**University of California – Riverside**
**School of Education**
Winter 2022
*Imagining Teaching: Science-Mathematics Emphasis:* EDUC 003
3 Units
Tracy Lawrence
2351 SPROUL HALL
Tuesday 4:00 - 5:50pm
Office Hours: Thursday 3:30-4:30pm by Zoom
https://ucr.zoom.us/j/95925532242?pwd=Nmo5Snl6UlAzVk1uMkdlYVNzSWJDUT09
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# EDUC 003 Imagining Teaching: Science-Mathematics Emphasis

## COURSE OVERVIEW

### CATALOG COURSE DESCRIPTION

3 Units which includes 2 hours of lecture and 2 hours of field work per week. 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 2 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-SOE POLICIES

### ACCOMODATIONS 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 (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

SOE 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% (2 days) of the course meetings 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 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.

**COVID-19/NON-COMPLIANCE POLICY**
All students in this course, as a condition of physical presence in the classroom (including for exams or tests in the classroom or other location on the UCR campus), must be compliant with the UC SARS-CoV-2 (COVID-19) Vaccination Program (Program) at all times. Compliance is easily achieved by providing proof of Full Vaccination or submitting a request for Exception or Deferral as required by the Program. Students in violation of the Program or related directives of the instructor will be subject to disciplinary or other remedial action. The Policy can be found at: *https://policy.ucop.edu/doc/5000695/SARS-CoV-2_Covid-19.* Also non-compliance with COVID-19 health and safety standards such as masking during instructional activities will be considered disruptive under the UCR Standards of Conduct and could lead to disciplinary consequences: https://conduct.ucr.edu/policies/standards-of-conduct#10227_failure_to_comply_with_ucr_health_and_safety_requirements_for_covid19

If you need accommodations, please contact SDRC: http://sdrc.ucr.edu

## COURSE POLICIES

### CLASS MATERIALS
All class materials will be on Canvas at: https://elearnhome.ucr.edu/

### ANNOUNCEMENT POLICY
All class announcements / reminders will go to your UCR email address through Canvas.

### EMAIL POLICY
I will usually respond to emails within 48 hours Monday through Friday during regular work hours. If you want a quicker answer or assignment help, please come to my office hours. The Zoom link and times are on Canvas.

**Email Header Should Include -** class number, your name, and topic/purpose of email.

*Example: ED105 – Emily Jones – Discussion Activity 1*

### CLASS BEHAVIOR/CONDUCT
- You are required to follow all UCR mandates on COVID-19 safety behavior
- Please arrive on time and return from break on time.
- If you are not attending class, you should inform the instructor and check-in with a study buddy so that you can catch up on what you miss.
- Please use considerate language when sharing thoughts and opinions during class, in emails, etc. We all have different perspectives, but the goal is to create an environment that encourages academic discussion and personal growth.

### DIVERSITY
It is the policy of UCR to support and value diversity; therefore, we require in this class:
- Respect the dignity and essential worth of ALL individuals
- Promote a culture of respect throughout the university community in person and online
- Respect the privacy, property, and freedom of others
- Reject bigotry, racism, discrimination, violence, hazing, or intimidation of any kind
- Promote diversity of opinions, ideas, and background
- Respect the form of how people have asked to be addressed (names/pronouns)

### LATE WORK
Late work will be accepted for a full grade deduction up to one week past the due date in the syllabus. Papers more than one week late will not be accepted.

**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 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 CANVAS. Each assignment will contribute to the overall grade in the class according to the weight assigned by category.

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

## COURSE GRADING REQUIREMENTS

**1. Fieldwork: Log and Reflections (25% and required to receive credit):** All fieldwork hours with reflections must be completed in order to receive credit for the course. 30 total hours of observation must be completed each week: this includes **2 hours per week in a public, secondary school, regular education classroom** and **1 hour per week via assigned ATLAS classroom videos**. Your recorded field hours will be verified against records maintained by your mentor teacher. ***A student must complete the required field experience observations 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.**

**4. 5E Group Lesson Plan Project (25%):** Each student will be assigned to a group of students to develop a single lesson plan using the 5E Lesson Planning Template. 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 CANVAS. Assignments should be submitted online via Canvas (eLearn ) unless instructed otherwise.

## COURSE SCHEDULE/ TIMELINE

**Meeting #1** (Jan 4)

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

**CLASS:**

- Introductions, logistics and administration details, expectations from syllabus.
- 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 for prompts
- ***Contact your SMI Mentor Teacher to schedule your first visit for THIS WEEK, if possible***

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**Meeting #2** (Jan 11)

**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

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**Meeting #3** (Jan 18)

**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)

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 808 and #1049

**DUE NEXT TIME:**

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

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**Meeting #4** (Jan 25)

**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

- 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

**WATCH FOR NEXT TIME:**
- ATLAS videos Case # 297 and # 309

**DUE NEXT TIME:**
- ***Journal # 4*** See Canvas (eLearn) for prompts

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**Meeting #5** (Feb 1)

**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

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**Meeting #6** (Feb 8)

**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

**WATCH FOR NEXT TIME:**

- ATLAS videos Case # 68 and # 190

**DUE NEXT TIME:**

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

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**Meeting #7** (Feb 15)

**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
- Time to work on a group lesson plan

**READ FOR NEXT TIME:**

- Dixson, 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

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**Meeting #8** (Feb 22)

**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***

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**Meeting #9** (Mar 1)

**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***

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**Meeting #10** (Mar 8)

**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.***