

**University of California – Riverside  
Graduate School of Education**

Winter 2021

Imagining Teaching: Science-Mathematics Emphasis: EDUC 003

3 Units

Karen Withey-Smith

Wednesdays 5:00-6:50 pm by Zoom

<https://ucr.zoom.us/j/93951079993?pwd=cHdZbkxFazROYIB4WmF4ZGowNmtTQT09>

Office Hours: Monday 10:00-11:00 am by Zoom

<https://ucr.zoom.us/j/99053553853?pwd=dWM3ZEZ0ekFhekpwOWdqGVEUWpBQT09>

(or by appointment)

[karenw@ucr.edu](mailto:karenw@ucr.edu)

[karen.witheysmith@ucr.edu](mailto:karen.witheysmith@ucr.edu)

# **EDUC 003 Imagining Teaching: Science-Mathematics Emphasis**

## **COURSE OVERVIEW**

### **CATALOG COURSE DESCRIPTION**

3 Units, Lecture, 2 hours; field, 3 hours. Prerequisite(s): admission to the California Teach program; and consent of instructor. Students consider images of teaching and how they impact teaching in schools. Addresses topics related to teaching mathematics and science in the K-12 classroom. Includes three hours per week of classroom observations, some of which takes place in public school classrooms.

Course Prerequisites: None

### **COURSE OBJECTIVES**

- To observe, and participate in public school classrooms to gain insight into the profession
- To focus on the interactions between teachers and students
- To develop understanding of the effect of outside influences on student achievement
- To view education/teaching from a teacher's perspective and its role in society

### **LEARNING OUTCOMES**

- Students develop written analysis of academic papers.
- Students familiarized with standards-based instruction and the California Common Core Mathematics Standards and the Next Generation Science Standards.
- Students observe and assess classroom practice using analytic techniques.
- Students introduced to lesson design and planning.

## **UCR-GSOE POLICIES**

### **STUDENTS WITH DISABILITIES POLICY**

If you have a disability or believe you may have a disability, you can arrange for accommodations by contacting Student Disability Resource Center (SDRC) at 951-827-3861 (voice) or [sdrc@ucr.edu](mailto:sdrc@ucr.edu) (email). Students needing academic accommodations are required to register with SDRC and provide required disability-related documentation. If you have approved accommodation(s), you are advised to notify your instructor privately. The SDRC website <http://sdrc.ucr.edu> provides information about academic and non-academic support and has additional contact information.

### **ATTENDANCE POLICY**

GSOE takes seriously the need for students to attend and actively participate in classes; class absences and lack of participation undermine the learning process. Students who miss more than 20% of the course meeting are strongly urged to withdraw from the course. Instructors may also fail such students, except in the case of documented serious illness or immediate family emergency. Missing portions of

classes, through persistent late arrival or early departure, can count toward the “more than 20% of class time.”

### **ACADEMIC HONESTY POLICY**

Students are expected to conduct themselves and their work in a manner consistent with UCR’s policy on academic integrity. Academic misconduct includes, but is not limited to, cheating, fabrication and plagiarism (e.g., using another’s work or ideas without giving credit- intentionally or unintentionally). Submitting your own work more than once (e.g. for this class and another class, without both instructors’ knowledge and permission) is also a form of academic dishonesty and will result in an F. If you are at all unsure of what constitutes plagiarism or other forms of academic dishonesty, consult the UCR website for more information: <http://conduct.ucr.edu>. Please familiarize yourself with UCR’s policies and procedures regarding academic integrity, published in full in the General Catalog at <http://catalog.ucr.edu>.

### **WRITING POLICY**

The Graduate School of Education believes that all students should exit its program with strong writing skills. As such, the quality of written composition as well as content will be factored into grades on students’ papers for all education classes.

## **COURSE POLICIES**

### **ELECTRONIC COMMUNICATION POLICY**

As a default, I will be sending class emails to your UCR email, as it is also the email UCR staff will use when sending you important emails. Plus, it will help get you into the habit of using a more professional email for school and for potential future work. When sending me an email, please include your last name, followed by the course number, and followed by the purpose of the email in the subject heading (Example: Evans – EDUC102 – Question about Final Exam). Keep in mind that I will respond within 24 hours during the week and within 48 hours on the weekend unless the email is sent during my office hours, at which time you will get an almost immediate response.

### **BEHAVIOR/CONDUCT**

- Follow our Zoom class/discussion etiquette rules.

#### ***ZOOM ETIQUETTE***

- Mute yourself when you enter Zoom.
- You can temporarily unmute by holding down the space bar if muted.
- Be mindful of background noise; try to Zoom in a quiet space so you can hear.
- Use wait time in Zoom when asking questions/talking (there may be transmission lags).
- Feel free to ask for a repeat/paraphrase, we know sometimes transmissions glitch.
- Unmute to ask a question or feel free to put your question in the chat box.
- Say something if you can’t hear the Zoom video or instructor!

- It's better if you don't go to the black screen (if you can) when we're in conversation, it helps all of us be able to communicate and see each other.
  - Nodding is hard to see. Please signal with a thumbs up / down, unmute, or answer in the chat box.
  - If you have a procedural question during class, you can post in the Zoom chat log. I will be monitoring the chat box during class and will try to answer them as we go and/or let me know you've had a question at the end.
  - We want to be a positive community, always use thoughtful language when answering other students or the instructor.
- Please read all assignment instructions on Canvas (eLearn) and announcements as I post them.
  - I will be updating you regularly, please check your email often.
  - Use considerate language when sharing thoughts and opinions. We all have our own views, but the goal is to create an online environment that encourages academic discussion and personal growth.
  - No external electronic recordings, or downloading videos are allowed without prior approval from the instructor.

### **LATE PAPERS/ASSIGNMENTS**

Late assignments will be accepted up to 3 days beyond the due date, but will be decreased in total points by 10% unless accompanied by documentation that excuses the late assignment. If accompanied by a legitimate excuse, the assignment will not be decreased by 10% during the time period the excuse covers. Examples of acceptable excuses are:

- Illness with a doctor's note
- Having to care for an ill loved one
- Having a death in the family
- Being involved in a car accident

There are no make-ups for this class' activities or discussion activities.

Communication is key to your success. If something happens, please let me know and we can work through your options for success in the course.

### **UCR ACADEMIC RESOURCE CENTER (for undergraduate students)**

The Academic Resource Center (ARC) is the central resource for academic support at UCR. All students are strongly encouraged to visit the ARC, which is staffed by professional and student employees who are well trained to provide academic support and dedicated to fostering academic excellence. Resources provided by the ARC include Tutoring, Supplemental Instruction, Study Skills Workshops, as well as several peer mentoring programs. Participating in these services is most useful to students when used proactively for academic enrichment. Visit [arc.ucr.edu](http://arc.ucr.edu) or call 951-827- 3721 for more information about hours, location and the schedule of services.

## COURSE RESOURCES

This course does not include a textbook. Instead you will be assigned various articles related to the teaching profession. You will also be assigned videos through ATLAS. All course materials will be uploaded onto CANVAS.

## GRADING SCALE

Assignments are due on the dates noted in the syllabus. Barring extraordinary circumstances, late assignments will not be accepted. Each assignment will contribute to the overall grade in the class according to the weight assigned by category.

<i>A+</i>	<i>97 -100%</i>	<i>C+</i>	<i>77-79%</i>
<i>A</i>	<i>93-96%</i>	<i>C</i>	<i>73-76%</i>
<i>A-</i>	<i>90-92%</i>	<i>C-</i>	<i>70-72%</i>
<i>B+</i>	<i>87-89%</i>	<i>D+</i>	<i>67-69%</i>
<i>B</i>	<i>83-86%</i>	<i>D</i>	<i>63-66%</i>
<i>B-</i>	<i>80-82%</i>	<i>D-</i>	<i>60-62%</i>
<i>F: 59% or below OR failure to complete fieldwork hours or submit verification OR failure to participate in classes as outlined in the syllabus.</i>			

## COURSE GRADING REQUIREMENTS

**1. Fieldwork: Log and Journal (25% and required to receive credit):** All fieldwork hours and journal assignments must be completed in order to receive credit for the course. 30 hours of observation must be completed at the rate of 1.5 - 2 hours per week in a public, secondary school, regular education classroom and 1.5 - 2 hour per week via assigned ATLAS classroom videos. **NOTE: Due to COVID-19 the usual mandatory 2 hours/week in actual classrooms has been modified to adapt to school districts' responses. It includes a minimum of 5 separate purpose driven check-in interactions with your mentor teacher plus additional replacement hours using ATLAS classroom videos. (See EDUC 3 Program Handbook for details regarding the modification of EDUC 3 Winter 2021 Field Hours)** Your recorded field hours (interactions with your mentor teacher) will be verified against records maintained by your mentor teacher. Two or three short questions/prompts based on topics covered during lecture each week will be posted on CANVAS. You will be required to respond to them with brief essays or short answers, usually a paragraph or two. The intention is to develop your critical observation skills in a classroom environment. One of the primary

skills teachers need to develop is critical observation as well as personal reflection. These assignments are a crucial element in your development as a reflective educational scholar. ***A student must complete field experience virtual classroom observations and/or discussions with your mentor teacher in order to receive a grade above C-. Furthermore, a grade of C- does not convert into an "S" grade should you elect to S/NC the course. University guidelines require students to earn a C or better in order to obtain "S" grades.***

**2. Weekly Journal Entries (30%):** Journal entries are a way for you to develop your understanding of the current state of education, according to your observations, while comparing and contrasting this with your developing philosophy and your understanding of educational research as related to Science/Math education. Like any learner, your understanding will evolve over time. A record of your thoughts and observations will help you recognize and guide your own development as a professional educator.

**3. Class Participation (20% and required to receive credit):** Each class will include lecture, writing, discussion and activity components. Your full participation will ensure you gain the skills and knowledge necessary to complete the assignments. Missing two or more classes during a quarter or habitually showing up late or leaving early may lead to receiving a failing grade for the course. Remember: **There are no make-ups for this class' activities, discussion activities, the discussion presentation.**

**4. 5E Group Lesson Plan Project (25%):** Each student will be assigned to a group of three students to develop a single lesson plan using the 5E Lesson Planning Guide. Each member will be required to turn in one written section of the plan (an Explore/Explain section or an Elaboration Section). The group is responsible for turning in one complete lesson plan, which includes each of the three individual sections written by each member of the group (Explore/Explain or Elaborate) plus the Engage and Evaluate sections, written collaboratively by the group. Finally, the group is responsible for presenting to the class how they would teach the proposed lessons. Details given in class.

**Assignments:** Each assignment is due on the date given in the syllabus. Assignments should be submitted online via Canvas (eLearn ) unless instructed otherwise.

## **COURSE SCHEDULE/ TIMELINE**

*(Do to COVID-19 this syllabus may continue to be updated as needed)*

### **Meeting #1 (Jan 6)**

**TOPIC:** What can I expect this quarter?

**CLASS:**

- Introductions, logistics and administration details, expectations.
- Protocol for emailing your SMI Mentor teacher
- ATLAS Videos and How to Use Them
- Class discussion and introduction to Common Core and Next Generation Science Standards (if time allows)

**READ FOR NEXT TIME:**

- Lee, O., Quinn, H., & Valdés, G. (2013). Science and Language for English Language Learners in Relation to Next Generation Science Standards and with Implications for Common Core State Standards for English Language Arts and Mathematics. *Educational Researcher*, 42(4), 223–233.  
<https://doi.org/10.3102/0013189x13480524>

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 251 and 806

**DUE NEXT TIME:**

- ***Journal # 1*** See Canvas (eLearn) for prompts
  - ***Make contact by email with your SMI Mentor Teacher***
- 

### **Meeting #2 (Jan 13)**

**TOPIC:** Why do we need standards to teach our math or science content?

**CLASS:**

- Lecture and discussion of Content Standards in the classroom; (CCSS) Common Core State Standards for and (NGSS) Next Generation Science Standards; Standards Activity

**READ FOR NEXT TIME:**

- Loewenberg Ball, D., Thames, M. H., & Phelps, G. (2008). Content Knowledge for Teaching. *Journal of Teacher Education*, 59(5), 389–407.  
<https://doi.org/10.1177/0022487108324554>

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 261 and 614

**DUE NEXT TIME:**

- **Journal # 2** See Canvas (eLearn) for prompts
- 

**Meeting #3** (Jan 20)

**TOPIC:** How important is knowing your math or science content?

**CLASS:**

- Discussion of reading and ATLAS cases
- Watch TED Talk

**READ FOR NEXT TIME:**

- van Zee, E. H., Iwasyk, M., Kurose, A., Simpson, D., & Wild, J. (2001). Student and teacher questioning during conversations about science. *Journal of Research in Science Teaching*, 38(2), 159–190. [https://doi.org/10.1002/1098-2736\(200102\)](https://doi.org/10.1002/1098-2736(200102)38(2)<159::AID-JRST159>3.0.CO;2-3)

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 808 and 1049

**DUE NEXT TIME:**

- **Journal # 3** See Canvas (eLearn) for prompts
- 

**Meeting #4** (Jan 27)

**TOPIC:** What is the real job of a teacher?

**CLASS:**

- Jigsaw Article and Discussion
  - Tanner, K. D. (2013). Structure matters: twenty-one teaching strategies to promote student engagement and cultivate classroom equity. *CBE—Life Sciences Education*, 12(3), 322-331.
- Video Case # 703 Describing and Presenting Properties (Gr K)

**READ FOR NEXT TIME:**

- Bybee, R. (2014). Guest Editorial: The BSCS 5E Instructional Model: Personal Reflections and Contemporary Implications. *Science and Children*, 051(08), 10–13. [https://doi.org/10.2505/4/sc14\\_051\\_08\\_10](https://doi.org/10.2505/4/sc14_051_08_10)
- Bybee, R. (2019). Guest Editorial: Using the BSCS 5E Instructional Model to Introduce STEM Disciplines. *Science and Children*, 056(06), 8–12. [https://doi.org/10.2505/4/sc19\\_056\\_06\\_8](https://doi.org/10.2505/4/sc19_056_06_8)

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 297 and 309

**DUE NEXT TIME:**

- **Journal # 4** See Canvas (eLearn) for prompts
- 

**Meeting #5** (Feb 3)

**TOPIC:** What is 5E and how does it fit into a teacher's lesson plan?

**CLASS:**

- Discuss requirements and templates for 5E Lesson Plan Project
- Amplify Science 5E Digital Platform Lesson
- Video # 173 Investigation with Cars and Ramps (Gr 1)

**READ FOR NEXT TIME:**

- Rainey, K., Dancy, M., Mickelson, R., Stearns, E., & Moller, S. (2018). Race and gender differences in how sense of belonging influences decisions to major in STEM. *International Journal of STEM Education*, 5(1), 10. <https://doi.org/10.1186/s40594-018-0115-6>

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 196

**DUE NEXT TIME:**

- **Journal # 5** See Canvas (eLearn) for prompts
- 

**Meeting #6** (Feb 10)

**TOPIC:** You are already a role model so what's next?

**CLASS:**

- Discussion of reading and ATLAS cases
- Inclusion and equity
- Time to work on a group lesson plan

**READ FOR NEXT TIME:**

- Hoffman, Lisa and Zollman, Alan (2016) "What STEM Teachers Need to Know and Do for English Language Learners (ELLs):Using Literacy to Learn," *Journal of STEM Teacher Education: Vol. 51 : Iss. 1 , Article 9*. DOI: [doi.org/10.30707/JSTE51.1Hoffman](https://doi.org/10.30707/JSTE51.1Hoffman)

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 68 and 190

**DUE NEXT TIME:**

- **Journal # 6** See Canvas (eLearn) for prompts
- 

**Meeting #7** (Feb 17)

**TOPIC:** How can we assist English Language learners in English proficiency while teaching math and science?

- Addressing the Needs of English Language Learners in STEM Subjects

**CLASS:**

- Lecture and discussion of ELL needs
- Video # 123 (Fr)
- Discussion of reading and ATLAS cases
- Jigsaw article in class from NSTA
  - Miller, E. C., Lauffer, H., & Messina, P. (2014). NGSS for English Language Learners. *Science and Children*, 051(05), 55–59.  
[https://doi.org/10.2505/4/sc14\\_051\\_05\\_55](https://doi.org/10.2505/4/sc14_051_05_55)
- Time to work on a group lesson plan

**READ FOR NEXT TIME:**

- Dixon, D. D., & Worrell, F. C. (2016). Formative and Summative Assessment in the Classroom. *Theory Into Practice*, 55(2), 153–159.  
<https://doi.org/10.1080/00405841.2016.1148989>

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 988 and 1023

**DUE NEXT TIME:**

- **Journal # 7** See Canvas (eLearn) for prompts
- 

**Meeting #8** (Feb 24)

**TOPIC:** How do we know if they learned what we taught?

**CLASS:**

- Lecture on formative vs summative assessments
- Discussion of reading and ATLAS cases
- Time to work on a group lesson plan

**WATCH FOR NEXT TIME:**

- NA

**DUE NEXT TIME:**

- *Group Presentation of 5 E Lesson Plan*
- 

**Meeting #9** (Mar 3)

**TOPIC:** What does it feel like to be a teacher? Modeling a 5E Math/Science Lesson

**CLASS:**

- iEval
- Group Presentations

**WATCH FOR NEXT TIME:**

- NA

**DUE NEXT TIME:**

- *Group Presentation of 5 E Lesson Plan*
- 

**Meeting #10** (Mar 10)

**TOPIC:** What does it feel like to be a teacher? Modeling a 5E Math/Science Lesson

**CLASS:**

- Group Presentations

**WATCH FOR NEXT TIME:**

- NA

**DUE NEXT TIME:**

- NA

*\*In teaching, things may change over the course of the quarter especially due to COVID-19. Therefore, this Syllabus and the Class Schedule is subject to change at the discretion of the instructor.*