

# Syllabus: ENGI 501 Teaching Engineering

See also the course Web and OWL-Space sites

[www.ece.rice.edu/~young/engi501](http://www.ece.rice.edu/~young/engi501)

## Description

This course is aimed at engineering and science graduate students who are considering a career in academia. Weekly seminars focus on the issues, principles, and practices associated with the effective teaching of quantitative classes. Each class will consist of presentations and discussions related to assigned readings and/or written exercises. Class participation and sharing your perspectives, questions, and ideas is critical so that we can all learn from each other. The course has no prerequisites, and provides three semester hours of credit. The course will not be given unless 12 students enroll.

## Course Objectives

After you finish this class, and perhaps even a year later, I hope you will—

- Remember the different learning styles and their implications for teaching.
- Understand the value of various teaching techniques: active learning, cooperative learning, team-based, project-based, etc.
- Know how and where to find information on engineering education and teaching techniques.
- Be able to assess your own teaching, and that of others, and to suggest actions for improvement.
- Be able to efficiently design a course or subject module with significant learning experiences and goals.
- Be able to assess students and provide appropriate feedback.
- Make appropriate uses of technology in teaching.
- Have a learning plan to continue your development as an effective teacher.
- Relate your disciplinary knowledge and research to your teaching.
- Recognize the value of good teaching and of mentoring students.
- Express to others the value of effective teaching.
- Become excited about becoming a great teacher and work at it.
- Become a change-agent within your institution to promote effective teaching, training, and support.
- Continue to document your progress through your teaching portfolio.

## Instructor

James F. Young, Abercrombie Lab A206, [young@rice.edu](mailto:young@rice.edu), x4721; office hours by appointment.

**Qualifications:** Modest, except enthusiasm and interest. I'm ashamed to admit that during my 35+ years in academia I was completely unaware, until about five years ago, of the vast research and literature on engineering education, the conferences, the journals, and, yes, even the funding opportunities. Since that time I have been working hard to catch up and to apply established principles to my teaching. This course is largely based on the three-day National Effective Teaching Institute workshop I attended in 2006, and a subsequent 2007 workshop at Rice by Drs. Felder and Brent. This course will be a joint journey and I expect to learn at least as much as the students. I also expect to have fun along the way.

## Schedule

**Class:** Tuesday 2:30–5 pm.

### **Texts**

*Teaching Tips: Strategies, Research, and Theory for College and University Teachers*, W. J. McKeachie and M. Svinicki, 12<sup>th</sup> Edition (Houghton Mifflin 2006, ISBN 0-618-51556-9).  
*Teaching Engineering*, P. C. Wankat and F. S. Oreovicz (Purdue University). Full pdf text free on-line; see the course web site for this and other on-line references.

### **Deliverables**

See the Course Schedule on the course Web site for details and dates. Detailed instructions and assessment criteria will be provided during the class. The primary assignments include:

- Short autobiography, as a way to get to know each other and to better form a learning community.
- Learning style self-assessment and a reflection on its implications for teaching.
- Course Observation. Students will pick an undergraduate engineering course to observe and will report on various aspects:
  - Syllabus content
  - Clarity of course & learning objectives
  - Lecture style and effectiveness
  - Student assignments, feedback, and tests
- Teaching Resources List; relevant journals, conferences, and web sites.
- Teaching Toolkit and Tips; best practices and interesting techniques to try.
- Course Module. Student teams will develop and document a plan for teaching a particular engineering topic covering 3-4 weeks.
- Micro-Teaching Exercise. A short, ~20 minute, representative lecture from the developed module, critiqued by the instructor and the class.
- Teaching–Class Portfolio. During the course students will draft a portfolio to document their activities. The portfolio will be due at the end of finals period and will incorporate the other assignments, including:
  - Introductory narrative
  - Statement of teaching philosophy
  - Teaching Resources & Tips
  - Course observation results and reflection
  - Description of developed course module and its features
  - Efforts to improve teaching skills
  - Teaching goals and plans
  - Appendices of supporting materials.

**Course Grade**

This course is participatory and interactive, and attendance at each class session is necessary. If you miss more than one class, you will be asked to do additional work to make up the material.

Your course grade will be based on a weighted combination of class participation and reports, written assignments, class presentations, and the final portfolio. Class reports, written class assignments, and the portfolio will be graded by the instructor. Team projects, such as the class module, will be jointly graded by the instructor and another team. Class presentations, such as the micro-teaching exercise, will be graded by the instructor and the class. These procedures may be modified based on class discussion; the goal is to provide the most useful and effective feedback to students.

Since student assessment and grading is one subject of this course, the class will jointly decide how to combine the various components to determine a final grade.

**Disabled Students**

Any student with a disability requiring accommodations in this course should contact Disabled Student Services in the Ley Student Center. In addition, he or she is encouraged to contact me during the first week of class to discuss the situation.