

MAE 311: Introduction to Methods of Teaching Secondary School Mathematics

Nicholas Lorenzen

Nicholas.Lorenzen@StonyBrook.edu

Spring 2023, Tuesday, 4:45-7:35

Office hours: Tuesday, 3:15 – 4:45, and by appointment

Final Exam: Monday, 5/15/2023 5:30-8:00

This is a course in the theory and practice of teaching mathematics at the secondary level. Students will experience the benefits of student-centered mathematics teaching, grounded in a constructivist philosophy of learning, and acquire tools for successfully implementing effective teaching strategies. We will analyze the NYS Next Generation and Common Core Math Standards and learn how to create tasks and lessons that facilitate student mastery of these standards. Students will actively observe and reflect upon the lessons of practicing teachers and will create and teach mathematics lessons to their peers.

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 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 submission. Specific details on due dates and expectations will be given during the semester.

What?	How?	Why?
Active class participation and homework (25%)	<ul style="list-style-type: none">- Be present, on time, to each class; missing more than one class will result in a significant grade reduction.- Actively engaged in all class discussions, including your peers' presentations.- Complete all assigned readings and other homework assignments before class; be ready to thoughtfully discuss them.- Submit written answers to specific prompts throughout the semester. Unless otherwise stated, homework will be due the class after which it is assigned, and should be submitted through our Google Classroom.	<ul style="list-style-type: none">- Everyone benefits from each other's ideas, questions, and feedback during class discussion.- Homework assignments are carefully chosen to give essential practice and reflection, and readings are chosen so that your practice is grounded in solid research.
Observations (25%)	<ul style="list-style-type: none">- Observe <i>at least</i> 36 hours (48 regular class periods) of classroom teaching in secondary schools.- Maintain an electronic journal, using instructor-provided template, to record your observation reflections each week.- Specific prompts will be posted and must be included in that week's reflection. Be ready to discuss your observations in class each week.- Remember you are a guest at each school, so be sure to dress and act professionally. Inappropriate or unethical behavior is grounds for course failure and dismissal from the teacher education program. You are expected to follow all school and district rules in each school where you observe. In particular, please check on school and district COVID health precautions that may be in place.	<ul style="list-style-type: none">- By observing secondary classes, you will learn a variety of practical strategies for teaching mathematics and managing a classroom. You will likely see examples of effective and ineffective teaching, as well as the impacts on student learning.- Observations prompts will focus your attention on specific aspects of classroom instruction and help align observations to class discussion.

Midterm lesson presentation (20%)	<ul style="list-style-type: none"> - Plan and present a lesson to your peers. Your plan and presentation must incorporate teaching strategies that we have learned in class and reflect a constructivist philosophy of learning. - Submit a written reflection that includes an analysis of student learning, with specific evidence from the lesson. - Will tentatively take place mid-semester. Assigned dates to follow. - More specific requirements and rubrics will be given in class. 	<ul style="list-style-type: none"> - The presenter will gain confidence in teaching a lesson, as well as practice planning a conceptually-focused lesson. - Through the presentations and follow-up discussions, the class will review important math concepts and learn various pedagogical strategies.
Final lesson presentation (20%)	<ul style="list-style-type: none"> - Plan and present a lesson to your peers. This lesson should demonstrate that you have reflected upon your midterm presentation and have implemented specific changes based on instructor's and peers' feedback. - Will tentatively take place during the last couple weeks of class. - More specific requirements and rubrics will be given in class. 	<ul style="list-style-type: none"> - The presenter will have another chance to practice teaching and demonstrate growth.
Final essay (10%)	<ul style="list-style-type: none"> - Write an essay that effectively communicates your understanding of various course topics. - Due on or before the posted date of the final. - More specific requirements and rubrics will be given in class. 	<ul style="list-style-type: none"> - This culminating assignment will demonstrate your understanding and application of course topics.

Grading thresholds are as follows (Actual final thresholds may be lowered if warranted, but achieving the lower bound of each of the following categories will guarantee that grade).

Grade	A	A-	B+	B	C+	C	D	F
Threshold	93-100	90-92	86-89	80-85	76-79	70-75	60-69	0-59

Also be sure that you are familiar with the PEP (Professional Education Program) requirements, as outlined here: https://www.stonybrook.edu/commcms/dtale/files/pep_guide.pdf

Required Resources

- Stigler, J. W., & Hiebert, J. (2009). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. Simon and Schuster.
- Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching*. John Wiley & Sons.
- Access to the New York State Next Generation Mathematics Learning Standards <http://www.nysed.gov/common/nysed/files/programs/curriculum-instruction/nys-next-generation-mathematics-p-12-standards.pdf>
- Access to NYS Common Core Curriculum <https://www.engageny.org/common-core-curriculum>
- Desmos, Calculate84, and Geogebra apps (a graphing calculator would also be helpful)

Contact: Please feel free to contact me anytime you have a question or concern, or want to provide feedback to me. The easiest way to contact me is through email or through a message on our Google Classroom. I will make my best efforts to respond in a timely manner.

Learning Standards

- Candidates demonstrate a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.
- Teacher candidates 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.
- Teacher candidates recognize the INTASC critical dispositions and ethical standards of the New York State Code of Ethics, they demonstrate critical dispositions and ethics in their interactions with students and colleagues.
- 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 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 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 understand the central concepts, tools of inquiry, and structures of the discipline and creates 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.
- The teacher candidate engages in ongoing professional learning and uses evidence to continually evaluate his or her practice, particularly the effects of his or 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.
- The teacher candidate seeks 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.

Learning Outcomes for “Speak Effectively before an Audience”

1. Research a topic, develop an oral argument and organize supporting details.
2. Deliver a proficient and substantial oral presentation for the intended audience using appropriate media.
3. Evaluate oral presentations of others according to specific criteria.

Student Accessibility Support Center Statement: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: <https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities> and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement: 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 http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Until/unless the [latest COVID guidance](#) is explicitly amended by SBU, during Fall 2021 "disruptive behavior" will include refusal to wear a mask during classes.

Teacher Education Program Mandatory Professional License Disclosure:

https://www.stonybrook.edu/commcms/dtale/guide/looking_for_job.php#mandatorydisclosure