MED 335. Techniques in Middle & Secondary Mathematics
MED 335- Section 1   Spring 2023
Tuesday 10:00-10:50 a.m.   Thu 10:00-10:50 a.m.   SCI A213

| Office: | Tuesday 2-3pm (in person) - Wednesday Zoom 2-3 pm (zoom) |

Instructor: Dr. Sinan Kanbir
Email: skanbir@uwsp.edu

Course Description/ Intents:

M ED 335. Techniques in Secondary Education. 4 cr. Aims, methods, materials, techniques, planning, organization, assessment, and pre-clinical experience (formerly known as "practicum") Prerequisite: Junior status and admission to Professional Education Program. [UWSP Course Catalog]

Course Overview &Objectives

Learning to teach cannot take place in a semester or a year. Good teachers are still engaged in considering how to improve their practice even after many years in the classroom, searching for new ways to craft instruction to enable all students to learn. Becoming proficient in these practices is a career-long endeavor. In this course, you will learn tools to help you enact these practices. Still, more importantly, you will develop the habits of mind to continue improving your ability to conduct these practices during your student teaching, and throughout your teaching career.This course provides an understanding of the current knowledge base of teaching methods in mathematics and the skills required to plan, evaluate, and implement effective mathematics pedagogy in secondary classrooms. Topics include selecting and adapting evidence-based methods of teaching for the content area of mathematics, planning lessons and units, assessing learning, and developing practices and dispositions that promote inquiry and critical thinking.

This course promotes ways in which current practice, research, and technology can be used to integrate a meaning-centered mathematics program into the middle&secondary school curriculum. You will develop skills, abilities, and beliefs that will help you create an environment that encourages your students' inquiry and problem-solving as you study how to guide their learning of mathematics The Wisconsin State Mathematics Standard document has two parts: Standards for Mathematical Content and Standards for Mathematical Practice, provide the rationale and foundation of this course. Attention is given to promoting the math learning of all students. You will have the opportunity to learn about how students learn mathematics, implement effective mathematics teaching practices, and put your learning into practice by engaging in work with your peers during class. Peer teaching and reflection activities will facilitate your application of class readings, discussions, and activities in a safe, practical setting.

The primary goals of this course include helping you to:
- Develop an understanding of how students learn middle and secondary school mathematics and gain a more profound knowledge of the K – 12 mathematics curricula.
- Develop organizational and instructional techniques for teaching mathematics in grades 6–12 and relating mathematics to other content areas.
- Begin developing the professional habits of successful educators.
- Examine and reflect on your beliefs relative to the teaching and learning of mathematics and develop a personal philosophy and vision of teaching mathematics.
- Explore and reflect on issues of the learning environment and develop a working perspective on how to create a learning environment that enhances instruction.

- Develop lesson plans for teaching WI-CCSSM in middle-secondary mathematics classrooms by using various resources and technology
- Widen your repertoire of instructional and planning strategies by
    - Learning to plan lessons and units of instruction
    - Learning to set goals to focus on learning
    - Learning to design/select, and implement tasks that promote problem-solving and reasoning
    - Learning to launch cognitively demanding tasks
    - Learning to use instructional tools appropriately
    - Learning to assess student learning
    - Learning to plan instruction for diverse learners
    - Learning principles of classroom management
- Examine appropriate discourse practices by
    - Learning to identify and ask purposeful questions
    - Learning to facilitate meaningful mathematical discussions
    - Learning to support productive struggle in learning mathematics
- Attend to equity issues in mathematics education.

Course Outcomes/Requirements

- Complete **40 hours of pre-clinical** experience that includes time in classrooms at high school and middle school/junior high levels (10 hours will be completed as peer teaching in our regular classroom meetings. So, you will need to **observe 30 hours** of in person math teaching in a middle-high school math classroom).
- Plan, instruct, and assess a minimum of 3 lessons.
- Demonstrate a thoughtful approach to issues and challenges of teaching mathematics at the middle and secondary levels.
- Use technology to complete a presentation summarizing a selected reading and its connection to teaching and learning.
- Demonstrate a deep understanding of content, learning environment, and motivational issues through the completion of a culminating activity.

Course/Class Structure

This course tries prospective teachers of mathematics is like being the guide of a mountain expedition. Since mathematics is not a spectator "sport" which means that since all of us must climb the mountain, we will all be doing mathematics in a manner that emphasizes understanding WHY and HOW? Much of our work will emphasize <u>analyzing</u> critical mathematical concepts and <u>sharing</u> explanations in order to dig deep into our understanding. I hope that some lessons will include a vision of what the focus of the lesson might look like in an actual classroom for both my practice and peer teaching practice. Finally, many of our class periods will have us scattered about in different classrooms. You must take responsibility for your growth and development.

Course Materials/ Resources /Not Required- Reading materials will be provided.   **BOOKS**

Required Text/Reading:

> National Council of Teachers of Mathematics (Ed.). (2014). *Principles to Actions: Ensuring Mathematical Success for All*. Reston, VA: National Council of Teachers of Mathematics.

> Smith, M. S., & Stein, M. K. (2011). *5 Practices for orchestrating productive mathematics discussions*. Second edition. Reston, VA: National Council of Teachers of Mathematics.
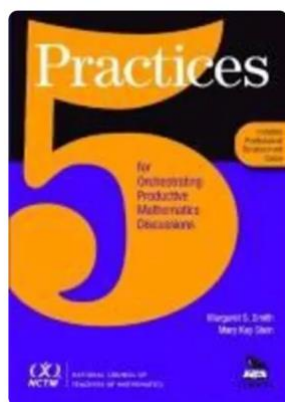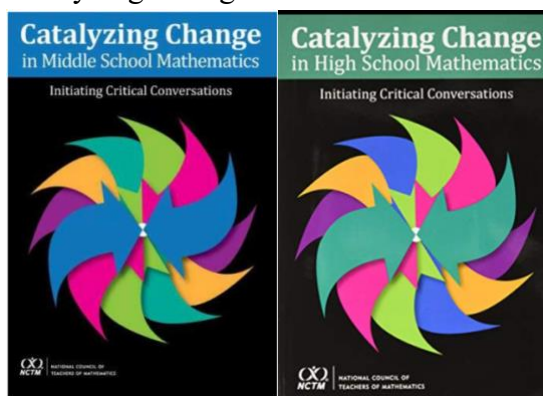

Suggested Reading:

> Wieman, R. & Arbaugh, F. (2013). *Success from the start: Your first years teaching secondary mathematics*. Reston, VA: National Council of Teachers of Mathematics.

> Liljedahl, P. (2021). *Building Thinking Classrooms in Mathematics: 14 Teaching Practices for Enhancing Learning*, Grades K-12. Corwin Press, Inc. [Pfau Library owns this book as a e-book with unlimited access. You can download some its chapters as a pdf or read all of the book online if you don't want to purchase the book. To access the book, you can use the following permanent link: https://csu-sb.primo.exlibrisgroup.com/permalink/01CALS_USB/6rdjcv/alma991011177945002916

Catalyzing Change in Middle School Mathematics and High School Mathematics

Online Resources

1. http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
2. http://www.fosteringmathpractices.com/routinesforreasoning/
3. https://curriculum.illustrativemathematics.org/HS/index.html
4. https://www.nctm.org/classroomresources/
5. https://mathigon.org/
6. Coherence Map: https://achievethecore.org/coherence-map/
7. https://illustrativemathematics.org/math-curriculum/9-12-math/
8. https://www.desmos.com/
9. https://globalmathdepartment.org/category/episodes/
10. https://www.youtube.com/watch?v=ppWPuXsnf1Q&list=PLZHQObOWTQDP5CVelJJ1bNDouqrAhVPev&index=1
11. https://www.3blue1brown.com/podcast
12. https://www.teachingchannel.com/
13. https://www.youcubed.org/
14. https://brilliant.org/paths/high-school-mathematics/
15. https://www.openmiddle.com/
16. http://www.wodb.ca/
17. Mathematics Assessment Project: https://www.map.mathshell.org/
18. https://emergentmath.com/algebra-warm-ups-for-geometry-teachers/
19. Math For Love: https://mathforlove.com/
20. Robert Kaplinsky Problem-Based Lesson Search Engine: http://robertkaplinsky.com/prbl-search-engine/
21. A Pathway to Equitable Math Instruction: https://equitablemath.org/

Membership in the Teaching Community:
You are encouraged to join teacher organizations.

- National Council of Teachers of Mathematics (NCTM): Student membership is $49, and you may join online at http://www.nctm.org. As part of your membership, you will be subscribed to the new mathematics teacher journal, have full access to NCTM Illuminations (great lessons and interactives), access to MyNCTM (online member community), and have online bookstore discount.

- TODOS: Mathematics for ALL: Student membership is $15. See https://www.todos-math.org/. The mission of TODOS is to advocate for equity and high-quality mathematics education for all students— in particular, Latina/o students.

Tentative Requirements/Expectations for Students:

Attendance (20 points): Because we will be seeking a way to teach mathematics in a way you were not taught, attendance and participation are crucial elements in this course to envision how it would be studied and/or practiced in the classroom. You are expected to attend every class meeting. If you are absent more than two times without exceptional circumstances, it will be considered unprofessional and result in a disposition concern form. If you are absent from four virtual meetings or more, your course grade will be "F."

Participation (30 points): You are expected to participate in class activities and discussions. In your active mode of learning environment, you are not only reading what others have written (receptive) but also writing and speaking using your expressive language. Not only listen to my knowledge about mathematics (receptive) but also engage in small–group discussions and make verbal reports to the whole class (expressive). Your participation in class also means that you should not only share your ideas during class discussions and in small group work but also listen and learn from your course mates and me.

Engagement: Students are expected to begin upon arrival to class (this can be working on a warmup or talking with the instructor about assignments or other course considerations). During scheduled class time, you should be "on task," listening for understanding and relevance, offer ideas, and ask questions that clarify or extend ideas. This includes challenging ideas in a respectful fashion.

Effort & attitude: Students are expected to consistently complete assignments, demonstrate a reasonable level of enthusiasm for the content, respect the entire cohort, be willing to work in a variety of settings (individual, pairs, small, groups, whole class), be organized in a way that shows thought and preparation, and accept feedback in a profession manner.

IQ (50 points): You are expected to respond in writing to the assigned readings with one idea (I) that you learned about teaching and/or learning mathematics, and one question (Q) that you would ask the class to help guide the discussion of the reading. IQs should be submitted before the class of an assigned reading.

Weekly Prep Assignments: Before class, you will read a chapter/article, watch a video, and/or answer questions based on readings or videos. Each activity is intended to help you make sense of class activities or readings, so that you feel more comfortable asking questions and contributing to class activities and discussions.

Presentation (90 points): You will present series of assigned projects as follow

1.   Curriculum Topic Study group presentation (15 points)
2.   Article Presentations (20 points): You will be getting an article from Mathematics Teacher and the Teaching Middle School Mathematic (NCTM), details will be presented later.
3.   Lockdown math Episode lesson presentations (15p)
4.   Lesson Segment- Peer teaching (20 points)
5.   Vision Essay presentation (15 points)

Read/Watch -Reflect (80 points): We will read some assigned reading from multiple sources. You will see a tentative schedule for reading assignments, but dates or even the readings themselves may change as we go along. You will be asked to submit your reflections approximately five-six times during the semester. The intent is to support you in developing a habit of reflection on your own thinking and learning; you may even find this record useful when you begin teaching. Only reflections that are typed will be accepted, unless otherwise specified

Lesson Plans for Pre-Clinical Experience **(30 points):** This course includes series of practicum experience. You will design a thorough lesson plan around a high cognitive demand task— elements will be discussed in class but will include questions to ask, differentiation, timing of lesson, closure, formative assessment. Then, you will teach the lesson to your peers during class in small groups and two times in your regular math class. Finally, you will reflect on your peer teaching.

Pre-Clinical Experience Summaries and Reflections (20 points): You will write a summary and reflection of your teaching. Information about the format and content of the summary and reflection will be provided.

Pre-Clinical Experience Journal (40 points): This experience is key element of your initial teaching steps. You will write/report/reflect your math class observation experience. Information about the format will be provided.

Homework assignments -Problem Sets (60 points): You will be asked to work on and hand in (scan-Canvas) some paper homework assignments. More information about the assignments will be given with each assignment.

Biweekly Quizzes (50 points): There will be quick biweekly evaluations based on two-week long topic (HW, and in-class materials).
In-Class Evaluation (60 points): There will be two in-class evaluations. Evolutions may be 60-minute length.
Mid-Term (50 points): There will be a cumulative test given (week 9-10). Study guide will also be provided.
Final Examination (60 points): The final examination time will be during finals week. More information about its format and content will be provided.

MED 335-Point Distribution

Evaluation Item	Points (Max)
Attendance	20
Participations	30
IQs	50
Presentations	90
Read/Write-Reflection	80
Pre-Clinical Lesson Plans	30
Pre-Clinical Summaries/Reflections	20
Pre-Clinical Journal	40
Homework- SETs	60
Biweekly Quizzes	50
In-Class Evaluations (Two Evals)	60
Mid-Term	50
Final	60
Total	**640**

E. Grading

This 4-credit hour class requires 6–8 hours of outside of class study per week. Make sure that you schedule and put in those hours consistently throughout the semester. Your course grade will be calculated on a percentage basis (number of points earned out of number possible) and assigned a corresponding letter:

94-100% = A	90- 93 % = A-	
86-89% = B+	83-85% = B	80-82% = B-
76-79% = C+	73-75% = C	70-72% = C-
66-69% = D+	60-65% = D	
Less than 60% = F		

I will not use any kind of judgments to lower your final grade.

Additional Course policies & Expectations

1. Incomplete grades will be given only under special circumstances.
2. Any work that is turned in should be completely your own work. Even though students will be working in groups often each individual is responsible for their own work. Cheating/Academic dishonesty can result in failing the course.
3. Cell phones and SMART watches are not allowed on tests and quizzes.
4. Make-up tests/assignments will only be given under very special circumstances. Please look the course calendar and plan accordingly.
5. Calculators cannot be shared during quizzes and tests.
6. Cell phones and computers are a distraction to students and the instructor, please keep these devices silent and out of sight. If there is a situation that requires your attention to a cell phone contact, **please leave the classroom to deal with it.**

Disposition Concerns: The Mathematical Sciences Department takes the preparation of teachers seriously. As such, we expect pre-service teachers to treat their preparation with the same level of seriousness. As you may know, the School of Education evaluates teacher candidates based on certain disposition indicators:

- Collaboration Issues: The ability to work together, especially in a joint intellectual effort.
- Honesty/Integrity: The ability to demonstrate truthfulness to oneself and to others; demonstrate moral excellence and trustworthiness.
- Respect: The ability to honor, value, and demonstrate consideration and regard for oneself and others.
- Emotional Maturity: The ability to adjust one's emotional state to suitable level of intensity in order to remain engaged with one's surroundings.
- Reflection: The ability to review, analyze, and evaluate the success of past decisions in an effort to make better decisions in the future.
- Flexibility: The willingness to accept and adapt to change.
- Responsibility: The ability to act independently, demonstrating accountability, reliability and sound judgment.

While there are many behaviors that may result in the issuance of a disposition concern form, some of the most frequent causes are *poor attendance, consistently being late for class, and not completing assigned tasks.* We view each of these as an indication of lack of reverence for learning and lack of responsibility, and any of these will result in the filing of a disposition concerns form. Any student needing to arrange a reasonable accommodation for a documented disability should contact Disability Concerns at 715-346-3365 or emailing datctr@uwsp.edu and/or by completing the http://www.uwsp.edu/disability/Documents/Request%20for%20Services.pdf
For more information, check out the Assistive Technology website.
http://www.uwsp.edu/assistive/Pages/default.aspx
Religious Beliefs: Students' sincerely held religious beliefs will be reasonably accommodated with respect to all examinations and other academic requirements. According to UWS 22.03, you must notify the instructor within the first three weeks of classes about specific dates which require accommodation.

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Welcome! I look forward to sharing the semester
 with you and wish you the best over the coming
                      weeks.
          – Your instructor, Dr Kanbir
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In MED 335 You Must NOT:

1. **Use the following 4-letter word beginning with F: "FOIL."**
2. **Talk about "plugging" values into formulae or function expressions. The correct word is "substitute."**
3. **Put arrows on the ends of graphs of quadratic functions.**
4. **Think that something like $y = 2x + 3$ completely specifies a function.**

> **If you are going to be a good mathematics teacher you must discipline yourself to use mathematically correct language at all times (and particularly *when* you are actually teaching mathematics).**

Perhaps you need to be aware of the following:

Teacher Arrested at New York's John F. Kennedy Airport—Held in Isolation

A secondary school teacher was arrested today at New York's John F. Kennedy International airport as he attempted to board an international flight while in possession of a ruler, a protractor, a pair of compasses, a slide-rule and a calculator.

At a press conference, a U.S. Border Control spokesman said he believes the man is a member of the notorious Al-Gebra movement. He did not identify the man, who has been charged by the police with carrying weapons of math instruction.

"Al-Gebra is a problem for us," the spokesman said. "hey derive solutions by means and extremes, and sometimes go off on tangents in search of absolute values. They use secret code names like x and y and refer to themselves as 'unknowns'." "But we have determined that they belong to a common denominator of the axis of medieval with coordinates in every country. As the Greek philosopher Isosceles used to say, 'There are three sides to every triangle'."

When asked to comment on the arrest, Republican leader Ed Milliband said, "If God had wanted us to have better weapons of math instruction, He would have given us more fingers and toes." Democrats told reporters they could not recall a more intelligent or profound statement by the Republican leader.

The vision of mathematics promoted by National Council of Teachers of Mathematics is based on the following six principles:

- Excellence in mathematics education requires equity —high expectations and strong support for all students.
- A curriculum is more than a collection of activities; it must be coherent, focused on important mathematics, and well-articulated across the grades.
- Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.
- Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.
- Assessments should support the learning of important mathematics and furnish useful information to both teachers and students.
- Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.

---Principles and Standards for School Mathematics
National Council of Teachers of Mathematics, 2000, pp.11–24

In the spirit of these principles and Standard for Mathematics Practices (SMP), this course is designed to provide you to opportunity to

1. Develop and understand mathematical knowledge for teaching related to 6-12 mathematics.
2. Analyze how diverse groups of students understand particular mathematics topics at various grade levels and construct instruction plans based on the analyses.
3. Learn about and become familiar with elementary school mathematics curriculum (e.g., Common Core State Standard for Mathematics (CCSSM 2010) and Standard for Mathematics Practice(SMP), etc.).
4. Become knowledgeable about teaching and learning materials (textbooks, resources, manipulatives, and technology) to assist them in planning meaningful activities for elementary students.
5. Be aware of current issues and topics of debate regarding mathematics education and learn to create an instructional environment independently and collaboratively so that it promotes problem solving with understanding and sense making for diverse groups of students.
6. Develop and practice habits of reflection and examination of teaching practices.

Preservice Teacher Outcomes:

Preservice teachers will be expected to develop and show competency in each the InTASC Model Core Teaching Standards' (2011) learning outcomes.

http://www.ccsso.org/Documents/2011/InTASC_Model_Core_Teaching_Standards_2011.pdf

Upon successful completion of this course students will be able to:
- Demonstrate an enhanced ability to provide multiple representations, analyze concepts and potential student difficulties, and communicate about mathematical situations involving number and operations. (InTASC #4)
- Effectively communicate their personal beliefs relative to teaching and learning of mathematics both orally and in writing. (InTASC #1, 8, 9, 10)
- Explore the issues and mathematical concepts required for teaching elementary mathematics and effectively communicate ideas and thoughts with peers via consistent dialog. This lays a foundation of confidence with mathematics that prepares prospective teachers for the ever-increasing demands within the professional of elementary teaching…not just able to do the mathematics bit able to explain WHY. (InTASC #1,3,4)
- Apply and adapt a variety of problem-solving strategies and develop the logical and critical thinking skills necessary to continue to read about and learn mathematical topics and how mathematics is used in real-world situations. (InTASC #5)
- Develop a deeper and broader understanding of mathematics as a whole by exploring the connections that exist among mathematical topics and between mathematics and other content areas. (InTASC #4, 5)
- Demonstrate deep understanding of the big idea of number sense, both at the elementary level and beyond. (InTASC #4, 5)
- Demonstrate personal and professional skills and habits that prepare one for the work of a public school teacher, especially the practice of reflecting on one's work and the work of students. (InTASC #10)
- Model persistence, conjecturing, and generalizing when working with mathematical situations/problems.
- Demonstrate, through field experience, the ability to create an engaging and inclusive learning situation. (InTASC #2, 3)