E 110. Principles of University Teaching and Learning in STEM
Fall Quarter, 2016. 2 units (1. 0. 1).

Instructor: Cassandra Volpe Horii, Ph.D.
Director of the Caltech Center for Teaching, Learning, & Outreach
Contact: cvh@caltech.edu, 626-395-6225, MC 369-B6
Office: 3rd Floor North, Student Services Building #86, Holliston Ave.

Class Meetings: Tues. 9:30-10:30 AM, Center for Teaching, Learning, & Outreach
(same location as office—see above)

Office Hours: Flexible; please e-mail or call to set up.

Website: Class page will be in Moodle, http://moodle.caltech.edu, in September.
E110 will be listed under “E (FA 2016)”; enrollment key will be “horii”.

Catalog Description:
Research on university-level teaching and learning in Science, Technology, Engineering, and Mathematics (STEM) disciplines has progressed rapidly in recent years; a well-established body of evidence-based principles now exists to inform instructors and students at the undergraduate and graduate levels. Increasingly, future PIs and faculty are called upon to demonstrate knowledge of and ability to apply established pedagogical and assessment practices, as well as to analyze the efficacy of new approaches. In this course, weekly interactive meetings will provide focused overviews and guided application of key pedagogical research, such as prior knowledge and misconceptions, novice-expert differences, and cognitive development as applied to university teaching. We will also explore emerging university teaching and learning practices and their theoretical basis (e.g., the flipped classroom, online learning). Readings will inform in-class work and students will apply principles to a project of their choice.

Welcome to E110, a course designed to enable you to achieve these learning outcomes:
• Identify and explain central research findings on university STEM teaching and learning.
• Apply findings to relevant courses and disciplines.
• Construct a comprehensive, current, and individually meaningful view of effective university-level STEM teaching and learning.
• Value and practice evidence-based teaching and learning approaches.

In addition, E110 will address your individual interests and outcomes through an independent project and “Emerging Topics” class sessions. Together, our shared outcomes plus your individual work should prepare you to be an effective, articulate, and self-directed university instructor and advanced life-long learner, whether in academia or in similar settings.

Weekly Coursework & Participation
Most weeks, you’ll have a choice of readings: either a chapter in one of our core texts, How Learning Works* or Reaching Students,** or a selection of primary research articles on the subject (often

Students, depending on interests, we could discuss the process during E110.†

Accommodations: Should any course-related concerns or needs arise related to a disability or accessibility issue, I would very much like to help as early in the quarter as possible, so please let me know. In the case of a documented disability, please contact Dr. Barbara Green, Associate Dean of Students, x.6351 to coordinate any special accommodations.

† Note that Human Subjects Training and IRB review are required for conducting any research involving students; depending on interests, we could discuss the process during E110.