**Northern Michigan University**
**Department of Mathematics & Computer Science**
**Mathematics for the Elementary School Teacher I**
**MA 150-01 (80856) MWRF 12:00 – 12:50 WS 3806**
**MA 150-02 (80857) MWRF 2:00 – 2:50 WS 3616**

**Instructor:** Dr. Carol Bell **Office:** New Science Facility 1113
**Office Phone:** (906) 227-1603 **email:** cbell@nmu.edu
**Office Hours:** MWRF 1:00 – 2:00, 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:** A grade of "C" or better in MA 100 or equivalent recommendation on the mathematics placement exam.

**Course Description:** This course is designed to examine elementary school mathematics from an advanced standpoint. The emphasis is on the development of the system of real numbers and the language, models, concepts, and operations associated with it. Quantitative thinking skills are developed through applications and problem solving situations. In this course, the students will:

A. compare the characteristics of different numeration systems from a historical perspective;
B. examine the structure and properties of whole numbers, integers, rational numbers, and real numbers;
C. develop concrete and conceptual models for each of the operations and their algorithms;
D. focus on problem solving and a variety of strategies for solving problems;
E. develop skills for applying number theory to elementary school mathematics;
F. use mental computation and estimation in appropriate situations;
G. use technology as a tool in problem solving;
H. extend the process of mathematical proof through logical, intuitive reasoning.

**Text and Other Requirements:**

- *Mathematics for Elementary School Teachers* (ISBN-13: 978-0-618-76836-3), Fourth Edition, by Bassarear, Houghton Mifflin Company, 2008.
- A scientific calculator may be useful for solving some of the problems.

**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).

**Course Goals:** You will develop more competence with respect to the abilities articulated in the program standards outlined in the *Principles and Standards for School Mathematics* published by the National Council of Teachers of Mathematics. That is:

- ***Mathematical problem solving:*** You will become a more powerful and more confident problem-solver.
- ***Mathematical reasoning and proof:*** Your ability to use reasoning – deductive, inductive, and intuitive – will grow, and you will be able to explain your solution paths.
- ***Mathematical communication:*** You will appreciate the role of discussion in learning mathematics, and you will appreciate the value of vocabulary and notation as tools, which makes communication easier.
- ***Mathematical connections:*** You will be more aware of connections between various mathematical topics and of connections between mathematics and other areas.
- ***Mathematical representation:*** You will increase your ability to represent problems in effective ways.

There are three important levels of mathematics competency required for you to become an excellent elementary mathematics teacher. The three levels are identified below.

Level 1 – Mechanical Ability (Can you **do** it?)

For example, can you solve this proportion for the missing term? $\frac{x}{13} = \frac{1}{2}$

Level 2 – Comprehension (Do you know **why**?)

For example, would the previous proportion help you solve the problem of how many female ducks there are in a flock of 13 ducks if you know that 1 out of every 2 ducks in this flock is a female?

Level 3 – Communication (Can you **explain** it to your students?)

For example, do you know the rules and vocabulary, and can you apply them accurately to teach someone to solve the word problem above who does not already know how?

**Assessment Format:** Described below are the components on which you will be assessed throughout the semester.

- **Problem Sets (30% - 20% written and 10% presentation):** Exercises from the concepts discussed in class will be assigned regularly. There are two components that you will be graded on for each problem set: written work turned-in and presentation of exercises to the class. All problem sets will have two deadlines: presentation and written work to be turned-in.

Written Work

All written work must be neat, organized, and may not be submitted on spiral notebook paper. The instructor reserves the right to make you re-submit your written work, if it is not legible and organized. Past-due assignments will be penalized 50% and will be accepted only up to one class period after the original due date for written work to be turned-in. The lowest problem set (written work turned-in) will be dropped.

Presentation

Part of your overall problem set grade will be based on your ability to present exercises to the class at the board. Beginning the class period following a problem set assignment, any student who is able to work one or more of the exercises will present a solution to the class at the board. It is possible that more than one method exists for solving the problem. In this case, several presentations of the same exercise are possible so different students may do a presentation of the same problem. Exercise presentations are worth 2.5, 1.5 or 0.5. A grade of 2.5 will be awarded if you give a correct explanation and solution. A grade of 1.5 will be awarded if you give a correct solution, but not a very good explanation. A grade of 0.5 will be awarded if you do not give a correct solution, and a score of 0 will be given if you do no presentations. You may not ask the instructor for help on any exercises prior to the presentation deadline. This is to help you gain confidence in your own mathematical abilities and to help you improve your abilities to explain mathematical concepts. You are required to do a minimum of four problem presentations. The four best problem presentations will be used to determine your presentation grade. Additional problem presentations beyond the required four presentations that are graded as 2.5 will count toward a percentage of extra credit.

- **Projects (30%):** Throughout the semester you will be given several projects that emphasize mathematical thinking (conceptual understanding) and writing.

- **Journal Assignments (10%):** Throughout the semester you will be given four journal assignments that emphasize your interpretation of a given situation. It is suggested that you type your journal assignments, but a neatly written paper is acceptable as long as it is not on spiral notebook paper (no jagged edges). The instructor reserves the right to make you re-submit any journal assignment that is not legible. Each journal assignment turned in will be graded as 2.5, 1.5 or 0.5. A grade of 0 will be assigned, if you do not turn in the assignment. You may re-submit the assignment only if you receive a 0.5. In this case, the maximum grade you can receive is a 1.5.

- **Examinations (30%):** Each exam will consist of questions from the material discussed in class. A university-approved excuse is generally a prerequisite for rescheduling any exam. The final exam date and time are noted below and are also available online.

  Section 01 (12 – 12:50) Tuesday, December 11, 12:00 – 1:50
  Section 02 (2 – 2:50) Wednesday, December 12, 2:00 – 3:50

**Grading Scale (%):** Your course grade will be based on your total number of points as a percentage of the total possible points for the semester. Percents and corresponding grades are listed below.

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|---|---|---|---|
| 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: E |

**Attendance:** You are strongly encouraged to attend each class. The objective is to increase your mathematics knowledge base and that is very difficult to do if you are not attending and participating. Much of what you learn will evolve from in-class explorations, experiences, and discussions. Each student, present or not, is responsible for all directives announced in class.

**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.

**ADA Statement**
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.

*There is a lot of evidence that a very beneficial way of learning mathematics is to learn to talk about mathematics. Study groups are a great way to learn mathematics! Collaboration on assignments is suggested and recommended.*