

# COLLEGES OF WORCESTER CONSORTIUM

## Certificate in College Teaching

IDND 30534: TEACHING IN THE SCIENCES (online)

Spring 2009

Syllabus

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### Course Description

This course is designed to introduce present and future faculty to innovative practices in teaching the sciences. From a pedagogical perspective, we will address two pressing issues associated with college-level science: first, a large percentage of college students that begin as science majors often leave the sciences for other majors, and, second, public understanding of science is at an all time low. Throughout this course, we will discuss new ways to help students get interested in and learn science, and students will work together to implement active learning and inquiry-based instruction into existing or newly designed science courses.

### Course Objectives

At the end of this course, students should be able to:

- Formulate student learning outcomes for a science course
- Develop effective assessment methods based on learning outcomes and determine what skills are being tested
- Implement active learning practices including cooperative learning groups, inquiry-based exercises, and student-centered activities
- Convert standard "cookbook" laboratory activities into open-ended student investigations

### Online Course

This course is taught in an entirely online format using Clark University's Blackboard course management system. All our discussions will take place asynchronously using discussion boards, providing the maximum degree of flexibility possible to you in terms of reading, responding, and discussing.

Students in the class are **required** to respond to each other's postings – not only does it provide your fellow students with a timely answer, but it helps to build a 'virtual' classroom community. *This is a discussion-oriented class, so you should be discussing the readings and prompts with each other, not just with the instructor.* I assure you that I will read all your questions, comments, and responses, and will be actively engaged in your discussions throughout the course.

### Reading Assignments

There is NO textbook to buy for this class – although you may find it helpful to have a textbook for the course you will be either designing or redesigning. You will be assigned reading material in the form of: review articles, primary literature and other handouts that will be posted on the course site for you to download or read online. It is the responsibility of the student to obtain copies of the assigned material and reading the handouts prior to posting on the Discussion Board.

## Course Projects

There are three projects in this course:

- 1) Inquiry-based Course Design/Redesign
  - (a) writing learning outcomes specifically for a science course
  - (b) formulating an exam not based on strict memorization
  - (c) selecting a teaching activity that complements the learning outcomes and assessment plan

- 2) Rework a “cookbook” laboratory

Cookbook labs contain “observe and record” activities and often do not require students to really “think” about the lab contents. Unlike a cookbook lab, an inquiry-based lab asks students to address a challenge, solve a problem, test a hypothesis, explain a phenomenon, or answer a question in the same manner that a research question is confronted.

- 3) Poster Presentation

An overview of your learning objectives, assessment strategies, teaching activities, and uncooked lab will be presented as a poster. The four components should be linked by the pedagogical practices discussed during the course.

## Course Schedule

### WEEK 1

(Wed. 3/11 – Tue. 3/17)

Science Anxiety and Using ‘Hooks’

### WEEK 2 (Wed. 3/18 – Tue. 3/24)

Nature of Scientific Inquiry

### WEEK 3 (Wed. 3/25 – Tue. 3/31)

Assessing Inquiry

### WEEK 4 (Wed. 4/1 – Tue. 4/7)

Active Learning in the Sciences

### WEEK 5 (Wed. 4/8 – Tue. 4/14)

Creative Teaching in the Sciences

### WEEK 6 (Wed. 4/15 – Tue. 4/21)

Integration of Research, Teaching, and Learning

### WEEK 7 (Wed. 4/22 – Wed. 4/29)

Undergraduate Research

Final Project (Poster) is due Wed, May 6.

## Course Grading

### *Discussion Board Participation (25%)*

With respect to discussion board postings, students are expected to make both *primary postings* and *responses* every week. A primary posting provides a springboard for discussion amongst your classmates and is based upon the course materials and your professional experiences. A response is a thoughtful reaction or reply to a primary posting. In a response, you are expected to reflect upon what the original posting contained, consider it in light of your own professional/personal experiences and the course readings, and post a response that supports, extends, and/or challenges the original posting.

### *Course Design/Redesign*

- Learning outcomes (15%)
- Exam (15%)
- Teaching Activity (15%)

### *Uncooked Laboratory (15%)*

### *Poster (15%)*

## Academic Honesty Policy

There are no tests in this course, only take-home assignments. You are encouraged, and even required, to complete some assignments collaboratively. Thus, many of the traditional concerns about academic honesty are not relevant here. However, the collaborative nature of the work in this course does require that clear guidelines about collaboration be set. When an assignment is done individually, you may consult any people you wish during the thinking and planning phases of the assignment. At the point at which you begin to write, your work is expected to be your own.

When an assignment is done collaboratively, all group members are expected to contribute approximately equally to the planning, execution, and reporting of the work. The inclusion of your name on a piece of submitted work is interpreted as your certification that you did your fair share of the group work. (This is generally not an adequate safeguard against “freeloading” in an undergraduate course, but in a course of this nature, it is usually sufficient.)

When making use of external sources such as books, published papers, web resources, etc., you are expected to cite sources of ideas and information that are not your own, and to enclose in quotation marks and properly attribute any material that you take verbatim from other sources. Such quotations should generally be brief, a few sentences at most. Consult Clark University’s “College Board Procedure for Dealing with Accusations of Violation of Academic Integrity” at [www.clarku.edu/offices/aac/integrity.shtml](http://www.clarku.edu/offices/aac/integrity.shtml) for additional details and for penalties and procedures in case of violations.

## Students with Disabilities

If you believe that you may need accommodations in this course, and if you have not already done so, please contact Jane Daigneault, Coordinator of Disability Services at Clark University (508-793-7468). Also, consult “Disability Services at Clark” at [www.clarku.edu/offices/aac/ada/](http://www.clarku.edu/offices/aac/ada/). If you would like to discuss how your accommodations will be implemented during this course or if you would like to share information unrelated to accommodations, please make an appointment to see me as soon as possible.