

**Teaching Middle School Mathematics
MED 379 Fall 2022**

Monday, Tuesday, Wednesday, and Thursday 10:00-10:50 (Sci A 212)

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Available ▾

Course Description/Intent:

Topics focus on algebraic reasoning and number theory concepts. Content includes proportional reasoning, linear and non-linear functions, analytic geometry, elementary proof techniques, divisibility, primes, composites, special number sets, and basic counting principles.

Viewpoints and trends in teaching middle school mathematics with instruction planning, and evaluation issues. Implications of research related to organization, content, and techniques for teaching grade 5-9 mathematics. Includes practicum experiences.

Course Objectives and Goals

1. Develop an understanding of how students learn middle school mathematics.
2. Develop organizational and instructional techniques for teaching mathematics in grades 5–8 and relating mathematics to other content areas.
3. Become knowledgeable about the appropriate use of manipulative materials and technology.

In particular,

- To understand algebra as a language and as a system of representation/ algebraic reasoning skills.
- To understand and describe relations and functions in various ways—graphs, tables, equations and words.
- Using algebra, distinguish between proportional and other relationships such as additive relationships and inversely proportional relationships.
- To develop problem-solving and problem-posing techniques and strategies.
- Using algebra, reason about how quantities vary together in a proportional relationship, using tables, double number lines and tape diagrams for support.
- To develop sense of language and concepts related to number theory and counting.
- To learn to recognize and justify relationships between numbers and sets of numbers, and hence become progressively proficient in *proving* theorems/results in the context of number theory
- To develop holistic view of problem solving that concerned with $R = \{\text{real numbers}\}$, its subsets, and its field and order properties.

In summary:

You should experience a classroom in which “solving problems is not only a goal of learning mathematics but also a major means of doing so.” You should have frequent opportunities to formulate, grapple with, and solve complex problems that require a significant amount of effort and should then be encouraged to reflect on their thinking” (*Principles and Standards for School Mathematics*, National Council for Teachers of Mathematics, 2000, p. 52).

Course Materials/ Resources (see Library Reserve section or online journal):

1. Van de Walle, J. A., Bay-Williams, J. M., Lovin, L. H., & Karp, K. S. (2014). Teaching student--centered mathematics: Developmentally appropriate instruction for grades 6–8 (2nd ed.). Boston, MA: Pearson.
2. Smith, Margaret S., and Mary Kay Stein. 2011. 5 Practices for Orchestrating Productive Mathematics Discussions. Reston, VA: National Council of Teachers of Mathematics.
3. Common Core State Standards for Mathematics: Download from website:
http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
4. <https://www.illustrativemathematics.org/content-standards/1>
5. <https://www.openmiddle.com/>

Additional Readings will be available on Canvas

Course Structure and Tentative Requirements

Attendance: Because we will be seeking a way to teach children mathematics in way that you were not taught, attendance and participation are crucial elements in this course to envision how it would be studied and/or practiced in classroom. You are expected to attend every class meeting. If you are absent more than 3 **times** without any special circumstances, it will be considered unprofessional, and it will result in a disposition concern form. If you are absent 4 meetings or more, your course grade will be “F”.

Participation (30 points): You are expected to participate in class activities and discussions. In your actively mode of learning environment, you are not only reading what others had written (*receptive*) but also to write and to speak using your *expressive* language. Not only listen my knowledge about mathematics (*receptive*) but also engage in small –group discussion 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 me and from your course mates. **You will be asked to present solutions to the class, and your willingness to do so will be reflected in your grade. It is expected that you will present solutions and/or lead a discussion at least 6 times during the semester.**

Presentation (60 points): You will present **series of assigned projects as follow**

1. Article Presentations (20 points): You and your partner will be getting an article from **the Teaching Middle School Mathematic (NCTM)**, details will be presented later.
2. Problem Solving Project (15 points):
3. Math Games Presentations (10 Points)
4. Assessment Projects (15 points)

Read/Watch -Reflect (60 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 **four 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 Practicum Experiences (30 points): This course includes three practicum experiences. For each experience, your grade strand will write a lesson plan. More information about the content and grading will be provided

Practicum Experiences Summaries and Reflections (30 points): Right after the practicum experiences you will write a summary and reflection of your teaching. Information about the format and content of the summary and reflection will be provided.

Homework assignments (80 points): You will be asked to work on and hand in approximately ten paper homework assignments (activities from your textbook and sets of materials from my sources) which will give you the opportunity to solidify and further develop your understanding of ideas we will cover in class. More information about the assignments will be given with each assignment.

Content Post Test (50 points): You will be taken a pre- and post-version of the MCT tests. The pre-version will not be graded but the post-version will be graded, and it will be around the week 12-13 of this semester.

Weekly Quizzes (70 points): There will be quick weekly evaluations based on a weeklong topic (HW, and in-class materials).

In-Class Evaluation (60 points): There will be two in-class evaluations. Evaluations may be 50-minute length.

Mid-Term (50 points): There will be a cumulative test given (week 9-10). Study guide will also be provided.

Final Examination (100 points): The final examination time will be during finals week. More information about the content will be provided.

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.

MED 379 -Point Distribution (Dr. Kanbir)

Evaluation Item	Points (Max)
Participations	30
Presentations	60
Read/Write- Reflection	60
Practicum Lesson Plans	30
Practicum Summaries/Reflections	30
Homework- SETs	80
Weekly Quizzes	70
In-Class Evaluations (Two Evals)	60
Mid-Term	50
Content Post Test	50
Final	100
Total	600

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.
- All of this requires a level of focus that cannot be obtained while you are using your cell phone (including texting, social networking, playing games or browsing the internet) or Reading other material (including preparing for other classes). The use of a cell phone (which includes texting), reading other materials, and other unproductive and disruptive behaviors are considered unprofessional. **Cell phones must be out of sight.**
- UWSP is committed to providing reasonable and appropriate **accommodations** to students with disabilities and temporary impairments. If you have a disability or acquire an impairment or injury during the semester and you need assistance, please contact the * Disability Resource Center as soon as possible, in room 108 of the Collins Classroom Center (CCC), at 715-346-3365, or at DATC@uwsp.edu. You may also want to visit their website, [Disability Resource Center \(DRC\) - University of Wisconsin-Stevens Point \(uwsp.edu\)](http://www.uwsp.edu/dos/Pages/stu-academic.aspx).
- All students are expected to know the UWSP student **responsibilities** found on the Dean of Students webpage. Information on Academic Concerns is available at <https://www.uwsp.edu/dos/Pages/stu-academic.aspx>. Information on Conduct Concerns and on Personal Concerns are also available on the Dean of Students site.
- **Incompletes:** A grade of incomplete may be given when circumstances arise which are beyond the student's control, and which result in the student being unable to complete the course. A grade of incomplete will only be used if the student is passing when the circumstances arise.

In MED 379 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).

And, finally, 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. “they 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.

“Since 1980 when the National Council of Teachers of Mathematics (NCTM) published An Agenda for Action, which included the recommendation that “problem solving be the focus of school mathematics” (p. 1), classroom teachers and curriculum writers have attempted to put this recommendation into practice. My work as a mathematics educator continually illuminates the challenge of creating a classroom environment that embodies authentic problem solving. It seems that there exist barriers to a consistent and genuine practice of problem solving at all levels of mathematics education.”

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 PreK-5 mathematics, particularly in the domains of the number systems, counting and place values, whole number operations, algebraic reasoning, and problem solving as it relates to number and operations.
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 but 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)

“Not everything that counts can be counted, and not everything we count, counts.” – Albert Einstein