05:300:443:01
Methods of Teaching and Assessing Secondary Mathematics
Spring 2019

Tuesdays 4:30-7:30 p.m.
Scott Hall Room 102 (SC-102)

Course details
Instructor: Professor Gerald Goldin
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Mode of instruction: Seminar

Prerequisite for 05:300:443: admission to teacher education program.

Background
To teach secondary school mathematics effectively requires attention to and knowledge of many factors. These factors include:

- mathematical content, processes, structures, and applications;
- learning objectives and hierarchies of mathematical prerequisites;
- strategies of motivation; and diverse engaging classroom activities (including explorations, learning through problem solving, creating and investigating mathematical representations);
- students’ differing abilities and learning styles in mathematics;
- cultural and gender influences;
- students with disabilities or special needs;
- strategies for differentiating instruction;
- different teaching styles;
- the purposes and design of assessments.

This course is designed to help develop professional expertise in all of these. First, we include in this syllabus some important information about students with disabilities (pp. 1-2), followed by course learning goals enumerated in New Jersey’s Professional Standards for Teachers and the Standards of the Council for the Accreditation of Educator Preparation (pp. 2-12). Course description continues on p 13.

Students with Disabilities

Rutgers University welcomes students with disabilities into all of the University’s educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are
officially enrolled, participate in an intake interview, and provide documentations: https://ods.rutgers.edu/students/documentation-guidelines.

If the documentation supports your request for reasonable accommodations, your campus’s disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.

**Course Description**

**New Jersey Professional Standards for Teachers (2014)**

1. **Standard One: Learner Development.** The teacher understands how learners grow 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.

   i. **Performances:**
   (1) The teacher regularly assesses individual and group performance in order to design and modify instruction to meet learners’ needs in each area of development (cognitive, linguistic, social, emotional, and physical) and scaffolds the next level of development;
   (2) The teacher creates developmentally appropriate instruction that takes into account individual learners’ strengths, interests, and needs and that enables each learner to advance and accelerate his or her learning;

   ii. **Essential Knowledge:**
   (1) The teacher understands how learning occurs--how learners construct knowledge, acquire skills, and develop disciplined thinking processes--and knows how to use instructional strategies that promote student learning;
   (2) The teacher understands that each learner’s cognitive, linguistic, social, emotional, and physical development influences learning and knows how to make instructional decisions that build on learners’ strengths and needs;
   (3) The teacher identifies readiness for learning, and understands how development in any one area may affect performance in others;
   (4) The teacher understands the role and impact of language and culture in learning and knows how to modify instruction to make language comprehensible and instruction relevant, accessible, and challenging.

   iii. **Critical Dispositions:**
   (1) The teacher respects learners’ differing strengths and needs and is committed to using this information to further each learner’s development;

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(2) The teacher is committed to using learners’ strengths as a basis for growth, and their misconceptions as opportunities for learning;
(3) The teacher takes responsibility for promoting learners’ growth and development; and
(4) The teacher values the input and contributions of families, colleagues, and other professionals in understanding and supporting each learner’s development.

2. Standard Two: Learning Differences. The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.

i. Performances:
(1) The teacher designs, adapts, and delivers instruction to address each student’s diverse learning strengths and needs and creates opportunities for students to demonstrate their learning in different ways;
(2) The teacher makes appropriate and timely provisions (for example, pacing for individual rates of growth, task demands, communication, assessment, and response modes) for individual students with particular learning differences or needs;
(3) The teacher designs instruction to build on learners’ prior knowledge and experiences, allowing learners to accelerate as they demonstrate their understandings;
(5) The teacher incorporates tools of language development into planning and instruction, including strategies for making content accessible to English language learners and for evaluating and supporting their development of English proficiency;
(6) The teacher accesses resources, supports, and specialized assistance and services to meet particular learning differences or needs and participates in the design and implementation of the IEP, where appropriate, through curriculum planning and curricular and instructional modifications, adaptations, and specialized strategies and techniques, including the use of assistive technology.

ii. Essential Knowledge:
(1) The teacher utilizes resources related to educational strategies for instruction and methods of teaching to accommodate individual differences and to employ positive behavioral intervention techniques for students with autism and other developmental disabilities;
(2) The teacher understands and identifies differences in approaches to learning and performance and knows how to design instruction that uses each learner’s strengths to promote growth;
(3) The teacher understands students with exceptional needs, including those associated with disabilities and giftedness, and knows how to use strategies and resources to address these needs;
(5) The teacher understands that learners bring assets for learning based on their individual experiences, abilities, talents, prior learning, and peer and social group interactions, as well as language, culture, family, and community values;

iii. Critical Dispositions: (1) The teacher believes that all learners can achieve at high levels and persists in helping each learner reach his or her full potential;
(2) The teacher respects learners as individuals with differing personal and family backgrounds and various skills, abilities, perspectives, talents, and interests;
(3) The teacher makes learners feel valued and helps them learn to value each other;
(4) The teacher values diverse languages, dialects, and cultures and seeks to integrate them into his or her instructional practice to engage students in learning.

3. **Standard Three**: Learning Environments. The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.

i. **Performances**:
   (1) The teacher collaborates with learners, families, and colleagues to build a safe, positive learning climate of openness, mutual respect, support, and inquiry;
   (2) The teacher develops learning experiences that engage learners in collaborative and self-directed learning and that extend learner interaction with ideas and people locally and globally;
   (3) The teacher collaborates with learners and colleagues to develop shared values and expectations for respectful interactions, rigorous academic discussions, and individual and group responsibility for quality work;
   (4) The teacher manages the learning environment to actively and equitably engage learners by organizing, allocating, and coordinating the resources of time, space, and learners’ attention;
   (5) The teacher uses a variety of methods to engage learners in evaluating the learning environment and collaborates with learners to make appropriate adjustments;
   (6) The teacher communicates verbally and nonverbally in ways that demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives learners bring to the learning environment;
   (7) The teacher promotes responsible learner use of interactive technologies to extend the possibilities for learning locally and globally; (8) The teacher intentionally builds learner capacity to collaborate in face-to-face and virtual environments through applying effective interpersonal communication skills.

ii. **Essential Knowledge**:
   (1) The teacher understands the relationship between motivation and engagement and knows how to design learning experiences using strategies that build learner self-direction and ownership of learning;
   (2) The teacher knows how to help learners work productively and cooperatively with each other to achieve learning goals;
   (3) The teacher knows how to collaborate with learners to establish and monitor elements of a safe and productive learning environment including norms, expectations, routines, and organizational structures;
   (4) The teacher understands how learner diversity can affect communication and knows how to communicate effectively in differing environments;
   (5) The teacher knows how to use technologies and how to guide learners to apply them in appropriate, safe, and effective ways;

iii. **Critical Dispositions**:
   (1) The teacher is committed to working with learners, colleagues, families, and communities to establish positive and supportive learning environments;
   (2) The teacher values the role of learners in promoting each other’s learning and recognizes the importance of peer relationships in establishing a climate of learning;
(3) The teacher is committed to supporting learners as they participate in decision-making, engage in exploration and invention, work collaboratively and independently, and engage in purposeful learning;
(4) The teacher seeks to foster respectful communication among all members of the learning community.

4. Standard Four: Content Knowledge. The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches, particularly as they relate to the Common Core Standards and the New Jersey Core Curriculum Content Standards and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

i. Performances:
(1) The teacher effectively uses multiple representations and explanations that capture key ideas in the discipline, guide learners through learning progressions, and promote each learner’s achievement of content standards;
(2) The teacher engages students in learning experiences in the discipline(s) that encourage learners to understand, question, and analyze ideas from diverse perspectives so that they master the content;
(3) The teacher engages learners in applying methods of inquiry and standards of evidence used in the discipline;
(4) The teacher stimulates learner reflection on prior content knowledge, links new concepts to familiar concepts, and makes connections to learners’ experiences;
(5) The teacher recognizes learner misconceptions in a discipline that interfere with learning, and creates experiences to build accurate conceptual understanding;
(6) The teacher evaluates and modifies instructional resources and curriculum materials for their comprehensiveness, accuracy for representing particular concepts in the discipline, and appropriateness for his or her learners;
(7) The teacher uses supplementary resources and technologies effectively to ensure accessibility and relevance for all learners;
(8) The teacher creates opportunities for students to learn, practice, and master academic language in their content; and
(9) The teacher accesses school and/or district-based resources to evaluate the learner’s content knowledge.

ii. Essential Knowledge:
(1) The teacher understands major concepts, assumptions, debates, processes of inquiry, and ways of knowing that are central to the discipline(s) he or she teaches;
(2) The teacher understands common misconceptions in learning the discipline and how to guide learners to accurate conceptual understanding;
(3) The teacher knows and uses the academic language of the discipline and knows how to make it accessible to learners;
(4) The teacher knows how to integrate culturally relevant content to build on learners’ background knowledge;
(5) The teacher has a deep knowledge of student content standards and learning progressions in the discipline(s) he or she teaches;
(6) The teacher understands that literacy skills and processes are applicable in all content areas and help students to develop the knowledge, skills, and dispositions that enable them to construct meaning and make sense of the world through reading, writing, listening, speaking, and viewing;
(7) The teacher understands the concepts inherent in numeracy to enable students to represent physical events, work with data, reason, communicate mathematically, and make connections within their respective content areas in order to solve problems.

iii. Critical Dispositions:
(1) The teacher realizes that content knowledge is not a fixed body of facts but is complex, culturally situated, and ever evolving. He or she keeps abreast of new ideas and understandings in the field;
(2) The teacher appreciates multiple perspectives within the discipline and facilitates learners’ critical analysis of these perspectives;
(3) The teacher recognizes the potential of bias in his or her representation of the discipline and seeks to appropriately address problems of bias;
(4) The teacher is committed to work toward each learner’s mastery of disciplinary content and skills;
(5) The teacher shows enthusiasm for the discipline(s) they teach and is committed to making connections to everyday life.

5. Standard Five: Application of Content. The teacher 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.

i. Performances:
(1) The teacher develops and implements projects that guide learners in analyzing the complexities of an issue or question using perspectives from varied disciplines and cross-disciplinary skills (for example, a water quality study that draws upon biology and chemistry to look at factual information and social studies to examine policy implications); 
(2) The teacher engages learners in applying content knowledge to real world problems through the lens of interdisciplinary themes (for example, financial literacy and environmental literacy); 
(3) The teacher facilitates learners’ use of current tools and resources to maximize content learning in varied contexts;
(4) The teacher engages learners in questioning and challenging assumptions and approaches in order to foster innovation and problem solving in local and global contexts;
(5) The teacher develops learners’ communication skills in disciplinary and interdisciplinary contexts by creating meaningful opportunities to employ a variety of forms of communication that address varied audiences and purposes;
(6) The teacher engages learners in generating and evaluating new ideas and novel approaches, seeking inventive solutions to problems, and developing original work;
(7) The teacher facilitates learners’ ability to develop diverse social and cultural perspectives that expand their understanding of local and global issues and create novel approaches to solving problems;
(8) The teacher develops and implements supports for learner literacy development across content areas.
ii. Essential Knowledge: (1) The teacher understands the ways of knowing in his or her discipline, how it relates to other disciplinary approaches to inquiry, and the strengths and limitations of each approach in addressing problems, issues, and concerns.
(2) The teacher understands how current interdisciplinary themes (for example, civic literacy, health literacy, global awareness) connect to the core subjects and knows how to weave those themes into meaningful learning experiences;
(3) The teacher understands the demands of accessing and managing information as well as how to evaluate issues of ethics and quality related to information and its use;
(4) The teacher understands how to use digital and interactive technologies for efficiently and effectively achieving specific learning goals;
(5) The teacher understands critical thinking processes and knows how to help learners develop high level questioning skills to promote their independent learning;
(6) The teacher understands communication modes and skills as vehicles for learning (for example, information gathering and processing) across disciplines as well as vehicles for expressing learning;
(7) The teacher understands creative thinking processes and how to engage learners in producing original work;
(8) The teacher knows where and how to access resources to build global awareness and understanding, and how to integrate them into the curriculum.

iii. Critical Dispositions:
(1) The teacher is constantly exploring how to use disciplinary knowledge as a lens to address local and global issues;
(2) The teacher values knowledge outside his or her own content area and how such knowledge enhances student learning;
(3) The teacher values flexible learning environments that encourage learner exploration, discovery, and expression across content areas.

6. Standard Six: Assessment. The teacher understands and uses multiple methods of assessment to engage learners in examining their own growth, to monitor learner progress, and to guide the teacher’s and learner’s decision-making.

i. Performances:
(1) The teacher balances the use of formative and summative assessment as appropriate to support, verify, and document learning;
(2) The teacher designs assessments that match learning objectives with assessment methods and minimizes sources of bias that can distort assessment results;
(3) The teacher works independently and collaboratively to examine test and other performance data to understand each learner’s progress and to guide planning;
(4) The teacher engages learners in understanding and identifying quality work and provides them with effective descriptive feedback to guide their progress toward that work;
(5) The teacher engages learners in multiple ways of demonstrating knowledge and skill as part of the assessment process;
(6) The teacher models and structures processes that guide learners in examining their own thinking and learning as well as the performance of others;
(7) The teacher effectively uses multiple and appropriate types of assessment data to identify each student’s learning needs and to develop differentiated learning experiences;
(8) The teacher prepares all learners for the demands of particular assessment formats and makes appropriate accommodations in assessments or testing conditions, especially for learners with disabilities and language learning needs;
(9) The teacher continually seeks appropriate ways to employ technology to support assessment practice both to engage learners more fully and to assess and address learner needs.

ii. Essential Knowledge:
(1) The teacher understands the differences between formative and summative applications of assessment and knows how and when to use each;
(2) The teacher understands the range of types and multiple purposes of assessment and how to design, adapt, or select appropriate assessments to address specific learning goals and individual differences, and to minimize sources of bias;
(3) The teacher knows how to analyze assessment data to understand patterns and gaps in learning, to guide planning and instruction, and to provide meaningful feedback to all learners;
(4) The teacher knows when and how to engage learners in analyzing their own assessment results and in helping to set goals for their own learning;
(5) The teacher understands the positive impact of effective descriptive feedback for learners and knows a variety of strategies for communicating this feedback;
(6) The teacher knows when and how to evaluate and report learner progress against standards;
(7) The teacher understands how to prepare learners for assessments and how to make accommodations in assessments and testing conditions, especially for learners with disabilities and language learning needs.

iii. Critical Dispositions:
(1) The teacher is committed to engaging learners actively in assessment processes and to developing each learner’s capacity to review and communicate about their own progress and learning;
(2) The teacher takes responsibility for aligning instruction and assessment with learning goals;
(3) The teacher is committed to providing timely and effective descriptive feedback to learners on their progress;
(4) The teacher is committed to using multiple types of assessment processes to support, verify, and document learning;
(5) The teacher is committed to making accommodations in assessments and testing conditions, especially for learners with disabilities and language learning needs;
(6) The teacher is committed to the ethical use of various assessments and assessment data to identify learner strengths and needs to promote learner growth.

7. Standard Seven: Planning for Instruction. The teacher 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.
i. Performances:
(1) The teacher individually and collaboratively selects and creates learning experiences that are appropriate for curriculum goals and content standards, and are relevant to learners;
(2) The teacher plans how to achieve each student’s learning goals, choosing appropriate strategies and accommodations, resources, and materials to differentiate instruction for individuals and groups of learners;
(3) The teacher develops appropriate sequencing of learning experiences and provides multiple ways to demonstrate knowledge and skill;
(4) The teacher plans for instruction based on formative and summative assessment data, prior learner knowledge, and learner interest;
(5) The teacher plans collaboratively with professionals who have specialized expertise (for example, special educators, related service providers, language learning specialists, librarians, and media specialists) to design and jointly deliver, as appropriate, learning experiences to meet unique learning needs;
(6) The teacher evaluates plans in relation to short- and long-range goals and systematically adjusts plans to meet each student’s learning needs and enhance learning.

ii. Essential Knowledge:
(1) The teacher understands content and content standards and how these are organized in the curriculum;
(2) The teacher understands how integrating cross-disciplinary skills in instruction engages learners purposefully in applying content knowledge;
(3) The teacher understands learning theory, human development, cultural diversity, and individual differences and how these impact ongoing planning;
(4) The teacher understands the strengths and needs of individual learners and how to plan instruction that is responsive to these strengths and needs;
(5) The teacher knows a range of evidence-based instructional strategies, resources, and technological tools, including assistive technologies, and how to use them effectively to plan instruction that meets diverse learning needs;
(6) The teacher knows when and how to adjust plans based on assessment information and learner responses;
(7) The teacher knows when and how to access resources and collaborate with others to support student learning (for example, special educators, related service providers, language learner specialists, librarians, media specialists, and community organizations).

iii. Critical Dispositions:
(1) The teacher respects learners’ diverse strengths and needs and is committed to using this information to plan effective instruction;
(2) The teacher values planning as a collegial activity that takes into consideration the input of learners, colleagues, families, and the larger community;
(3) The teacher takes professional responsibility to use short- and long-term planning as a means of assuring student learning;
(4) The teacher believes that plans must always be open to adjustment and revision based on learner needs and changing circumstances.
8. **Standard Eight: Instructional Strategies.** The teacher 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.

**i. Performances:**
(1) The teacher uses appropriate strategies and resources to adapt instruction to the needs of individuals and groups of learners;
(2) The teacher continuously monitors student learning, engages learners in assessing their progress, and adjusts instruction in response to student learning needs;
(3) The teacher collaborates with learners to design and implement relevant learning experiences, identify their strengths, and access family and community resources to develop their areas of interest;
(4) The teacher varies his or her role in the instructional process (for example, instructor, facilitator, coach, and audience) in relation to the content and purposes of instruction and the needs of learners;
(5) The teacher provides multiple models and representations of concepts and skills with opportunities for learners to demonstrate their knowledge through a variety of products and performances;
(6) The teacher engages all learners in developing higher order questioning skills and metacognitive processes;
(7) The teacher engages learners in using a range of learning skills and technology tools to access, interpret, evaluate, and apply information;
(8) The teacher uses a variety of instructional strategies to support and expand learners’ communication through speaking, listening, reading, writing, and other modes;
(9) The teacher asks questions to stimulate discussion that serves different purposes (for example, probing for learner understanding, helping learners articulate their ideas and thinking processes, stimulating curiosity, and helping learners to question).

**ii. Essential Knowledge:**
(1) The teacher understands the cognitive processes associated with various kinds of learning (for example, critical and creative thinking, problem framing and problem solving, invention, and memorization and recall) and how these processes can be stimulated;
(2) The teacher knows how to apply a range of developmentally, culturally, and linguistically appropriate instructional strategies to achieve learning goals;
(3) The teacher knows when and how to use appropriate strategies to differentiate instruction and engage all learners in complex thinking and meaningful tasks;
(4) The teacher understands how multiple forms of communication (oral, written, nonverbal, digital, and visual) convey ideas, foster self-expression, and build relationships;
(5) The teacher knows how to use a wide variety of resources, including human and technological, to engage students in learning;
(6) The teacher understands how content and skill development can be supported by media and technology and knows how to evaluate these resources for quality, accuracy, and effectiveness.
iii. Critical Dispositions:
(1) The teacher is committed to deepening awareness and understanding the strengths and needs of diverse learners when planning and adjusting instruction;
(2) The teacher values the variety of ways people communicate and encourages learners to develop and use multiple forms of communication;
(3) The teacher is committed to exploring how the use of new and emerging technologies can support and promote student learning;
(4) The teacher values flexibility and reciprocity in the teaching process as necessary for adapting instruction to learner responses, ideas, and needs.

9. Standard Nine: Professional Learning. The teacher engages in ongoing individual and collaborative professional learning designed to impact practice in ways that lead to improved learning for each student, using evidence of student achievement, action research, and best practice to expand a repertoire of skills, strategies, materials, assessments, and ideas to increase student learning.

i. Performances:
(3) Independently and in collaboration with colleagues, the teacher uses a variety of data (for example, systematic observation, information about learners, and research) to evaluate the outcomes of teaching and learning and to adapt planning and practice;
(4) The teacher actively seeks professional, community, and technological resources, within and outside the school, as supports for analysis, reflection, and problem-solving.

ii. Essential Knowledge:
(1) The teacher understands and knows how to use a variety of self-assessment and problem-solving strategies to analyze and reflect on his or her practice and to plan for adaptations/adjustments;

iii. Critical Dispositions:
(1) The teacher takes responsibility for student learning and uses ongoing analysis and reflection to improve planning and practice;

11. Standard Eleven: Ethical Practice. The teachers acts in accordance with legal and ethical responsibilities and uses integrity and fairness to promote the success of all students.

i. Performances:
(2) The teacher advocates, models, and teaches safe, legal, and ethical use of information and technology including appropriate documentation of sources and respect for others in the use of social media;
(3) The teacher promotes aspects of students’ well-being by exercising the highest level of professional judgment, and working cooperatively and productively with colleagues and parents to provide a safe, healthy, and emotionally protective learning environment;
(4) The teacher maintains the confidentiality of information concerning students obtained in the proper course of the educational process and dispenses such information only when prescribed or directed by Federal and/or State statutes or accepted professional practice;
(5) The teacher maintains professional relationships with students and colleagues;
ii. Essential Knowledge:
(1) The teacher understands how personal identity, worldview, and prior experience affect perceptions and expectations, and recognizes how they may bias behaviors and interactions with others;
(4) The teacher knows and understands strategies to foster professional and productive relationships with students and colleagues.

iii. Critical Dispositions:
(1) The teacher recognizes that an educator’s actions reflect on the status and substance of the profession;
(2) The teacher upholds the highest standards of professional conduct both as a practitioner in the classroom and as an employee vested with the public trust;
(3) The teacher recognizes, respects, and upholds the dignity and worth of students as individual human beings, and therefore deals with them justly and considerately;
(4) The teacher recognizes his or her obligation to the profession of teaching and does not engage in any conduct contrary to sound professional practice and/or applicable statutes, regulations, and policy.

Council for the Accreditation of Educator Preparation (2013) 2:

Standard 1: CONTENT AND PEDAGOGICAL KNOWLEDGE
1.1 Candidates demonstrate an understanding of the 10 InTASC standards at the appropriate progression level(s) in the following categories: the learner and learning; content; instructional practice; and professional responsibility.
1.3 Providers ensure that completers apply content and pedagogical knowledge as reflected in outcome assessments in response to standards of Specialized Professional Associations (SPA), the National Board for Professional Teaching Standards (NBPTS), states, or other accrediting bodies (e.g., National Association of Schools of Music – NASM).
1.4 Providers ensure that completers demonstrate skills and commitment that afford all P-12 students access to rigorous college- and career-ready standards (e.g., Next Generation Science Standards, National Career Readiness Certificate, Common Core State Standards).

Standard 2: CLINICAL PARTNERSHIPS AND PRACTICE
2.3 The provider works with partners to design clinical experiences of sufficient depth, breadth, diversity, coherence, and duration to ensure that candidates demonstrate their developing effectiveness and positive impact on all students’ learning and development. Clinical experiences, including technology-enhanced learning opportunities, are structured to have multiple performance-based assessments at key points within the program to demonstrate candidates’ development of the knowledge, skills, and professional dispositions, as delineated in Standard 1, that are associated with a positive impact on the learning and development of all P-12 students.

2 http://caepnet.org/standards/introduction
Course catalogue description:

05:300:443 Methods of Teaching Secondary School Mathematics (3)
Reviews the status of secondary mathematics teaching in the United States, the reform movement of the 1990s, and current thinking about issues of concern to practicing teachers. Encourages development of personal style and approach to teaching high school mathematics. Topics include instructional planning, assessment, individual differences, cultural and gender differences, and teaching styles.

Goals for the course
This course is designed for candidates who will become middle and/or high school teachers of mathematics, or (at the graduate level) for practicing teachers to increase their expertise and develop coaching skills for working with less experienced teachers of mathematics.

It is expected that students will increase their knowledge about the development of learners’ mathematical reasoning, and acquire ways to build instruction based on that knowledge. The course encourages the development of personal style in teaching, and provides for the acquisition of a repertoire of pedagogical techniques. Students will also increase their knowledge of Common Core State Standards (CCSS), the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments currently used in New Jersey, and Student Growth Objectives (SGOs) as currently required in New Jersey.

Specifically, in this course you will:
1. Gain broad introductory knowledge of the field of mathematics education, with a focus on learning and teaching mathematics at the secondary level.
2. Learn about mathematical content, processes, structure, and applications through the study of strands of problem solving tasks.
3. Explore the construction of learning objectives, and hierarchies of mathematical prerequisites, focusing on especially challenging mathematical concepts.
4. Develop strategies for motivating and engaging students in mathematical activity.
5. Learn about ways to differentiate instruction to accommodate students’ different ability levels, prior knowledge, and learning styles in mathematics.
6. Develop strategies for encouraging creative mathematical activity, and fostering the development of mathematical talent and “high ability.”
7. Develop strategies for fostering growth in mathematical understanding among “slow learners” of mathematics.
8. Develop strategies for working effectively with mathematics students having disabilities or special needs.
9. Learn about research on learning and teaching through readings and the exploration of videos of learners engaged in doing mathematics.
10. Explore cultural and gender issues, including culturally relevant pedagogy and “stereotype threat,” as these pertain to mathematics teaching and learning.
11. Learn about different purposes of mathematics assessments, the design of classroom assessments oriented toward various purposes, and the influences of standardized assessments on teaching.

12. Gain experience with different teaching styles, and develop your own personal style.

13. Increase your knowledge of the National Council of Teachers of Mathematics (NCTM) Standards, the CCSS, the PARCC assessments, and SGOs.

14. Reflect on your continuing development as a teacher of mathematics, and the professional role of the mathematics teacher in the wider community.

**Required Texts:**


Membership in the National Council of Teachers of Mathematics (NCTM.org) is also a course requirement.

Additional Readings will be provided electronically through Sakai.

**Academic Integrity and Academic Honesty Policy:**

In this course, the standard Academic Integrity Policy and Academic Honesty Policy of Rutgers University, including rules regarding plagiarism, will be strictly enforced. The relevant regulations can be found at the following locations:

- For the Academic Integrity Policy for Rutgers undergraduate and graduate students available, please see [http://academicintegrity.rutgers.edu/integrity.shtml](http://academicintegrity.rutgers.edu/integrity.shtml)

- The Rutgers University Code of Student Conduct can be accessed at [http://policies.rutgers.edu/PDF/Section10/10.2.11-current.pdf](http://policies.rutgers.edu/PDF/Section10/10.2.11-current.pdf)

- For further information about the university’s Academic Integrity Policy, please visit [http://studentconduct.rutgers.edu/academic-integrity](http://studentconduct.rutgers.edu/academic-integrity)

- Related regulations may also be found under the Academic Policies and Procedures section of the Rutgers Graduate School of Education catalog found at [http://catalogs.rutgers.edu/generated/gse_current/pg32.html](http://catalogs.rutgers.edu/generated/gse_current/pg32.html).

For various assignments, you are permitted or expected to use material from published or on-line sources. When this occurs, you must specify which material was referenced, and provide a
citation. You must place quotations from sources in quotes, and in each case make clear the source from which you are quoting.

If you have questions or doubts, please bring these up for discussion.

Responsibilities

In addition to required course assignments (see below), you are expected to fulfill the following responsibilities:

- **Class attendance**: Class attendance is required. If you must miss a class for good reason, please let me know in advance. One absence is assumed to be for a good reason, but additional absences will reduce your final grade if not for a bona fide reason (e.g., a medical note, or an absence approved in advance). If it is an excused absence, you are responsible for contacting the instructor, getting the course materials, and making up for the class. Repeated lateness may lower your grade in class participation.

- **Class participation**: In many classes, there will be extended periods of time when you are asked to participate in an activity, sometimes with a partner, followed by discussion. A high level of attention, engagement, and involvement is expected of everyone. You will be expected to present (sometimes partial or incorrect) ideas to the class for discussion. Use of cell phones or other electronic devices during class time for unrelated activities is not permitted.

- **Postings and assignments**: Most weeks, you will be asked to complete an assignment and/or to post comments on readings for the following week, or on topics discussed in class during the weeks before. Keeping up with these in a timely way is essential.

- **Personal meetings with instructor**: Each participant should schedule a personal meeting of about ½ hour with the instructor, which may be after a class or during an office hour period, for discussion, feedback, and questions.

Course assignments and grading

Your assignments consist of five components, each of which counts a somewhat different percentage.

- **Participation (20%)** – Your participation grade will be based on your active engagement with weekly class activities and discussions.

- **Weekly assignments (20%)** – Your weekly assignments, including written assignments, on-line discussions, postings to Sakai, and responses to other students’ postings, will be evaluated for substance, quality, and thoughtfulness.

- **Lesson planning, micro-teaching and assessment (25%)** will be an important activity. This includes a short presentation of your lesson during the course, followed by peer critique, reflections, and analyses to be posted and evaluated. Detailed instructions will
be provided. For those in teacher certification programs, these assignments will constitute your first “clinical teaching work sample” (CTWS1) and disposition assessment. More experience teachers will develop, present, and discuss a model mathematical activity to the class.

- **Unit planning (25%)** – Participants will develop model unit plans on selected topics in secondary mathematics. This will involve collaborative group planning: analysis of prerequisites, identification of conceptual and proficiency objectives, motivational and culturally relevant strategies, language goals, sequencing of content and activities, and assessment plans. Each participant will then refine and submit a unit plan for evaluation.

- **Reflection paper (10%)**. Detailed instructions will be provided.

**Grade ranges:** A (90-100), B+ (86-89), B (80-85), C+ (76-79), C (70-75)

**Course schedule (tentative: subject to revision week by week)**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading or activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/22/19</td>
<td>Introduction. Course overview. Information about the practicum.</td>
<td>Get student membership in NCTM.</td>
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<tr>
<td></td>
<td></td>
<td>A close, critical look at the CCSS.</td>
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<td></td>
<td></td>
<td>Some historical perspectives.</td>
<td></td>
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<tr>
<td>2</td>
<td>1/29</td>
<td>Algebra and algebraic thinking.</td>
<td>Reading assignment; post.</td>
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<td></td>
<td></td>
<td>The nature of learning objectives in mathematics.</td>
<td>Tentative selection of lesson topics.</td>
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<tr>
<td></td>
<td></td>
<td>Presentation about field work.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2/05</td>
<td>Hierarchies of mathematical prerequisite skills; Differentiating instruction Task development and lesson planning</td>
<td>Reading assignment; post. Explorations</td>
</tr>
<tr>
<td>4</td>
<td>2/12</td>
<td>More on differentiating instruction; Mathematical content, processes, structures, and applications Representations</td>
<td>Lesson development activity; post</td>
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<tr>
<td></td>
<td></td>
<td>Students’ learning styles</td>
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<tr>
<td>5</td>
<td>2/19</td>
<td>Motivational strategies</td>
<td>Reading assignment; post</td>
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<td></td>
<td></td>
<td>Culturally relevant teaching</td>
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<td></td>
<td></td>
<td>Teaching for understanding</td>
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<tr>
<td>6</td>
<td>2/26</td>
<td>Mathematical creativity, giftedness, high-ability and promising students The “slow learner” in mathematics Students’ learning styles</td>
<td>Assessment development assignment Micro-teaching lesson plans (grp #1)</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Assignment Title</td>
<td>Details</td>
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<tr>
<td>7</td>
<td>3/05</td>
<td>Micro-teaching and critique #1</td>
<td>Unit planning assignment</td>
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<tr>
<td></td>
<td></td>
<td>Unit planning group activity</td>
<td>Micro-teaching analyses due 3/26</td>
</tr>
<tr>
<td>8</td>
<td>3/12</td>
<td><strong>On-line activity (tentative)</strong></td>
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<td></td>
<td></td>
<td>“Why should I learn mathematics?”</td>
<td>Reading assignment; post</td>
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<tr>
<td></td>
<td></td>
<td>Unit planning and motivation</td>
<td>Microteaching lesson plans (grp #2)</td>
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<tr>
<td>3/19</td>
<td></td>
<td><strong>Spring break week - no class meeting</strong></td>
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<tr>
<td>9</td>
<td>3/26</td>
<td>Micro-teaching and critique #2</td>
<td>Reading assignment; post</td>
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<td></td>
<td></td>
<td>Language and mathematics</td>
<td>Microteaching analyses due 4/09</td>
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<td></td>
<td></td>
<td>Assessment: purposes, techniques</td>
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<tr>
<td>10</td>
<td>4/02</td>
<td><strong>On-line activity (tentative)</strong></td>
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<td></td>
<td></td>
<td>“How should I teach mathematics?”</td>
<td>Reading assignment; post</td>
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<td></td>
<td></td>
<td>Unit planning and motivation</td>
<td>Microteaching lesson plans (grp #3)</td>
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<tr>
<td>11</td>
<td>4/09</td>
<td>Problem solving, students’ reasoning</td>
<td>Draft unit plans due</td>
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<td></td>
<td></td>
<td>Micro-teaching and critique #3</td>
<td>Microteaching analyses due 4/23</td>
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<td></td>
<td></td>
<td>Student Growth Objectives (SGOs)</td>
<td>Microteaching lesson plans (grp #4)</td>
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<td></td>
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<td></td>
<td>Responses to unit plans</td>
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<tr>
<td>12</td>
<td>4/16</td>
<td>Micro-teaching and critique #4 more on students’ reasoning</td>
<td>Microteaching analyses due 4/30</td>
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<td></td>
<td></td>
<td></td>
<td>Microteaching lesson plans (grp #5)</td>
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<td>Unit plan discussion</td>
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<tr>
<td>13</td>
<td>4/23</td>
<td>Assessments in mathematics: purposes, design, uses and misuses</td>
<td>Assessment development activity</td>
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<td></td>
<td></td>
<td></td>
<td>Reading assignment; post</td>
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<td></td>
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<td>Microteaching analyses due 4/30</td>
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<tr>
<td>14</td>
<td>4/30</td>
<td>Toward a philosophy of teaching</td>
<td>Final unit plans due</td>
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<tr>
<td></td>
<td></td>
<td>Summing it up.</td>
<td>Reflection papers due 5/05</td>
</tr>
</tbody>
</table>

Week-by-week topics and assignments are subject to change. Please remain current with the assignment information posted on Sakai.

Note: There is no in-class meeting or office hour 3/12/19 (tentatively, conference attendance), 3/19/19 (Spring break week), or 4/02/19 (tentatively, NCTM week). We shall have planned on-line activities during the weeks of 3/12 and 4/02.