Northern Michigan University
Department of Mathematics & Computer Science
MA 354-01 Junior High School Mathematics Methods and Materials (10760)
F 8:00 – 9:40 WS 3806

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Office Hours: MWRF 12:00 – 1:00, or by appointment

*** ”Walk-in’s” are welcome as long as I do not have a prior commitment. E-mail is a good way to contact me to ask questions or voice your concerns related to the class.

Prerequisites:
Admission to the methods phase of teacher education, junior standing, and either MA 151 or ED349 (may be taken concurrently).

Course Description:
Examination of the current middle school curriculum and proposed curriculum revisions as well as effective methodology for this level. Field experiences are required.

Course Goals:
MA354 is designed for secondary education and elementary level mathematics majors and will address the teaching of mathematics at the middle school level, grades 6-8, with Standards-based emphasis. The mathematics curriculum will be examined with attention given to the special needs and characteristics of the middle school student. There will be a great emphasis on activity-based learning. A 9-10 hour field experience in a middle school, documented in a semester journal, is a required component of the course.

Through various reading and analyses, discussions, problem solving activities and interactions with middle school students and teachers, the students will begin to build a philosophical foundation for the teaching of mathematics in the middle school.

Course Objectives:
The students will:

A. examine the current middle school curriculum, the NCTM *Curriculum and Evaluation Standards*, Michigan Educational Assessment Program (MEAP) objectives as embodied in the *Michigan Curriculum Framework* and the NCTM *Principles and Standards of School Mathematics*;
B. examine and participate in different modes of instruction, including cooperative learning;
C. study different approaches to curriculum through the examination and analyses of current text series;
D. develop methods to teach problem solving strategies and investigative techniques;
E. explore verbal, concrete, pictorial, graphical, and algebraic models as ways of communication mathematics to middle school students;
F. examine the real numbers and various operations;

G. explore the integration of geometry into the middle school curriculum;
H. develop meaningful ways to use mental computation and estimation;
I. examine the role of various manipulatives in teaching middle school mathematics;
J. develop activities in quantitative literacy;
K. explore lab activities that involve the use of the tools of measurement and measurement systems;
L. examine algebraic models and special topics in algebra and their place in the middle school curriculum;
M. explore the use of technology in the classroom;
N. develop effective classroom management and planning techniques specific to the needs of middle school students.

Texts and Other Requirements:

1. *Principles and Standards for School Mathematics*, The National Council of Teachers of Mathematics, Reston, VA: 2000. Sign up for the 120-day free access to full document at http://standards.nctm.org/.
2. Download *Curriculum Focal Points for Prekindergarten through Grade 8* (full document) at http://nctm.org/standards/focalpoints.aspx?id=282 (50 pages).
3. *Michigan Curriculum Framework*. Information on the Framework is available at http://www.michigan.gov/documents/MichiganCurriculumFramework_8172_7.pdf.

Optional Requirements:

4. Become a member of the National Council of Teachers of Mathematics (NCTM) before the end of the term. The current cost of student membership is $38, which includes an online subscription to one school journal. Student membership applications are available on-line at http://nctm.org.

Appropriate Classroom Laptop Use:

Although having a laptop in class opens up new learning possibilities for students, sometimes students utilize it in ways that are inappropriate. Refrain from instant messaging, e-mailing, surfing the Internet, playing games, writing papers, doing homework, etc. during class time. Acceptable uses include taking notes and working on assigned in-class activities, projects, and discussions that may be enhanced by laptop use. It is easy for your laptop to become a distraction to you and to those around you. Inappropriate uses will be noted (silently) and will result in loss of a grade in participation points. If you use your laptop during class, you will be expected to email me the notes you typed in class at the end of the class period (I will not ask for them but will keep records of those who do/do not).

Assessment Format:

All written assignments are to be typed and submitted in hard copy form (not e-mailed). When you refer to a book, article, or other source, you <u>must</u> provide a <u>full</u> citation. When you use resources to generate ideas for lesson plans, etc., you must provide a citation. (If you are unsure what to include, look at the citations in our text. Web citations must be complete enough for me to easily access the same webpage.) Late assignments will be penalized 10% per day that they are not submitted.

I. Class Attendance/Participation (20%)

Since each class represents a significant amount of group discussion and interaction, it is essential for you to attend every class. In the event of an EMERGENCY, you will be expected to complete additional work to compensate for the absence. The make-up work for the class missed will consist of:

1. Development of an additional lesson plan *or*
2. Short written assignment on the subject(s) discussed in class during absence.

Class participation is expected. If you are preparing to be a teacher, communicating effectively with others in the classroom setting is critical to your professional development.

As part of your participation grade, it is expected that you will volunteer for one of the following opportunities.

- Science Olympiad at NMU on Saturday, February 9th (4 – 5 volunteers are needed). See http://www.soinc.org/events/metric/index.htm for more information.
- Minnesota Council of Teachers of Mathematics (MCTM) Annual Spring Conference in Duluth, MN; April 25 – 26 (2 – 3 volunteers are needed to present).

II. Field Experience (30%)

You must participate in all field work experiences. Please remember to wear professional attire while you are in the schools. At a minimum, this means no shorts or blue jeans. Also, you will be expected to wear a name badge identifying you and your affiliation at all times. You will be expected to know and follow any additional rules required by the school. You are required to keep a journal that includes detailed descriptions of what you learned during each of your classroom visitations. Below are questions that you may use as a guide in writing your journal descriptions.

Questions:

1. What are the physical and non-physical attributes of the learning environment? Do you think they were conducive to learning? Why or why not?
2. How does the teacher open or begin the class?
3. What do you perceive the objective(s) of the lesson to be?
4. Which ideas outlined in the Michigan Curriculum Framework are emphasized?
5. How does the teacher assess whether or not the objectives have been met?
6. How does the teacher motivate the students for the lesson or individual activities?
7. What classroom management techniques does the teacher use?
8. What teaching strategies does the teacher use?
9. What nonverbal forms of communication, including classroom arrangement, body language and the teacher's movement around the room, are employed?

10. How does the teacher provide for students who complete tasks quickly as well as work with students who need individual help?
11. What is the teacher's general professional attitude towards the students?
12. What, if any, (a) technology-related learning experiences, (b) other instructional aids (manipulatives), and (c) collaborative learning strategies are utilized?
13. How does the teacher end the class?
14. How does the teacher address different student learning styles?
15. What might you consider doing differently if you taught the lesson?

III. Instruction and Classroom Management Plans (30%)

A variety of lesson plans will be developed that coincide with the Michigan Curriculum Framework and the NCTM Principles and Standards. If time permits, you will have the opportunity to participate in mini-teaching one of your lessons to your peers in the class.

You will develop a plan on classroom management that focuses on management strategies you can use solely in your classroom without relying on outside support. There are many texts available that have strategies outlined on which you may base your plan (e.g. *Discipline with Dignity* by Richard L. Curwin and Allen N. Mendler, Association for Supervision and Curriculum Development, Alexandria, VA, 1999. ISBN 0-87120-357-X). There will be time in class for you to share your plan and also provide feedback on plans of other students.

IV. Final Exam (20%)

- The final exam will be a take-home exam and will be distributed on our last class day. It is due on or before the date of our scheduled final exam, which is Friday, May 2 (10:00 – 11:50am).
- Failure to answer all questions on the final exam will result in one whole letter grade lower than your earned grade (for example, an A would be reduced to a B). In addition, the instructor reserves the right to reduce the student's grade if the final exam contains too many errors.

The quality of our public education system depends in large measure on the quality of classroom teaching. You will be the model of excellence and professionalism for your students. As you complete each assignment, imagine that it will be reviewed not only by me, but also by prospective employers and parents of your future students. Please strive for excellence – not just go through the motions to complete a program requirement.

Grading Scale (%): Your course grade will be based on the percentages outlined under Assessment Format. Corresponding grades as a percentage of the total are listed below.

100 – 93.0: A	86.4 – 82.5: B	76.4 – 72.5: C	66.4 – 62.5: D
92.9 – 89.5: A-	82.4 – 79.5: B-	72.4 – 69.5: C-	62.4 – 59.5: D-
89.4 – 86.5: B+	79.4 – 76.5: C+	69.4 – 66.5: D+	59.4 – 0: F

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