal settings
- Creating inclusive learning environments
- Designing effective science programming for any audience
- Effectively communicating science concepts through inquiry-based learning opportunities.

In addition, you will be expected to master a certain amount of basic ocean science content that will be presented in hands-on activities and by visiting scientists as well as in at least 1 inquiry activity (see below). While all of the following areas may be touched on depending on the activities we do in class, you are expected to be familiar enough with the underlined ones to facilitate others’ learning about them. You will be presenting to your peers and public audiences on at least one of them during the course of the class. I strongly encourage you to purchase a basic oceanography textbook such as Invitation to Oceanography, by Paul Pinet and review it throughout the quarter.

1) Physical Oceanography
   i) Water density, stratification, and global ocean circulation
   ii) Relationship of Earth, Moon, Sun and tides
   iii) Light in the ocean
2) Geological Oceanography
   i) Geology of sandy beaches
   ii) Plate tectonics
3) Chemical Oceanography
   i) Salinity and currents
4) Biological Oceanography
   i) Structure and function of planktonic invertebrates
   ii) Structure and function of benthic invertebrates
   iii) Structure, function and evolution of fishes
   iv) Ecology of rocky intertidal, sandy beach, open ocean and kelp forest environments
5) Interdisciplinary
   i) Human impacts on marine environments

Timeline and Daily Readings:
Please start making any necessary scheduling arrangements for your out of class teaching assignments now.

NOTE: except for week 1, assigned readings and on-line discussions must be completed before class each week

Session 1  Sept 30  Communicating Ocean Sciences
ASSIGNED READING:
   www.oceancommission.gov/documents/full_color_rpt/welcome.html

Session 2  Oct 7  Teaching and Learning
ASSIGNED READING:
1. Read ch. 1 out of Surrounded by Science
2. Read ch. 8 out of Surrounded by Science
   Executive Summary
   http://www.nap.edu/catalog.php?record_id=12190

Session 3  Oct 14  Inquiring Minds
ASSIGNED READING:
1. Read ch. 3 out of Surrounded by Science
2. How Students Learn Ch.9 (Bransford & Donovan, 2005)

INFORMAL LEARNING OBSERVATION WRITEUP DUE on Canvas using the rubric available there. Everyone hands one in.

Session 4  Oct 21  Designing an Activity
ASSIGNED READING:
1. Brochu, L. and T. Merriman (2002). Personal Interpretation, Chapters 3 & 4
2. Designs for Learning: Studying science museum exhibits that do more than entertain (Allen, 2004)
Session 5  Oct  28
ASSIGNED READING:  The Nature and Process of Science
1. American Association for the Advancement of Science
(1990), Science for All Americans; Chapter 1, The Nature
of Science
http://www.project2061.org/publications/sfaa/online/sfaatoc.h
tm
anyway? Differing perceptions among science center staff.
ASTC Dimensions: 5-6
3. Read Ch. 2 from Surrounded by Science

Your review of peer-reviews of in-class communication activity DUE on Canvas
by the beginning of class; Everyone hands one in.

Session 6  Nov  4
ASSIGNED READING:  Blank Slates or Clever Minds: Building Ocean
Knowledge
1. Investigating the impact of prior knowledge and interest on
aquarium visitor learning (Falk & Adelman, 2003)
2. Children’s own concepts Ch. 7 (Osborne, 2001)
3. Read Ch. 9 from Surrounded by Science

Session 7  Nov 11
ASSIGNED READING:  Interaction and Questioning Strategies
1. Read Ch. 4 & 5 out of Surrounded by Science
2. The right question at the right time (Elstgeest, 2001)

Session 8  Nov 18
ASSIGNED READING:  Assessment and Evaluation in Informal Settings
1. Learning from Museums Ch. 6 & 9 (Falk & Dierking,
2000)
2. Read Ch. 6 out of Surrounded by Science

INQUIRY ACTIVITY WRITE UP DUE on Canvas by the beginning of class;
each set of partners hands in one full write-up.

Session 9  Nov 25
ASSIGNED READING:  Creating an Inclusive Learning Environment
1. Read Ch. 7 out of Surrounded by Science

Session 10  Dec  2  **Family Science Night**  
We will discuss in class the requirements and format for final presentations.

-peer rubric evaluations of outside of class communication activities due on or before December 3.

**Course Requirements:**

1. Attend class and participate in discussions (any absences must be cleared in advance except in the case of emergency – even a phone message just before class will suffice).

2. Complete assigned readings and be prepared to discuss them in class.

3. Start and/or summarize one weekly discussion and participate in all other online discussions.

4. Observe a learning activity in an informal educational setting and fill out an observation sheet on it. **Due by Oct 14.**

5. Lead two ocean sciences learning activities outside of class: at least 2 two-hour ocean-science learning activities on different days using materials we provide or that you design in an informal learning site with a partner. You must submit peer evaluation rubrics for each of your activities. All of the rubrics are **Due by Dec 3.**

6. Develop an inquiry activity for your own learning with a partner. The preferred partnership will include one person pursuing a science degree and one person pursuing an education/communication degree. The project will be completed in a series of steps, culminating with a presentation of your activity to your peers and the public. **For those of you in the teaching/communicating realm,** you will be expected to

   a. Identify an ocean science content area/idea you wish to master
   b. Do background research on your topic and write up the findings (5-8 pages)
   c. Work with your science partner to find or create a high-quality activity for communicating the basics of this topic.
   d. Present that activity with your partner on the last night of class.
   e. With your partner, submit a written version of what you have created or adapted using the provided template.

   **For those of you in the sciences realm,** you will be expected to
a. Identify a learning sciences content area/idea you wish to master
b. Do background research on your topic and write up the findings (5-8 pages)
c. Work with your education/communication partner to find or create a high-quality activity that builds from this topic to communicate a basic science idea that your partner is working on.
d. Present that activity with your partner on the last night of class.
e. With your partner, submit a written version of what you have created or adapted using the provided template.

Grading:

- **Participation (20%)**
  - On-line Starter/Wrapper responsibilities
  - Class attendance and participation

- **Teaching and observation (40%)**
  - One observation session in an informal learning setting (using observation rubric)
  - Two two-hour (minimum) activities in informal settings (documented through peer-evaluation rubrics and your review of them)
  - One in-class teaching activity (documented through peer evaluations and your review of them).

- **Written assignments (20%)**
  - Report of your inquiry activity results
  - Written version of the activity you adapt or create for your inquiry project.

- **Presentation (20%)**
  - Final presentation of your activity at the Family Science Night.

**Policy on student conduct:**
Students are expected to conduct themselves in the classroom (including on-line discussion boards) in compliance with the university's regulations regarding civility. Students are expected to comply with all regulations pertaining to academic honesty as well. For further information, visit the university’s comprehensive website (http://oregonstate.edu/studentconduct/offenses-0), or contact the office of Student Conduct and Mediation at 541-737-3656.

**Statement Regarding Students with Disabilities**
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.