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2021

### Teaching and Learning Mathematics in Secondary Schools

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*CUNY City College*

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**School of Education**  
**CITY COLLEGE of NEW YORK**  
**City University of New York**

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The School of Education prepares knowledgeable, reflective, caring teachers and leaders for diverse communities.

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Semester:        Fall 2021                            Tuesdays 4:50 – 7:20  
Course:         EDSE 44600                            Teaching and Learning Mathematics in Secondary Schools  
  
Instructor:      Prof. D. Stylianou ([dstylianou@ccny.cuny.edu](mailto:dstylianou@ccny.cuny.edu))

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1. Name, number, and course description

*EDSE 44600     Teaching and Learning Mathematics in Secondary Schools*

The course is designed to prepare teacher candidates to teach mathematics at the secondary school level. The purpose of the course is to examine curricula, materials, methods, the integration of content and methodology, and related aspects of mathematics instruction at the secondary school level. Topics include national and state standards for mathematics teaching, mathematical tasks, planning for instruction, adapting instruction for diverse learners including students with special needs and English language learners, classroom management, cooperative learning, assessment, use of computers and calculators, and use of manipulative materials. Student will discuss the NCTM Standards, the New York State Learning Standards for Mathematics and the Core Curriculum Standards.

This course is about mathematics and teaching mathematics. We will engage in two qualitatively different kinds of activities over the semester. In the first type of activity, content activities, you will be students of mathematics. In the second type of activity, pedagogical activities, you will be teachers of mathematics. The purpose of this structure is that to teach for understanding you must first have an image of what you want your students to understand. That image will be what guides you when selecting/designing course materials, preparing instruction, and engaging your students during instruction. The content activities are intended to enrich your images of secondary school math topics. The pedagogical activities are intended for you to learn to express those images in ways that are conducive for students to build powerful mathematical understandings.

This course is “situated in the practice of teaching” in that it integrates theory and fieldwork. Teacher candidates are expected to participate in structured field observations and complete assignments based on this fieldwork. Teacher candidates are expected to observe mathematics classes at an assigned school. Subsequently, teacher candidates’ observations will be linked to the theory of mathematics education and for the development of their skills in planning and implementing mathematics instruction. In short, field observations will motivate the learning of pedagogical theory and the theory will provide tools to advance the understanding of the observed teaching. Overall, teacher candidates will have the opportunity to develop knowledge central to teaching by engaging in activities that are at the heart of a teacher’s daily work and using materials that depict the work of teaching (e.g., student work, curricula and test analysis, etc.) in order to create opportunities for critique, inquiry, and investigation.

**ONLINE NATURE OF THIS COURSE and ONLINE PROFESSIONALISM:**

It is important to note that **this is an online course**. This means that the course will not meet in person at CCNY. Instead, all required work will be done online. The course will consist of both asynchronous and synchronous instruction.

Asynchronous instruction is when teachers post the readings, videos, and other materials online before the class period, and students respond to essay prompts, problems, quizzes, etc., by a given due date/time. Each week you will

find such assignments posted on Blackboard. Specifically, each week you will have a “Discussion Forum” prompt to respond to, by 11:59 PM on Monday night. The prompt will usually be asking you to reflect on readings and fieldwork.

Synchronous learning is a learning event where the learner and instructor are in the same place at the same time.” In our case, this will happen via Blackboard Collaborative for one hour each week on Tuesdays at 4:50 PM.

All assignments will be discussed in detail on Blackboard, and your responses (discussion prompts, prompts, and exams) will have to be posted on Blackboard.

Assignments will be submitted electronically either via Blackboard or via email. Please attend to basic professional etiquette when sending emails (use your CCNY email account, use proper address and a signature) and label your assignments with your name. Please do not send assignments labeled as “Assignment4” or “EDSE446” or “StylianouAssignment”. They will likely be misplaced or confused with someone else’s assignment with similar unfortunate labels. Also, if you want to receive feedback, then please send your files in an editable format (as google docs or as word files, not pdfs).

If you need assistance with Blackboard, please log into Blackboard using your CCNY email credentials. Once on Blackboard, you can find help and support. As this is an online course, you need to have steady internet access, and a computer to fully participate. CCNY provides laptop computers for students upon request.

### OER COURSE

This is an OER (Open Education Resources) Course. This means that there is no expectation to purchase a textbook. Rather, you will be directed towards resources that are available to you at no cost, such as internet documents and articles from the library. Hence, you will be requested to download these items or access them electronically. Once again, internet access is paramount to success in this course.

2. Prerequisites : Adolescent Learning and Development, Issues and Perspectives in Sec. Education
3. Co-requisites : 30 hours of independent fieldwork
4. Place of course in curriculum: Required X Elective \_\_\_\_\_
5. Working themes of the Conceptual Framework of the School of Education and how addressed in the course.

<b>Theme</b>	<b>Addressed by</b>	<b>Evidence</b>
Developing in-depth knowledge about the world	<ul style="list-style-type: none"> <li>- Explore math content in line with NCTM, NY State, and NY City professional standards</li> <li>- Examine current theories related to math education</li> <li>- Development of in-depth mathematics conceptual understanding</li> <li>- Connect content to real world applications</li> </ul>	<ul style="list-style-type: none"> <li>- Class discussions</li> <li>- Lesson planning</li> <li>- Curriculum project</li> <li>- Mathematical task assignment</li> </ul>
Becoming skillful, reflective practitioners	<ul style="list-style-type: none"> <li>- Use of a variety of experiences to facilitate construction of understanding and critical thinking</li> <li>- Opportunities to question assumptions and develop habits of reflection</li> <li>- Integration of field experiences</li> </ul>	<ul style="list-style-type: none"> <li>- Class discussions</li> <li>- Practicum journals</li> <li>- Lesson planning</li> <li>- Curriculum project</li> <li>- Mathematical task assignment</li> </ul>
Education for and about diversity	<ul style="list-style-type: none"> <li>- Discuss learning styles, special needs, and cultural differences to promote equity in the classroom</li> <li>- Use of candidates’ diversity as a resource</li> </ul>	<ul style="list-style-type: none"> <li>- Class discussions</li> <li>- Practicum journals</li> <li>- Lesson planning</li> <li>- Mathematical task assignment</li> </ul>
Nurturing leadership for learning	<ul style="list-style-type: none"> <li>- Connect course work to issues of mathematics education and the world</li> <li>- Participate in the professional organizations and related events</li> </ul>	<ul style="list-style-type: none"> <li>- Class discussions</li> <li>- Lesson planning</li> <li>- Curriculum project</li> </ul>
Building caring communities	<ul style="list-style-type: none"> <li>- Make connections to other courses, and events in the college and/or the word at large</li> </ul>	<ul style="list-style-type: none"> <li>- Class discussions</li> <li>- Practicum journals</li> </ul>

6. Teacher candidate outcomes expected upon completion of course

Upon successful completion of the course the teacher candidate will provide evidence of beginning, developing, or proficient competence in the following:

- Selects, uses, and determines suitability of the wide variety of available mathematics curricula and teaching materials for all students including those with special needs such as the gifted, challenged, and speakers of other languages (NCTM 8.1)
- Selects and uses appropriate concrete materials for learning mathematics (NCTM 8.2)
- Uses multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students' mathematical knowledge (NCTM 8.3)
- Plans lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates (NCTM 8.4)
- Participates in professional mathematics organizations and uses their print and on-line resources (NCTM 8.5)
- Demonstrates knowledge of research results in the teaching and learning of mathematics (NCTM 8.6)
- Uses knowledge of different types of instructional strategies in planning mathematics lessons (NCTM 8.7)
- Demonstrates the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and to help students develop and test generalizations (NCTM 8.8)
- Develops lessons that use technology's potential for building understanding of mathematical concepts and developing important mathematical ideas (NCTM 8.9)

#### 7. Instructional methods implemented in the course

- Reflection through discussion and journal writing;
- Use of media and technology specifically related to course content;
- Emphasis on small group work and decision-making, on literacy development, and on formative instructor feedback throughout;
- Integration of field observations and theoretical discussions

#### 8. Policies and Procedures

##### *Attendance*

The expectation is that you will be *present, on time, and prepared* for every class. Attendance is expected at all scheduled/synchronous classes. Just as any professional teacher does in school, in the event of an emergency or other special circumstances, please contact the instructor if you will not be present in class for any reason. Overall, missing *more than one class* will be considered excessive and will result in a lower grade for the course (see below).

##### *Class Participation*

You are expected to complete in-class assignments and to participate in class discussions and activities in a reflective and professional manner. You will be evaluated based on your willingness to participate in activities and discussions and your ability to ask questions that represent thoughtful reflection on the material presented and the readings. Good teachers must also be good colleagues. Thus you will also be assessed on how well you work with others. (*CUNY SOE Conceptual Framework: D. Nurturing Leadership for Learning, E. Building Caring Communities*). To establish a collegial relationship, we must be able to see and hear each other. Online instruction puts distance between us, and keeping cameras off increases the distance in that it makes us anonymous and invisible. While CUNY policy affords you the option of keeping your computer camera off, it is preferred that you keep the camera on and be in a well-lit room.

#### Class performance rubric

- 4.0 Missed no more than three hours of class. Was always prepared for class. Contributed in a positive manner to class discussions on a regular basis. Enthusiastically participated in class activities. Was respectful of the ideas of others. Encouraged others to participate.
- 3.0 Missed no more than five hours of class. Was prepared for class. Contributed in a positive manner to class discussions on a regular basis. Enthusiastically participated in class activities. Was respectful of the ideas of others. Encouraged others to participate.
- 2.0 Missed no more than six hours of class. Was usually prepared for class. Made some contribution to class discussions on a regular basis. Participated in class activities. Was respectful of the ideas of others.
- 0.0 Missed more than eight hours of class. Was seldom prepared for class. Did not contribute to class discussion or contributions were negative and/or disruptive. Took little or no interest in class activities. Was disrespectful to others.

#### *Late Assignments*

Assignments are due at noted times. For all late assignments, the maximum number of points available on the assignment will be reduced by 1 point for each day the assignment is late. For example, if a 20 point assignment is submitted three days beyond the due date, the maximum number of points that could be awarded for the assignment is 17. In the case of extenuating circumstances only, extensions MAY be granted at the discretion of the instructor. Be advised that computer problems will not be accepted as extenuating circumstances, so it is best to complete assignments as early as possible in order to avoid a computer problem time crunch.

#### *Make-up exams and tests*

There will be no make-up exams. In the event of serious illness and hospitalization, students may request a make-up exam, but it will only be granted to them at the discretion of the instructor, at a time that is convenient to the instructor (most likely to be asked to take the regular exam the next time the course is offered).

#### *Writing Standard*

The quality of your ideas as well as your presentation will be taken into consideration when assigning grades. As a teacher you are expected to produce written documents that are easily read, well organized, clearly understood, grammatically correct, and include no spelling errors. You are encouraged to use the grammar- and spell-checker capabilities of your word-processor, and to ask your peers to proof-read your papers prior to submitting them to the instructor. Your grade will be reduced if you fail to attend to these aspects of your written assignments.

#### *Academic Integrity*

As a student, you have the responsibility to be honest, and to conduct yourself in an ethical manner while pursuing academic studies. Should you be accused of a breach of academic integrity, procedural safeguards including provisions of due process have been designed to protect student rights.

#### *Disability Accommodation*

If you have a documented disability and require special classroom modifications or other accommodations, you should notify the instructor early in the semester to discuss your needs. You should also notify the *Office of Student Disability Services* (Baskerville Hall, Room 26, tel. 212-650-5913). The staff of OSDS assists students with physical or learning disabilities and can help alleviate difficulties you may encounter during the semester.

#### 9. Assessment:

(See Blackboard for full descriptions of assignments)

Class attendance, participation and weekly discussion forums	20%
SEMSA Project	40%
Final Exam	40%

<u>POINTS</u>	<u>GRADE</u>	<u>POINTS</u>	<u>GRADE</u>	<u>POINTS</u>	<u>GRADE</u>
97-100	A+	80-82	B-	67-69	D+
93-96	A	77-79	C+	63-66	D
90-92	A-	73-76	C	60-62	D-
87-89	B+	70-72	C-	0-59	F
83-86	B				

10. Required Text(s) and Materials (Information posted separately on Blackboard)

See note above about OER courses. No textbook is required. Instead, a set of readings from relevant journals will be made available electronically.

*\*\*\*\*\* Students will be required to use email and use the internet throughout this course. You may obtain a City College email account and access the internet on campus. Students are expected to access the internet and use the college library outside of class time. Please plan for this in your schedule.\*\*\*\*\**

FOR ADDITIIONAL POLICIES OF THE PROGRAM PLEASE READ THE STUDENT HANDBOOK.

## EDSE 44600 Schedule Fall 2021

Week	Topics & Objectives	Discussion Forum (to be completed by 11:59 on Monday before class)	Read/Watch	Activities
Week 1 9/1	<ul style="list-style-type: none"> <li>- Syllabus, course objectives</li> <li>- Mathematics Education Survey: Where do we stand (complete ahead of time)</li> <li>- Setting the Stage: Engaging with A Challenging Mathematical Task</li> </ul>	<ul style="list-style-type: none"> <li>- DF1: Introduction</li> <li>- DF2: Q&amp;A</li> <li>- DF3: "How should secondary math classrooms look and sound?"</li> </ul> <p>(Detailed instructions for each DF (discussion forum) will be posted on Bb each week.</p>	<ul style="list-style-type: none"> <li>- Polya</li> <li>- Kelemanik</li> <li>- Medina et al</li> </ul>	<ul style="list-style-type: none"> <li>- Go over syllabus, learning objectives, field work, assignments</li> <li>- Explain further the "online" nature of class</li> <li>- Solve handshake problem in groups</li> <li>- Use that to set the stage of our work</li> </ul>
Week 2 9/8	<ul style="list-style-type: none"> <li>- Establishing a classroom culture for learning</li> <li>- Introduction to the NCTM Standards and Principles</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- DF1: "Starting the school year"</li> <li>- DF2: "What do you know about the 'Common Core State Standards'?"</li> </ul>	<ul style="list-style-type: none"> <li>- Overview of in PSSM, CCSS</li> <li>- Download CCSS-M</li> </ul>	<ul style="list-style-type: none"> <li>- Overview of PSSM &amp; CCSS</li> <li>- Brief discussion on "starting the school year"</li> </ul>
Week 3 9/15	<ul style="list-style-type: none"> <li>- Introduction to PtA</li> <li>- Setting up goals</li> </ul>	<ul style="list-style-type: none"> <li>- DF: Croom's reading</li> </ul>	<ul style="list-style-type: none"> <li>- PtA (on NCTM website)</li> <li>- Hunt &amp; Stein</li> </ul>	<ul style="list-style-type: none"> <li>- PtA – Establishing Goals</li> <li>- <b>VIDEO</b> "Area of a triangle"</li> </ul>
Week 4 9/22	<ul style="list-style-type: none"> <li>- Mathematical Tasks: Are They All Created Equal?</li> </ul>	<ul style="list-style-type: none"> <li>- DF: "Sort Mathematical tasks"</li> <li>- DF: The case of Cathy and David. Similarities and Differences.</li> </ul>	<ul style="list-style-type: none"> <li>- Smith &amp; Stein</li> <li>- Stein &amp; Smith</li> </ul>	<ul style="list-style-type: none"> <li>- Define cognitive demands</li> <li>- <b>VIDEO</b> Staircase goals and task</li> </ul>
Week 5 9/29	<ul style="list-style-type: none"> <li>Maintaining levels of demand</li> <li>Cooperating learning</li> </ul>	<ul style="list-style-type: none"> <li>- DF1: Cooperating learning</li> <li>- DF2: Academic language</li> </ul>	<ul style="list-style-type: none"> <li>- Gibert</li> <li>- Allen</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- No synchronous class Monday schedule</li> <li>- <b>Written Case: C&amp;D</b></li> </ul>
Week 6 10/6	<ul style="list-style-type: none"> <li>- Maintaining Levels of demand</li> <li>- The teaching Cycle and Lesson Planning</li> <li>- Cooperative learning</li> <li>- Facilitate meaningful discourse</li> </ul>	<ul style="list-style-type: none"> <li>- Gilbert's reading</li> <li>- HM: Start planning your SEMSA – lesson plans</li> </ul>	<ul style="list-style-type: none"> <li>- Kelemanik</li> <li>- Candela</li> </ul>	<ul style="list-style-type: none"> <li>- <b>VIDEO Bike and Truck</b></li> <li>- <b>Written case: Hexagon</b></li> </ul>
Week 7 10/13	<ul style="list-style-type: none"> <li>- Putting it all together: goals, tasks, facilitating discourse, 5P</li> <li>- Questioning</li> </ul>	<ul style="list-style-type: none"> <li>- DF: "Lesson plan formats - which one is best?"</li> </ul>	<ul style="list-style-type: none"> <li>Rubel &amp; Meyer</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Written Case: Pay it forward</b></li> <li>- <b>VIDEO</b> Bansham Missing function</li> </ul>

Week 8 10/20	- Representation	- DF: “What types of representations are used?”	- Imm & Stylianou	Taking action: Ch6 <b>VIDEO (2)</b> Calling Plans Counting cubes
Week 9 10/27	- Understanding the edTPA: Task 1	-	- edTPA handbook (download) - Boaler & Humphreys	- Working on edTPA/SMESA Task 1 <b>Humphreys VIDEO</b>
Week 10 11/3	- Understanding the edTPA: Task 2			-
Week 11 11/10	- Academic Language			
Week 12 11/17	- Differentiation Asynchronous class			Thomplinson SfS
Week 13 11/24	Perseverance and productive struggle	DF: Can struggle be productive?	Nctm.org	<b>VIDEO</b> <b>S-pattern</b>
Week 14 12/1	Eliciting student responses	Prepare an outline of Task 2	Nctm.org	<b>VIDEO</b> <b>Ms. Brovey – Two tank</b> <b>Ms. Lynch - Sine</b> <b>Task 1 due</b>
Week 15 12/8	Course review	- Prepare one question that should be on the final exam.		- <b>Task 2 due</b>
12/16	Final Exam			-

### Access to Documents and Videos:

Videos can be accessed at <https://www.nctm.org/PtAToolkit/>

Each week you will be given the exact video to watch. For example, during week 6 you will watch “Bike and Truck” from that collection:

<https://www.nctm.org/Conferences-and-Professional-Development/Principles-to-Actions-Toolkit/The-Case-of-Shalunda-Shackelford-and-the-Bike-and-Truck-Task/>

For each video, you will be asked to download and read the accompanying commentary, and to download and solve the mathematical task that is used in the video.

### Readings:



All readings can be accessed either through the library or from a set of websites. A few of these readings will also be posted on Blackboard (when I have permissions to do so).

Polya: <https://math.berkeley.edu/~gmelvin/polya.pdf>

Kelemanik: <http://www.fosteringmathpractices.com/wp-content/uploads/2019/08/FINAL-Effective-Teaching-Strategies.pdf>

Medina et al [https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY\\_CC/qlf695/cdi\\_proquest\\_journals\\_1609095949](https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY_CC/qlf695/cdi_proquest_journals_1609095949)

CCSS-M: <http://www.corestandards.org/Math/>

PtA [https://www.nctm.org/uploadedFiles/Standards\\_and\\_Positions/PtAExecutiveSummary.pdf](https://www.nctm.org/uploadedFiles/Standards_and_Positions/PtAExecutiveSummary.pdf)

Smith & Stein: [https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY\\_CC/qlf695/cdi\\_proquest\\_journals\\_231067578](https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY_CC/qlf695/cdi_proquest_journals_231067578)

Stein & Smith: [https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY\\_CC/qlf695/cdi\\_jstor\\_primary\\_41180401](https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY_CC/qlf695/cdi_jstor_primary_41180401)

Kelemanik: <http://www.fosteringmathpractices.com/wp-content/uploads/2019/08/FINAL-Effective-Teaching-Strategies.pdf>

Rubel & Meyer: [https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY\\_CC/qlf695/cdi\\_proquest\\_journals\\_231181909](https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY_CC/qlf695/cdi_proquest_journals_231181909)

Imm & Stylianou: [https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY\\_CC/qlf695/cdi\\_proquest\\_journals\\_231191136](https://cuny-cc.primo.exlibrisgroup.com/permalink/01CUNY_CC/qlf695/cdi_proquest_journals_231191136)

edTPA handbook: <https://concordia.csp.edu/teachered/wp-content/uploads/sites/3/Secondary-Math-Handbook.pdf>