Scientific Teaching
Biology 5045.001
Fall 2017

Instructor: Dr. Rudi Thompson, Distinguished Teaching Professor
Office Hours: Mondays: 10:15 am – 11:15 noon
Mondays: 10:15 am – 11:15 noon
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#1-42923-338-9

Course Description:

Scientific Teaching is a graduate level biology course designed for Teaching Assistants/Teaching Fellows, college lecturers and science researchers.

The objectives of the course are to:

✓ Aid in developing a meaningful and functional command of key knowledge and skills related to effective (science) teaching/communication.
✓ Aid in bringing about an understanding of the interrelationship between learning and teaching.
✓ Provide opportunities for students to experience the relationship between learning and teaching.
✓ To foster more positive linkages between science and education.
✓ To aid students in the use of the learning cycle as a model for effective instruction.
✓ To increase confidence in the ability to effectively communicate science to the society at large through preparation and practice.
✓ To provide support for the development of teaching strategies and techniques, which reflect the nature of science.
✓ To foster and further develop the scientific teacher’s ability to effectively create and assess active learning environments.
✓ To foster a problem-solving environment in order to create insight into the nature of science.
✓ To challenge all young scientists to bring to teaching the same critical thinking and rigor which they bring to their research.

Course Rationale

To help the scientific community understand that scientific teaching refers to teaching science in a way that represents the nature of science and to the teaching of science (Handlesman, et al, 2007)

Course Goals
This course will give you the knowledge, skills, and confidence to create and participate in active learning environments; to generate effective assessment techniques; to recognize, understand, and work with diverse learners; and to successfully communicate so others can learn.

Students will:
1. Understand that a scientific teacher sets learning goals that represent the nature of science.
2. Explore the breadth of reasons why/how we teach/communicate science.
3. Be able to define what constitutes the nature of science.
4. Develop active learning strategies for an in class and/or in laboratory session.
5. Develop a 90-minute interactive lesson to be conducted in an undergraduate lecture section.

Thompson’s Goals for Students – to learn
1. The Learning Cycle
2. The importance of the first day of class
   a. Pre-assessment
   b. Syllabus
   c. Setting the tone
3. Planning the sequence of an active-learning class
   a. Planning with your students
   b. Backward design
      i. Learning goals
      ii. Learning outcomes
   c. Writing assessments to guide instruction
4. Selecting class materials
   a. Engagement questions
   b. Exploration activities
5. Time management
   a. Lesson sequencing
   b. Pacing for different students/age groups
6. Effective Communication  
   a. Group Discussions  
   b. Classroom configurations  
7. Varying assessments  
   a. Formal/Informal  
   b. Formative/Summative  
8. Teaching Science Diversely  
   a. Culturally  
   b. Across age groups  
   c. Utilizing learning styles  

 Students Goals – To learn – (to be provided by students)  

 Thompson’s Goals for Students – To Do  

 1. Envision a class – The Big Picture  
 2. Write a syllabus  
 3. Select materials  
 4. Evaluate quality of an essay/paper, etc with subjective aspects  
 5. Generate fair ways to test what they know  
 6. Teach inclusively  
 7. Effectively group students  
 8. Connect with students yet maintain respect  
 9. Confidently conduct an interactive lecture  
10. Lecture in an organized and logical way  
11. Get students to ask questions and openly discuss
Student Goals – To Do – (To be provided by students)

Instructional Methods and Activities

BIOL 5045.001 meets once per week. The class will consist of a variety of the following: class discussions, working in small groups, individual homework and interactive lectures.

Policies and Procedures

Attendance and participation:

Attendance and participation in class activities is required of all students. More importantly, the discussions and group activities scheduled for class times are an essential part of your professional preparation. For this reason, attendance is mandatory and make up classes are not available. If a student were to miss more than one class session, their grade would be dropped one letter grade unless the session is missed due to illness or unforeseen circumstances. It is the student’s responsibility to contact the instructor before the next scheduled class session to discuss an absence. The student must make arrangements with the instructor to turn in any missed assignments.
Disability Accommodations:

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323."

Academic Misconduct:
Any student suspected of, or caught in the act of, plagiarism or cheating will receive a grade of zero for the assignment and the matter will be turned over to the Office of Student Development.

Course Requirements

Students will be evaluated on the basis of teaching and evaluating Teaching Episodes, homework, class participation and a final exam in two parts, the last of which will be comprehensive:

Cumulative Teaching Episode(s) = 50%
   Homework = 10%
   Attendance/participation = 15%
   Exams = 25%

Projects –
   o Teaching Episode 1 will consist of interactive presentations of the key concepts of your research article. (10%)
   o Teaching Episode 2 will consist of creating and delivering a teachable lesson to Biology 1082 students. (30%)
   o Observations of colleagues teaches. (10%)
   ✓ Homework – Homework will be discussed in detail during the semester and will primarily consist of gathering, reading, and highlighting journal articles involving scientific teaching.
   ✓ Attendance/Participation - will be comprised of prompt daily attendance and participation in class discussions. More than one absence will result in a drop of a letter grade.
   ✓ Exams -
   o The mid-term will consist of evaluations of three professional teaching days.
The final will consist of a take home portion as well as an in-class portion. The final exam will be comprehensive.