



MED 308 Methods in the Teaching of Secondary School Mathematics (3 credits)

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Course Description:

An introduction to the theory and practice of classroom teaching for the prospective secondary mathematics teacher. Actual field experience in classroom instruction and planning, curricular issues, evaluation and testing, and special learning techniques. Includes lectures, field observation, peer presentations, construction and critique of lesson plans, use of media, and research of teaching strategies.

Relationship to Teacher Education Program Conceptual Model:

The preparation of *reflective facilitators of learning* at Buffalo State College is anchored in a foundation of professional knowledge—knowledge of the *learner* (i.e., students in the schools) and their characteristics, knowledge of *content* to be taught, and knowledge of *pedagogy*. Course objectives for MED 308 address all three components of the conceptual model:

- *Knowledge of the learner* in the application of developmentally appropriate practices to adolescent education and in dealing with management problems in the classroom.
- *Knowledge of content* as teacher candidates become familiar with the New York State Core Curriculum.
- *Knowledge of pedagogy* as teacher candidates learn strategies for developing student understanding through active engagement, construct assessment instruments, and use technology to enhance instruction.

The required field work component provides teacher candidates with first hand experiences related to the varied characteristics of *learners*, the *content* or the knowledge, understandings, skills, and dispositions that are to be learned by learners in the schools, and the *pedagogy*, or the understanding of how particular topics, problems, or issues are presented to learners with diverse backgrounds, interests and abilities in the classroom.

Co-Requisite: MED 300 Field Experience (1 Credit)

Course Objectives:

- To provide the knowledge, skills, and attitudes necessary for entry into student teaching
- To offer prospective secondary mathematics student teachers an earlier opportunity to experience the challenges of teaching.
- To allow incubation time for teaching ideas prior to entry into the professional semester

***Student Outcomes:**

1. Students who complete MED 308 should understand how secondary school students learn mathematics. They should see secondary school mathematics as a discipline involving exploring, verifying, conjecturing, describing, and so on, and recognize that it is only through understanding how students *construct* their own knowledge of mathematics that we can understand how best to teach them.
2. Students who complete MED 308 should understand the importance of developing secondary school students abilities to solve significant real-world and hypothetical mathematics problems, to apply mathematical thinking to non-routine mathematical questions, and to understand the mathematical techniques they are learning.
3. Students who complete MED 308 should be knowledgeable of specific mathematical topics taught in each of the grades 7 through 12 and know where to gather resources to aid in the teaching of those topics.
4. Students who complete MED 308 should be able to engage students in mathematical discourse to help them understand mathematical ideas. Part of engaging students in discourse is having significant, worthwhile mathematical tasks for them to undertake and thus students are expected to be able to find and/or design such tasks.
5. Students who complete MED 308 should be able to establish a classroom environment that fosters the development of mathematical thinking. Features of the environment should include appropriate manipulatives (algebra tiles, geoboards, miras, etc.) and technology (standard and graphing calculators, computers with appropriate software, video materials, etc.)
6. Students who complete MED 308 should be able to assess the mathematical knowledge and understanding of secondary school students in multiple ways and be able to adjust plans and instruction for students based on the assessments.
7. Students who complete MED 308 should be able to communicate verbally about teaching and learning mathematics and work cooperatively on projects relating to teaching. Part of this communication should include reflection on personal beliefs about teaching and the ability to monitor one's own teaching effectiveness.
8. Students should be aware of the broader mathematics education community and the issues and discussions that guide both practice and research. In particular, students will be knowledgeable about NCTM and the positions it has taken on mathematics education reform.

*Adapted from Dr. Peter Kloosterman's course objectives (Indiana University)

Materials and Expenditures:

Texts: *Every Minute Counts* by David R. Johnson

Calculator: a TI-84 or TI-83 Plus Silver edition

Membership: You must become a member of the National Council of Teachers of Mathematics and AMTNYS (details to follow)

Attendance: You are expected to attend every class. The activities, materials, readings, and discussions that will be the focus of each class provide a foundation for reflective writing and professional growth. Since this is the preparatory course for your professional practice experience, it is expected that you will respond professionally and strive for unblemished attendance. Less than perfect attendance may affect your grade in the areas described below. In the event of an absence you should contact a classmate to discuss the material covered and any assignments prior to contacting the professor for assistance.

Grading Policy: Final grades will be calculated based upon the following criteria:

Homework and Activities	25%
Exams [20% each x 2]	40%
Final Project [Unit Plan (10%), Lesson (10%)]	20%
Class Participation, Group Process	15%
	100%

Final Grading System:

	B+: 87 – 89	C+: 77 – 79	D+ : 67 - 69
A: 95 - 100	B: 83 – 86	C: 73 – 76	D: 60 - 66
A-: 90 – 94	B-: 80 – 82	C-: 70 – 72	E: Below 60

Homework: All assignments are posted on the course website (see above). Assignments will be an integral part of your learning experience in this course. Many of these will be short papers and it is expected that you will use a word processor in preparing these. All written assignments should be double-spaced and in a 12 point font.

Late Submissions: Unless otherwise stated, assignments are due the class following the date they are issued. If you have a problem submitting an assignment on time, discuss it with me prior to the due date. I will not be able to accept an assignment more than one week late. Absence from class does not change the assignment due date. Assignments should be e-mailed or placed in my mailbox in the event of a class absence. Late submissions will receive a grade reduction.

Assessment of Homework: Collected work will be assessed based upon the general 4-point rubric described below. The 4-point system is similar to the 4 point GPA system.

Scoring Rubric:

4: Demonstrates a thorough understanding of the generalizations, concepts and facts specific to the task or situation and connects the mathematics with teaching and learning implications. Critique and reflection are well founded with examples from course activities, readings, and/or personal experience. Demonstrates personal growth and challenge. Spelling, grammar, format, or organization of the work does not detract from the reading and understanding the paper.

3: Displays a complete and accurate understanding of the generalizations, concepts and facts specific to the task or situation. Connections to teaching and learning are adequate. Critique and reflection have limited foundation in course activities, readings, and/or personal experience. Some description of personal growth is present. Spelling, grammar, format, or organization of the work detracts very little from the reading and understanding the paper.

2: Displays an incomplete understanding of the generalizations, concepts and facts specific to the task or situation and/or has notable misconceptions or an incomplete response. Connections to teaching and learning are minimal. Critique and reflection are minimal. Spelling, grammar, format, or organization of the work detracts somewhat from the reading and understanding the paper.

1: Demonstrates significant misconceptions about the generalizations, concepts and facts specific to the task or situation or omits significant parts of the question and response. The teaching and learning process and reflection and/or critique are not addressed. Spelling, grammar, format, or organization of the work detracts a great deal from the reading and understanding the paper.

Exams: There will be two examinations during the semester that will be administered on the following dates:

Thursday, February 22

Thursday, April 12

NOTE: A minimum of a two-hour notification of an absence from an exam is required. This notification can be by e-mail or telephone to the above number or the department office. In addition, written documentation of the problem is required if a make-up is to be allowed. A physician's note must be presented in the event of illness. In the event of a death in the family a copy of the obituary is required. Failure to adhere to these procedures will result in a grade of zero on the exam.

Field Work and Journal: As a co-requisite to MED 308, you must complete MED 300. MED 300 requires 25 hours of supervised field experience. This experience will involve our attending Lafayette High School two mornings each week and will include lesson planning, instruction, and assessment. A portfolio of your work and a journal documenting your reflections on your field experience will be required. Details on the field experience, portfolio, and journal will be provided separately. Journal entries may be shared with your peers and thus you must have access to e-mail. Absences from the field experience must be made up since this is a requirement for your student teaching placement.

Academic Integrity: *The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect for others' academic endeavors.** By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgments.*

No credit shall be awarded in situations where it has been determined that this policy has not been followed.

** Adapted from the University of Wisconsin's *Student Disciplinary Guidelines*.

Statement on Students with Disabilities: If you have a diagnosed physical disability, learning disability, or psychological disability which will make it difficult for you to carry out the course work outlined above or which requires accommodations such as assistance from note takers and/or readers, extended time on assignments, and so on, please advise the instructor during the first week of the course and contact the Office of Special Services for Students with Disabilities (878-4500) to discuss possible arrangements for reasonable accommodations.

Classroom Etiquette: Please turn off all cell phones or set to vibrate so as not to interrupt the environment in the classroom. Similarly, you are expected to arrive on time for every class.

Tentative Calendar:

<u>Week of:</u>	<u>Topic:</u>
1/22	NYS Core Curriculum, Lesson design
1/29	NCTM Standards, van Hiele levels
2/5	NYS Math A Assessment, NAEP
2/12	Standards-based curricula, Problem-based instruction
2/19	Constructivism, Exam #1
2/26	TIMSS, Concept development
3/5	Concept development, Cooperative learning
3/12	Cooperative learning
3/19	Assessment
3/26	Classroom management
3/30	is the Last day for course withdrawal
4/9	Classroom management, Exam #2
4/16	Lesson Presentations
4/23	Lesson Presentations
4/30	Lesson Presentations
	Unit Plan due by 4 pm, 5/3
	MED 300 portfolio due by 4 pm, 5/3