

Program Cover Document MTT 390: Methods of Teaching Mathematics II

I. Basic Course Information

MTT 390: Methods of Teaching Mathematics II has prerequisite MTT380. It is the second course in a two-course sequence of professional courses designed for mathematics education majors. MTT 390 has co-requisites SED 399 and RAL 328. This block of 3 courses will constitute Clinical Practice I.

II. Learning Goals

The content and performance goals for MTT 380 and MTT 390 directly address the goals of the Math Secondary Education program. In these courses, students make connections between the higher-level mathematics courses they have taken/are taking and the K-12 mathematics curriculum. In MTT 390, they will focus their attention on the sequence of high school mathematics courses for grades 9 –12.

Students in MTT 390 will relate their subject matter knowledge to the content and pedagogy appropriate for teaching mathematics. They will enhance their familiarity with national and state standards and they will examine standards-based teaching and curricula in light of mathematics education research. Specifically, students will realize that problem solving is central to all of mathematics and that it is to be incorporated as a central theme in their own teaching. Both a standards-based and a research perspective will permeate the course and form the basis for discussion of appropriate instructional strategies.

III. Student Assessment

The assessment in MTT 390 is a crucial part of the assessment plan for the Math Secondary Education program. As in MTT 380, the student will be assessed on the pedagogical goals for the program. Evidence of student progress will be collected and feedback given as students take part in Clinical Practice I where he/she will be teaching mathematics to middle or high school grade students.

The homework, small and large group teaching rehearsals, and projects in MTT 390 are designed as learning activities as well as methods of assessment. For example, a unit plan will be developed, with feedback from the professor, and taught during the field experience. Students will also be observed in the field when they teach their unit.

Student performance on these assessment instruments and the performance of students in their future professional courses, such as SED 498 and MTT 490 (Clinical Practice II), will be used to assess the success of MTT 390 in achieving its learning goals and its contribution to the fulfillment of the Math Secondary Education program goals.

IV. Learning Activities

The study of standards-based teaching explored in MTT 380 will continue in MTT 390 and will focus on high school curricula. Students will have to “teach” a standards-based lesson and be evaluated by their peers. The exploration of mathematics education research followed by the writing of a unit plan will also provide the students with an appreciation of standards-based teaching. Learning activities will be situated in high school content and a variety of strategies and methods of instruction will be used to model effective teaching of mathematics. Learning activities will consist of a combination of lectures; teaching demonstrations; explorations; group work, including small and large group teaching rehearsals; readings of research articles; participation in class discussion; projects; written assignments; and planning and teaching a unit in a middle or high school classroom, including an observation.

Departmental Course Syllabus – MTT 390: Methods of Teaching Mathematics II

Any syllabus for MTT 390 should include the points listed below.

I. **Basic Information**

- A. Purpose statement: In addition to subject matter knowledge, an effective teacher needs to have pedagogical content knowledge. MTT 390 is the second in a two-course sequence of professional courses designed to prepare mathematics education majors to teach mathematics effectively.
- B. Course description: This course is the second in a two-course sequence of professional courses for mathematics education majors. Students will be familiar with the standards for 9-12 mathematics, and will engage in exploring the teaching of topics from Discrete Math., Algebra, Geometry, Pre-Calculus and Calculus. These topics will be examined with a perspective gained from MTT 380 along with that gained from research. Classroom organization and management will also be explored. The course will be taken as part of a Clinical Practice I.
- C. Course prerequisites: MTT 380 (Methods of Teaching Mathematics I) is a prerequisite for this course. Students need to be majoring in mathematics secondary education to take this course. They need a strong foundation in higher level mathematics so that subject matter pedagogy can be examined and related to their content knowledge. The co-requisites are SED 399 and RAL 328. This block of 3 courses will constitute Clinical Practice I.

II. **Learning Goals**

- A. Content goals: Students will have the ability to evaluate and model their teaching from the perspective of the standards and from research. They will develop a global view of the content of high school mathematics as well as a variety of methods and strategies designed to motivate and engage students in learning that content.
- B. They will know what it means to teach through problem solving and the central role it plays in all of mathematics teaching. Many students believe that teaching mathematics can be successfully accomplished as a narrative exercise rather than it being guided by the process of problem solving. They will learn that the mathematical process of problem solving is central to mathematics and its teaching.
- A. Performance goals: The successful student completing this course should be able to do all of the following:
 - Demonstrate understanding and use of problem solving as a teaching method.
 - Select and use appropriate methods for teaching topics in high school mathematics.
 - Demonstrate use of appropriate calculators and computer software in teaching mathematics.
 - Utilize effective strategies, based on research, for teaching various mathematical topics.

- Demonstrate knowledge of print and electronic resources available to them.
- Create a unit plan.

III. **Student Assessment**

- A. **Assessment plan:** Students will be assessed and receive regular feedback on their work through some combination of homework, written and oral communication, group and/or individual projects, and small and large group teaching rehearsals, and in-class examinations. A unit plan will be developed as a common assessment in the courses in the block. Students will receive feedback on multiple phases of the unit plan, including meeting individually with the professor. They will be observed teaching one lesson in their school placements during their unit and receive feedback on their teaching.
- B. **Rationale:** A variety of methods of assessment are needed to assess the performance goals. In-class examinations, which normally preclude the use of books and the practice of group discussion, enable the professor to assess the knowledge an individual student has readily available. This is a practice based course and students are assessed on their knowledge of and ability to carry out particular teaching practices, such as planning a unit or assessing their students.
- C. **Methods and criteria:** A syllabus should coincide with the assessment plan in Part A and clearly describe the schedule for these assessment tools, the criteria that will be used to evaluate student performance, and how grades will be calculated.

IV. **Learning activities**

- A. **Summary of learning activities:** Learning activities will consist of a combination of lectures; teaching demonstrations; explorations; group work, including small and large group teaching rehearsals; readings of research articles; participation in class discussion; projects; written assignments; and planning and teaching a unit in a middle or high school classroom, including an observation.
- B. **Outside of class,** students are expected to do a significant amount of individual or group homework to achieve the learning goals.
- C. **Calendar or outline:** A guide to the organization of the course, a schedule of assessment tools, and a plan for the coverage of topics should be provided to the students.
- D. **Students will develop a unit plan and teach a unit during Clinical Practice I.**
- E. **Students will produce a unit plan incorporating current research.** The plan will require a thorough demonstration of knowledge of the topic, as well as methods and strategies for teaching that topic.

9/13/17 csl
2/7/22 RS

MTT 390 Methods for Teaching Mathematics II
Fall 2021

Instructor: Dr. Rachel Snider
Science Complex P204
Phone: (609) 771-2099
sniderr@tcnj.edu

Class Meetings: Monday and Thursday 3:30 – 4:50 in SCP 228

Office Hours: Tuesdays 2:00 – 3:30, Thursdays 5:15 – 6:45, and by appointment. All office hours are via Zoom (you can access the link on Canvas).

Website: Access through Canvas

Course Materials

- Course readings will be posted on the course Canvas site
- A video camera

To use Zoom:

Login at tcnj.zoom.us to activate your account with TCNJ's Single Sign On
For help troubleshooting issues with Zoom: <https://instructionaldesign.tcnj.edu/zoom/>
(bottom of page)

Computer and operating system requirements: <https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux>

Access to IT support:

If you have technology issues or needs during the semester, please contact the IT Helpdesk at 609-771-2660 or helpdesk@tcnj.edu.

Additional recommended books (not required, but great books for your reference as a teacher – any required sections will be posted on Canvas):

- Smith, M. S., & Stein, M. K. (2018). *5 Practices for Orchestrating Productive Mathematics Discussions* (2nd ed.). NCTM.
- Jones, F. H., Jones, P., & Jones, J. L. T. (2000). *Tools for teaching: Discipline, instruction, motivation*. Santa Cruz, Calif: F.H. Jones & Associates.
- The 5 Practices in Practice (High School or Middle School version):
 - Smith, M., Steele, M.D., & Sherin, M. G. (2020). *The 5 Practices in Practice: Successfully Orchestrating Mathematical Discussion in Your High School Classroom*. NCTM.
 - Smith, M., & Sherin, M. G. (2019). *The 5 Practices in Practice: Successfully Orchestrating Mathematical Discussion in Your Middle School Classroom*. NCTM.

Learning Goals

Course Goals: Students in MTT 390 will develop and demonstrate their knowledge of content and pedagogy appropriate for teaching middle and high school mathematics. Students will develop a deep understanding of the standards for teaching high school mathematics, know how to teach according to these standards, and become familiar with standards-based curricula. Students will engage in exploration of mathematics topics and teaching practices, and become familiar with the research literature in mathematics education.

Performance Goals: The course goals are tied to the five principles of the School of Education's Conceptual Framework, Creating Agents of Change (CF 1-5):

- CF 1. Demonstrating Subject Matter Expertise
- CF 2. Demonstrating Excellence in Planning and Practice
- CF 3. Demonstrating a Commitment to All Learners
- CF 4. Demonstrating a Strong, Positive Effect on Student Growth
- CF 5. Demonstrating Professionalism, Advocacy, and Leadership.

The successful student completing this course should be able to do all of the following:

- Develop a global view of the content of high school mathematics, as well as a variety of methods and strategies designed to motivate and engage students in learning that content (CF 1).
- Enhance their familiarity with national and state standards and they will examine standards-based teaching and curricula in light of mathematics education research (CF 2).
- Realize that problem solving is central to all of mathematics and that it is to be incorporated as a central theme in their own teaching (CF 3 & CF 5).
- Understand the concept of function which will be used to illuminate many topics that form the basis of school mathematics (CF 1).
- Develop both a standards-based and a research perspective that will permeate the course and form the basis for discussion of appropriate instructional strategies (CF 4 & CF 5).
- Reflect on his/her own growth during the field experience as a doer and teacher of mathematics (CF 5).
- Create a unit plan.

Student Assessment

The student will be required to reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality, using a variety of representations of mathematical concepts and procedures. The final grades will be based on weekly homework and reading, class activities, projects, a unit plan, field placement observation, and final exam. More details about the assignments will be provided later in the course.

Homework, Reading, Class Activities, Participation 30%

Task launch video analysis	
ABS video analysis	
Assessment Project	25%
Unit Plan	30%
Final Exam	15%
(These may be changed at the instructor's discretion.)	

Class policies:

1. For each calendar day an assignment is late, it will drop 10%. Late assignments will only be accepted for one week after the due date.
2. The instructor must be contacted prior to any due date to negotiate alternative arrangements if necessary. **At least 48 hours** is required for any project due date (Peer teaching, assessment project, or unit plan). And **at least 24 hours** is required for regular weekly assignments.
3. Students are responsible for any work that is missed.

Learning Activities

These activities will include a combination of: lectures, participation in class discussions and demonstrations, rehearsals, peer teaching, readings and homework assignments, a simulated teaching discussion, a unit plan, an assessment project, and a field observation.

Weekly Homework and Reading

Weekly assignments may include reading, posting reading responses, and problems engaging in the work of teaching. We will be using Perusall for our course readings. You can access it through the tab in Canvas.

Class Activities and Participation

This class will build on your experiences as learners, observers, and doers of mathematics and mathematics teaching. Moreover, an integral part of the work of teaching is talking through and listening to mathematical ideas in a collegial, respectful, and professional manner. Your participation grade will be based on: (1) Participating in class activities, including offering ideas and asking questions, (2) Being prepared for class, including completing all homework and reading assignments, (3) Collaborating with your group, (4) engaging in rehearsals as both teacher and student.

Participation rubric:

Participation	18-20 points	16-17 points	14-15 points	0-13 points
Interaction/ participation in classroom discussions and learning activities	A willing participant during groupwork and whole class discussions, fully engaged in all	Usually participates during groupwork and whole class	Rarely participates during groupwork and whole class discussions,	Never participates during groupwork and whole class discussions, not

	rehearsals Routinely volunteers a point of view that connects and extends and fits to the topic at hand	discussions, fully engaged in most rehearsals Occasionally volunteers a point of view that connects to the topic at hand	somewhat engaged in rehearsals Rarely volunteers a point of view that connects or fits the topic at hand	engaged in rehearsals Cannot articulate a point of view that connects, extends or fits the topic at hand.
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Rehearsals

Rehearsals provide the opportunity to engage in different teaching practices outside of a K-12 classroom setting. During rehearsals, one student will take on the role of teacher and engage in a specific teaching practice. Other students will act as students. The teacher can pause and ask questions, or as a class, we may stop the rehearsal to provide a suggestion or feedback. Often, we will have multiple students rehearse the same practice using feedback from the class or small group to make changes each time. Class time will include both small group and larger group rehearsals.

Attendance

Class participation is an important part of your learning and your classmates' learning in this course. Your attendance is therefore necessary. Please let me know (preferably in advance) that you will be absent. More than two unexcused absences will lower your classwork/participation grade. An unexcused absence during peer teaching will also lower your participation grade. For an excused absence, you need to notify the professor (preferably in advance) as soon as possible and provide pertinent information. It is your responsibility to share any documentation with me. You will not be able to make up any submitted class work from an unexcused absence. If you are absent, it is also your responsibility to check with your classmates about what you missed and see me if you have remaining questions. If you are having any problems due to the unusual circumstances of the pandemic, please contact me so that we can figure out the best way for you to be successful in this course.

If you are not feeling well, or experience cold, flu, or COVID-19 symptoms, you are encouraged NOT to attend class in person and to schedule a COVID-19 test with Health Services. If you are sick or need to quarantine, but feel able to attend class, I am happy to let you attend class virtually. I must be given advanced notice so that I can set up the Zoom call at the beginning of class. If you are not sick or in quarantine, you are expected to attend class in person.

ISOLATION. If you contract COVID-19 during the term and need to isolate, please indicate the length of your isolation time to me (you can email covidcomply@tcnj.edu to determine the recommended quarantine length, which will be based on your symptoms

and when you were diagnosed). Please be prepared to share documentation confirming your isolation requirement.

QUARANTINE. If you have close contact with someone who has COVID-19 and you are exempt from vaccination, contact covidcomply@tcnj.edu to determine the length of your quarantine. **If you are fully vaccinated you do NOT need to quarantine after contact with someone who has COVID-19 unless you have symptoms.** (You will need to get tested 3-5 days after your last exposure to the positive case even if you do not have symptoms, and wear a mask in all public indoor settings for 14 days. Students should contact Student Health Services at 609-771-2889 to coordinate testing.)

Technology

Feel free to bring computers and phones. However, also put them away and silence them when asked.

Peer Teaching

Peer teaching provides you the opportunity to plan for and teach parts of a lesson to a small group of your peers, who will act as students. We will engage in a few rounds of peer teaching during the semester. More specific information will be passed out in class.

Assessment Project

The assessment project provides an opportunity for you to practice learning from student thinking and to use research in your teaching. The project will give you first hand knowledge of how students approach a specific topic. More specific information will be passed out in class.

Unit Plan

You will develop a unit of eight lessons that you will teach in your placement classroom. More specific information will be passed out in class.

Final Exam

The final exam will be given during final exam week at the scheduled time and will be cumulative.

File Naming

Please name your files using the following convention:

LastName_FirstName_MTT390F21_AssignmentOrFileName.doc

LastName_FirstName_MTT390F21_AssignmentOrFileName.pdf

4th Hour

In this class, the deep learning outcomes associated with TCNJ's 4th hour are accomplished by a series of rigorous educational assignments that extend beyond the typical scheduled class time. These include additional out-of-class reading, writing, and homework problems.

Course Accessibility

Students who experience barriers in this course are encouraged to contact the instructor as early in the semester as possible. The Accessibility Resource Center (ARC) is available to facilitate the removal of barriers and to ensure reasonable accommodations. For more information about ARC, please visit: <https://arc.tcnj.edu/>. Student accommodations as determined by ARC (e.g., additional time, time flexibility) should be discussed as early as possible with the instructor, and must be followed regardless of course delivery mode.

Given the current circumstances of the pandemic, this syllabus is subject to change at the instructor's discretion if needed.

Tentative Course Overview

- Introduction to course and expectations: What mathematical work is involved in teaching?
- Teaching through tasks and discussions
 - Selecting tasks
 - Launching a task
 - 5 Discussion practices
 - Managing classroom discourse
 - Eliciting student thinking through questioning
- Assessing student thinking
- Explanations
 - Features of a good explanation
 - Explaining procedures
 - Explaining concepts
- Lesson planning

Additional topics:

Assessment

Technology

Internet resources

Literacy and academic language

Mathematics education research

Classroom management

Summarizing a lesson

Selected TCNJ Policies

TCNJ's Final Exam Policy is available here:

<http://www.tcnj.edu/~academic/policy/finalevaluations.htm>

Attendance: Students are expected to check the college calendar, and plan their course schedules and vacations so as to enroll only in those classes that they can expect to attend on a regular basis. Students are expected to participate in each of their courses through regular attendance at lecture and laboratory sessions, complete assignments as scheduled, and to avoid outside conflicts. It is further expected that every student will be present, on time, and prepared to participate when scheduled class sessions begin. In all circumstances, it remains the student's responsibility to initiate discussion about absence and arrangements for making up any missed work with each instructor.

TCNJ's attendance policy is available here:

<http://policies.tcnj.edu/policies/digest.php?docId=9134>

Academic Integrity Policy: *Academic dishonesty is any attempt by the student to gain academic advantage through dishonest means, to submit, as his or her own, work which has not been done by him/her or to give improper aid to another student in the completion of an assignment. Such dishonesty would include, but is not limited to: submitting as his/her own a project, paper, report, test, or speech copied from, partially copied, or paraphrased from the work of another (whether the source is printed, under copyright, or in manuscript form). Credit must be given for words quoted or paraphrased. The rules apply to any academic dishonesty, whether the work is graded or ungraded, group or individual, written or oral.*

TCNJ's academic integrity policy is available here:

<http://www.tcnj.edu/~academic/policy/integrity.html>

Americans with Disabilities Act (ADA) Policy: Any student who has a documented disability and is in need of academic accommodations should notify the professor of this course and contact the Office of Differing Abilities Services (609-771-2571). Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992.

TCNJ's Americans with Disabilities Act (ADA) Policy is available here:

<http://www.tcnj.edu/~affirm/ada.html>

Students who experience barriers in this course are encouraged to contact the instructor as early in the semester as possible. The Accessibility Resource Center (ARC) is available to facilitate the removal of barriers and to ensure reasonable accommodations. For more information about ARC, please visit: <https://arc.tcnj.edu/>.

Campus Diversity Statement: The campus community of The College of New Jersey is composed of people with diverse backgrounds, perspectives, and experiences. Given the increasing diversity of the population of the United States and the cultural effects of globalization, we must continually build upon our efforts to ensure that all perspectives

can be expressed. Our commitment to inclusiveness means that the campus community will constantly evaluate college policies, procedures and practices to remove those barriers that may affect our ability to be a welcoming and safe environment.

We commit to treating each other with civility and respect, and working together in a spirit of fairness and cooperation. Our individual commitment to inclusiveness requires that each of us becomes aware of our own assumptions about human behaviors, biases, preconceived notions and personal limitations. Collectively, we will have honest, yet respectful, discussions regarding different points of view pertaining to values and cultural issues. In our individual spheres of influence, we will engage in dialogue, activities, gatherings and conversations to ensure that we live out our commitment to inclusiveness.

When we inspire those within our circles of influence to promote the importance of inclusiveness, we are poised to influence not only our campus, but also our local, national, and global communities.

Policy Prohibiting Discrimination in the Workplace/Educational Environment: The College of New Jersey Policy Prohibiting Discrimination in the Workplace/Educational Environment governs the college's commitment to and expectations of having an environment that respects the diversity of all members of the campus community. The link to this policy is: <http://policies.tcnj.edu/policies/digest.php?docId=9122>. Under this policy, forms of discrimination or harassment based upon specific protected categories are prohibited and will not be tolerated. If you wish to report a concern, please contact Kerri Thompson Tillett, Chief Diversity Officer, at 771-3139, or via email at thompsok@tcnj.edu.

Power-Based Personal Violence: The College of New Jersey takes pride in being a welcoming and safe community. It's on us to prevent power-based personal violence (sexual assault, domestic/dating violence, and stalking) by safely intervening when we notice harmful situations. These situations may include but are not limited to: a friend using demeaning or abusive language, a classmate engaging in controlling or abusive behavior toward someone else, or anyone not seeking effective consent from a person before sexual activity (including times when their ability to consent is impacted by alcohol and/or other drugs).

Everyone's experience with power-based personal violence is unique. If you, or someone you know, has been impacted by power-based personal violence, TCNJ offers many resources. Tuning into what you want or need may help determine which resources, if any, you choose to pursue. Anti-Violence Initiatives (AVI) is a confidential resource that can assist you in identifying your needs and help you understand the options available.

You can schedule a confidential appointment with AVI by contacting Michelle Lambing, Assistant Director of AVI, at 609-771-2272 or by emailing michelle.lambing@tcnj.edu. You can also request an appointment online through the Online Wellness Link: <https://tcnj.medicatconnect.com/>.