Northern Michigan University  
Mathematics and Computer Science Department  
MA 354-1 Methods and Materials in Teaching Middle School Mathematics (11716)  
M 2:00 – 3:40pm  
WS 3616

**Instructor:** Dr. Carol Bell  
**Office:** Jamrich 2212  
**Office Phone:** (906) 227-1603  
**email:** cbell@nmu.edu  
**Office Hours:** MF 12:00-1:00, WR 2:00-4:00, 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 MA250 and MA251 (elementary education majors); or at least two mathematics courses at the 300-level or above (secondary education majors). ED 349 should be taken concurrently or have been completed already.

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

**Texts and Other Requirements:**  
2. You must have access to the NCTM Principles and Standards. Choose one of the following:  
   - Sign up for the 120-day free trial at [http://standardstrial.nctm.org/triallogin.aspx](http://standardstrial.nctm.org/triallogin.aspx)  
   - Become a member of the National Council of Teachers of Mathematics (NCTM). The current cost of student membership is $44, which includes an online subscription to one school journal and access to the e-Standards. Student membership applications are available on-line at [http://www.nctm.org/membership/content.aspx?id=7618](http://www.nctm.org/membership/content.aspx?id=7618)  
4. In place of two classes (01/19 and 02/23), we will be participating with the Math Teachers Circle on Friday, January 23, 6:00pm and Sunday, February 22, 4:00pm. Each place is TBA. If you are unable to make one or both of these alternate class periods, please see me for an alternate assignment.

**Course Goals:**  
MA354 is designed for 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 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.

**Learning Outcomes:**
Upon successful completion of this course, a student should be able to:
1. Examine the changing emphasis of the curriculum as described in current and relevant publications such as the "Agenda for Action", and NCTM's "Curriculum and Evaluation Standards for School Mathematics" and "Principles and Standards for School Mathematics"
2. Use an active, hands-on approach in the teaching of mathematical concepts
3. Develop a repertoire of examples, models, activities, and games for teaching middle school mathematics
4. Use manipulatives and models to help develop mathematical concepts
5. Integrate problem solving into the teaching of middle school mathematics
6. Identify the role of technology in the teaching of middle school mathematics
Evaluation of these learning outcomes will be done through assignments, field experiences, and the final project.

**Assessment Format:**
All written assignments should be submitted in hard copy form (not e-mailed). When you refer to a book, article, or other source, please provide a full 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 examples provided on the library’s web site.) Late assignments will be penalized 10% per day that they are not submitted.

I. **Class Attendance/Participation (10%)**
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.

You will also be expected to participate in online discussions based on assigned text readings.

II. **Problems and Activities (25%)**
Several mathematics problems or activities will be assigned throughout the semester. The purpose of these problems and activities is to help you gain a deeper understanding of different mathematical concepts and to get you to think about mathematics in a problem-solving context. Solutions should be neat and organized, just as you would write solutions for your own students.

III. **Lesson Plans and Peer Teaching (30%)**
A variety of lesson plans will be completed that coincide with the Common Core State Standards and the NCTM Principles and Standards. If time permits, you will have the opportunity to participate in mini-teaching some of your lessons to your peers in the class. Each of you will be given a mathematical concept to research and then teach to the class.

IV. **Field Experience (10%)**
You must participate in all field work experiences. If you are participating in a middle school field experience for another course, it is not necessary to obtain placement in a different school. If you do not have a field placement, let me know so that I can contact schools to get you a placement. When you are visiting schools, please remember to wear professional attire. At a minimum, this means no sweats, shorts or blue jeans and no open-toed shoes. 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.
required to submit a write up that includes detailed descriptions of what you learned during each of your classroom visitations. The field work assignments should be submitted after each time you do a classroom visitation. No field work assignments will be accepted after April 13, 2015. See the last two pages of the syllabus for additional information about the field work assignments.

V. Final Project (25%)
The final project will be presented in class on our last class meeting or during final exam week.

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 weighted percentage of the total are listed below.

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 95.0</td>
<td>A</td>
</tr>
<tr>
<td>94.9 – 90.5</td>
<td>A-</td>
</tr>
<tr>
<td>94.9 – 90.5</td>
<td>B+</td>
</tr>
<tr>
<td>89.4 – 86.5</td>
<td>B</td>
</tr>
<tr>
<td>76.4 – 72.5</td>
<td>C</td>
</tr>
<tr>
<td>66.4 – 62.5</td>
<td>D</td>
</tr>
<tr>
<td>59.4 – 0</td>
<td>F</td>
</tr>
</tbody>
</table>

NMU’s Non-Discrimination Statement
Northern Michigan University does not unlawfully discriminate on the basis of race, color, religion, sex, national origin, age, height, weight, marital status, familial status, handicap/disability, sexual orientation, or veteran status in employment or the provision of services, and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities.

Anyone having civil rights inquiries may contact the Equal Opportunity Office, 502 Cohodas Hall, telephone number 906-227-2420.

Disability Services
If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office by: coming into the office at 2001 C. B. Hedgcock; calling 227-1700; or e-mailing disserv@nmu.edu. Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

Important Deadlines:
- Last day to drop with 100% refund (No grade): Monday, January 12, 5:00p.m.
- Last day to drop with "W" grade: Friday, March 27
Guidelines for Field Work Assignments

You will be required to log your time and complete field work assignments that describe what you did and learned during your experience (e.g., what strategies did you use to help the students, what mathematics did you teach and learn, how did the session help you grow as a professional). There are many things that you might do in your field experience that will aid in your understanding of working with middle school students. At a minimum you should do the following: (1) observe classroom teaching, (2) work with diverse learners, (3) work one-on-one with a student, (4) teach a lesson developed with guidance from your host teacher, and (5) observe in a class in another grade. Below are questions or descriptions of what to include when writing your field work assignments. Your write up should be in paragraph form rather than numbered according to the questions provided.

Questions for classroom observations:
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 Common Core State Standards 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?

Questions for teaching a lesson:
1. What type of feedback or comments did your host teacher provide on your lesson plan?
2. Did your host teacher give you any reminders before you began teaching?
3. Describe the classroom learning environment.
4. What happened during the first few minutes of class before you began your lesson?
5. How did you introduce the lesson topic?
6. Did it appear that students were on task and understand the concepts you were teaching? What questions did the students ask you?
7. How did you summarize the lesson?
8. What happened during the last few minutes of class after you finished your lesson?
9. What verbal feedback did your host teacher give you afterwards?
10. Describe what went well and what you need to improve upon.
Description for working one-on-one with a student:
Provide a description of the mathematical background of the students with whom you worked, where your tutoring experience occurred, and what mathematical concepts you taught the student(s) including details of how you helped the student(s) gain a better understanding of those concepts. Include at least one example of success while working one on one with students and one example of what you need to improve upon. Explain how you think this experience contributed to your professional growth.

Description and questions for working with diverse learners:
Observe or work with students who have special needs (child at risk, ESL, ADD/ADHD, math anxiety, etc.). Below are a set of questions for you to consider for this reflection. Keep in mind that you should first spend time observing diverse learners in the classroom and then work with them as a group, with an aide, or one on one in order to gain more insight for working with students with special needs.

1. Describe the particular behaviors of the student that he or she seems to have difficulty self-managing.
2. If you observed the student in more than one subject area, did the student display different behavior patterns in different content area classes?
3. Did you recognize any discipline strategies implemented by any of the teachers to assist the student in managing his or her behavior?
4. If you observed the student during lunch, how did he or she interact with peers?
5. How did the student behave during a student-centered activity?
6. How did the student behave during a teacher-led activity?
7. Which learning style do you perceive this child to do best in (e.g. tactile/kinesthetic, auditory, visual)?
8. Did you notice any one in particular situation that triggered the student’s misbehavior, if observed?
9. Overall, what have you learned about students with special needs and their behavior through observing this student?
10. If you had a chance to work one on one with the student(s), describe the strategies that you used to help them better learn the concepts.