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

Class Meetings: Tues. 9:30-10:30 AM, Annenberg 107
Office Hours: Flexible; please e-mail or call to set up.
Website: Public page, http://www.teachlearn.caltech.edu/TAs/Courses.
     A private site link will be provided after first class session.

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 pedagogical practice 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 pedagogies 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 and current view of effective university-level STEM teaching.
- Value and practice evidence-based teaching 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**, whether in academia or in similar settings.

Weekly Coursework & Participation
Most weeks, you'll have **a choice of readings**: either a chapter in our core text, *How Learning Works*,* or a selection of newer, primary research articles on the subject. We'll spend a few minutes each week deciding who will read what for the next class so that our discussion can bring in a range of data and views. At times, weekly work may include preparation of a discussion question, a short draft or segment of projects, or input on the Emerging Topics sessions. As a 2 unit (1-0-1) pass-fail course, shaped in part by your participation, your **contributions in class** are essential. ***Weekly Coursework & Participation will contribute 50% of your course grade.***

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* *How Learning Works: 7 Research-Based Principles for Smart Teaching*, Susan Ambrose et al.. San Francisco: Wiley & Sons, 2010. ISBN-10: 0470484101. You may use any edition (print or e-book).

Projects:
Projects are your opportunity to design and carry out independent work that will:
    a) Advance your individual learning goals in university-level teaching;
    b) Apply coursework (readings, discussion, ideas) to an end product that is useful to you;
    c) Provide you with in-depth feedback from peers and the instructor;
    d) Be of an appropriate scope and depth to carry out in about five hours of focused work.
Example projects include: assembling a teaching portfolio, writing a statement of teaching philosophy, designing a syllabus for a course you may teach in the future, formulating a research question/study design about teaching and learning[†], implementing and assessing a new teaching strategy. Many other project formats are possible; please don't let these suggestions limit your imagination. Each project will also be shaped significantly by your specific topical interests and learning goals. ***Projects will contribute 50% of your course grade.***

Schedule: Class meetings (in bold) are Tuesdays, 9:30-10:30 AM, Annenberg 107

Oct 1	Course Overview. *Building expertise and organizing knowledge (ours and students').*
Oct 8	Prior Knowledge & Misconceptions. *Bane, boon, and more than we bargained for.*
Oct 15	Student Development. *Cognition, agency, and self-directed learning.*
Oct 22	Practice, Feedback, & Assessment. *Finding out and improving what students know and how they know it.*
Oct 29	Project Plans Due. *Discussion, feedback, next steps.*
Nov 5	Emerging topics 1: Guest Discussion TBD.
Nov 12	Emerging topics 2: (class will determine topic).
Nov 19	Emerging topics 3: (class will determine topic).
Nov 20-26	Individual project meetings (no formal class meeting the week of Thanksgiving)
Dec 3	FINAL CLASS: Project talks & feedback.
Dec 10	Last day to hand in e-files (projects & questionnaires).

Grades: E110 is a pass-fail class and grades are not a main focus. Formally, passing requires a minimum of 60% overall; both the weekly coursework and project are required in order to pass.

Caltech/JPL Auditors: are welcome, provided there's room and that you'll contribute in class!
-   *Caltech students & faculty*: please tell me your intentions so that I send you E110 updates.
-   *Caltech/JPL staff:* please contact me and then fill out a green "Audit Card" at the Registrar's Office. There is no fee.

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. In the case of a documented disability, please contact Dr. Barbara Green, Associate Dean of Students, x.6351.

[†] 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.