

## MAE 520: Advanced Methods of Teaching Secondary School Mathematics

Derek Pope

Email: [derek.pope@stonybrook.edu](mailto:derek.pope@stonybrook.edu)

Spring 2019, Tu 4 – 6:50

Final exam: Monday, May 20, 5:30-8

Office hours (in S240C): Tentatively Tu 3-4, Th 3-5

This is a course in the theory and practice of teaching mathematics at the secondary level. We will learn about the philosophy and goals of mathematics education, with an emphasis on implementation: curriculum development; teaching techniques and styles, learning theories and styles; and lesson planning and assessment. Students will plan an entire unit, the work sample, including lesson plans and assessments.

### Course Expectations and Grades

Course grades will be tentatively determined by the following. The goal for each assignment is to help you learn and apply course material. You will also leave this class with lessons, unit plans, and other resources that you can use in your own future classroom. Grading rubrics will be provided to help you clearly understand expectations and properly assess your own work before submitting it. More specific details on due dates, expectations, and grading rubrics will be given during the semester.

What?	How?	Why?
Active member of a community of learning (25%)	<ul style="list-style-type: none"><li>-Be present, on time, to each class; missing more than one class will result in a significant grade reduction.</li><li>-Be actively engaged in all class discussions, including your peers' presentations.</li><li>-Complete all assigned readings and other homework assignments before class.</li><li>-After each of your peers' lessons, complete the homework assignment they have created and give them constructive, critical feedback to help them improve their practice.</li><li>-Complete the "engagement journal" twice to provide evidence of your classroom engagement.</li></ul>	<ul style="list-style-type: none"><li>-Everyone benefits from each other's ideas, questions, and feedback during class discussion.</li><li>-Homework assignments are carefully chosen to give essential practice and reflection, and readings are chosen so that your practice is grounded in solid research.</li><li>-Through your peers' HW assignments, each of us will have a chance to create and assess authentic work.</li></ul>
Lesson Planning and Teaching (20%)	<ul style="list-style-type: none"><li>-Once during the semester, you will plan and present a 20-minute long, constructivist, conceptually-focused lessons to your peers. Topics will be randomly assigned.</li><li>-You will also create, administer, grade, and reflect upon the results of a homework assignment as assessment.</li></ul>	<ul style="list-style-type: none"><li>-The presenter will gain confidence in teaching a lesson, as well as practice planning a conceptually-focused lesson and assessing student understanding.</li><li>-Through the presentations and follow-up discussions, the class will review important math concepts and learn various pedagogical and classroom management strategies.</li></ul>
Classroom Management (10%)	Before the end of the semester, you will hand in a "journal" documenting the specific strategies and ideas you learned about effective classroom management practices.	<ul style="list-style-type: none"><li>-One of the most challenging aspects of teaching is managing the classroom effectively. This will give you a chance to compile many strategies for preempting, and dealing with, problem behaviors.</li></ul>

Midterm: collaborative unit plan (20%)	You will submit a complete unit plan as part of a group. Your plan will demonstrate a variety of pedagogical strategies, a constructivist approach toward teaching and learning, an understanding of how to sequence and scaffold a unit, and attention to differentiating instruction for students with various special needs. Your unit plan will also include a culminating assessment. Finally, you will give a 10-minute presentation of your unit plan to your peers.	-This will be a chance to put together various elements of your understanding of mathematics, pedagogical techniques, and assessment techniques into a coherent unit of study. -You are doing this cooperatively so that your group members can learn from one another, work off of each other's ideas, and strengthen each other's practice.
Final: individual unit plan, summary, and exit interview (25%)	You will submit an individual unit plan as a final assignment, due at the end of semester. Requirements will be given later in the semester. You will defend your instructional choices to me in an exit interview on or before the day of the final exam.	-This culminating assignment will be your opportunity to provide evidence of your understanding of, and ability to apply, the course material learned from Methods 1 and 2.

Also be sure that you are familiar with the PEP (Professional Education Program) requirements, as outlined here: <http://www.stonybrook.edu/pep/guide/requirement.shtml>

### Required Resources

- Sigler, J. and Hiebert, J. (1999) *The Teaching Gap*
- Boaler, Jo. (2015) *Mathematical Mindsets*
- Access to NYS Common Core Curriculum (<https://www.engageny.org/common-core-curriculum>),
- Access to the NYS Next Generation Mathematics Standards (<http://www.nysed.gov/curriculum-instruction/new-york-state-next-generation-mathematics-learning-standards>)
- A graphing calculator (or computer program/app capable of graphing, such as Desmos or Geogebra)

### Learning Standards

- Candidates demonstrate a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.
- Students plan and present lessons that demonstrate understanding of the New York State Common Core Standards for Mathematics, including the Standards for Mathematical Practice.
- Teacher candidates summarize, analyze, and critique current research in mathematics education.
- Candidate makes explicit connections to research or theory in justifying instructional plans.
- Students recognize the INTASC critical dispositions and New York State Code of Ethics, they demonstrate critical dispositions and ethics in their interactions with students and colleagues.
- Teacher candidates work with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation.
- Teacher candidates engage in ongoing professional learning and use evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, and other professionals in the learning community), and adapt practice to meet the needs of each learner.
- Teacher candidates seek appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth and to advance the profession.
- Teacher candidates understand how children learn and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.

- Teacher candidates use understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
- Teacher candidates understand the central concepts, tools of inquiry, and structures of the discipline and create learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.
- The teacher candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.
- The teacher candidate understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.
- The teacher candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills and pedagogy as well as knowledge of learners and the community context.
- The teacher candidate understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections and to build skills to apply knowledge in meaningful ways.

**Americans with Disabilities Act/Student Accessibility Support Center Statement:** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631) 632-6748. They will determine with you what accommodations, If any, are necessary and appropriate. All information and documentation is confidential.

[https://www.stonybrook.edu/commcms/studentaffairs/sasc/current\\_students/accommodation.php](https://www.stonybrook.edu/commcms/studentaffairs/sasc/current_students/accommodation.php)

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website:

<https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities>

**Academic Integrity:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at:

[https://www.stonybrook.edu/commcms/academic\\_integrity/](https://www.stonybrook.edu/commcms/academic_integrity/)

