Math 125: Topics in Mathematics for Teaching
Spring 2012 Syllabus

Class Meetings:	PPHAC 232
	MWF 1:10pm–2:20pm
Office Hours:	PPHAC 215
	Tue 10:15-11:45am, Wed 8:30-10:00am, *or by appointment*
Instructor:	Kevin Hartshorn
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Website:	http://math.moravian.edu/hartshorn/125

1   Required Materials

The text for this course is *Mathematics for Elementary Teachers* by Musser, Burger and Peterson, Ninth Edition.

You may find it useful to have a basic calculator in this course. The calculator included in most cell phones, Androids, and iPhones will be sufficient. Note that for exams, you will not be allowed to use your cell phone or similar device.

2   Goals and Objectives

The primary goals of this course are to provide a deeper understanding of mathematical concepts, methods of reasoning, and techniques of calculation that are taught in the elementary grades. Specifically, a successful student will be able to:

- use the mathematical content of this course to model and solve realistic problems;

- use mathematical reasoning to find patterns, make and test conjectures, and create simple proofs of find counterexamples to prove or disprove these conjectures;

- communicate results and conjectures using words, tables, symbols, and graphs;

- make connections between mathematical topics and other areas of mathematics, other disciplines, or situations in daily life;

- use technology as a tool to help solve problems;

- use visual and tactile aids (manipulatives) to make mathematical concepts more concrete;

Topics will include: sets, whole numbers, properties of numbers, fractions, decimals, numerical operations, decimals, ratios, proportions, percent, integers, statistics, and geometry. The precise coverage of topics will depend on the progress of the semester.

3   Grading and Assessment

Your course grade will be computed based on a raw percentage score, broken down as shown in the table below. Note that these numbers are to serve only as a general guide and your grade may be adjusted based on the judgement of your professor.

20%	Written homework submissions
20%	Class engagement (quizzes, worksheets, reading reflections)
10%	Culture Points (average of 6 submissions)
5%	Mental math development
10%	Midterm 1 (Wednesday, February 8)
10%	Midterm 2 (Friday, March 2)
10%	Midterm 3 (Wednesday, April 11)
15%	Final Exam (Thursday, May 3, 1:30pm)
100%	**Total**

When computing your score at the end of the semester, an A (+ or –) is typically given to a score of 85% or above, a B (+ or –) to a score between 70% and 85%, a C (+ or –) to a score between 60% and 70%, and a D (+ or –) to a score between 50% and 60%. These values are subject to change and are meant only as a rough guideline, and the final assignment of grades will be determined based on the performance of the entire class and the judgement of the professor.

Except for the midterms and final exam, all assignments in this course will be scored on a 10 point scale.

3.1   Written homework submissions

Problem sets will have two parts: ungraded computational practice and graded conceptual problems. Your reflection on the computational practice problems will count as one problem in the homework set.

Computational Practice

Solutions for the computation problems will be posted on the class web page 24 hours before the due date. Use these solutions to check your work.

I will not grade the problems in this section. Instead, you will be asked to write a half-page reflection on your work on the problems. The reflection should discuss how well you did on the problems and what troubles you encountered. If there is something in these problems that you feel I should know about or that gave your particular trouble, use the reflection to let me know.

Conceptual Questions

There will be a small selection of conceptual questions for you to answer. Each question will be graded on a 3-point scale (3 = excellent work, 2 = satisfactory work, 1 = inadequate response, 0 = no meaningful response).

Homework Presentation

As you complete your homework, please keep in mind the following points. Failure to do so will result in a penalty to your homework grade or a zero for the assignment.

1. Your work must be *neat* — do not give me your scratch work. After solving the problem, *rewrite* the problem on a fresh sheet of paper.

2. You must write the answers *in order* and use a *single column* format in your writing.

3. Homework with multiple pages must be stapled (not folded together). Staplers can be found in the Math/CS reading room (PPHAC 238) or the Math/CS office (PPHAC 216).

4. Paper must be neat and appropriate for a college-level course. Do not submit paper with torn edges or ratty ends.

When in doubt, remember that this is a college-level class that is preparing you for a profession. You need to practice presenting yourself and your work in the best possible light.

3.2   Classroom Engagement

Mathematics cannot be learned passively — you must actively engage the readings, the class discussions, and the homework sets. Most days I will collect some writing or worksheet reflecting your work for the day, which will count toward your class participation grade. This may be a quiz based on the reading, a worksheet completed in small groups, or an end-of-class summary of the day's work.

If you miss class, you cannot get credit for this assignment, regardless the reason for your absence.

3.3   Culture Points

There will six "culture point" assignments. These are opportunities for you to find connections between the mathematics we are learning in class and the world around us. For each assignment, you will find information related to mathematics and teaching. On completing the reading/activity, you will write a short response for submission.

The six assignments are:

1. *Math anxiety* (due Fri., Jan 27): You will find an article or essay that addresses the phenomenon of "math anxiety." Your submission should include a reflection of how you have personally seen math anxiety play out in class. You could reflect on your own anxiety, the impact one of your teachers/professors has had on math anxiety, or issues a friend/classmate has had with math anxiety.

2. *Cultural or historical mathematics* (due Fri., Feb 10): You need to find an article or essay that talks about mathematics in a cultural or historical setting. This could be a biography of a mathematician, comparisons of mathematics teaching in different countries, the role of mathematical thinking in a cultural activity (e.g.: quilting, baseball statistics, election predicitions), etc. Your submission will reflect on how you might think about the mathematics we are learning in this course as a part of your cultural education.

3. *Gender/race/status in mathematics* (due Fri., Feb 24): There are a lot of questions and challenges on the topic of mathematics and social inequality. Why do certain minorities seem to score lower on mathematics exams? Why are so many mathematics professors male? What role does poverty play in mathematics education? Your article can address any related issue on race, gender, or social inequality, but it must specifically address the question of learning *mathematics*. In your submission, you need to reflect on your own interpretation of the issue.

4. *Mathematics in the media* (due Fri., Mar 16): Portrayals of mathematics, mathematicians, and mathematics education can be found in many movies (*21*, *A Beautiful Mind*, *Stand and Deliver*) and television shows (*Simpsons*, *Numb3rs*). Pick one such example. In your submission, discuss the portrayal. Do you find it realistic? How do you think it impacts the public's view of mathematics?

5. *Mathematics and technology* (due Fri., Apr 4): Computers, the web, smartphones, the iPad. The advent of new technology has raised interesting questions about what we need to learn in mathematics and how best to accomplish that learning. Find and discuss an article that examines the impact of new technology on the teaching, learning, or necessity of mathematics.

6. *Open choice* (due Fri., Apr 27): Choose any one of the above topics. Find a new source to meet the requirements of the project and write a summary as required for that topic.

For each assignment, you will receive a sheet providing more complete details on what is required, as well as suggestions on where you might find appropriate resources.

3.4   Mental Math Development

Even with calculators and computers, the ability to quickly do mathematical computations in your head is important. Whether you are trying to quickly compute the tip at a restaurant, estimate the current average of your grades, determine to total cost of the items in your

shopping cart, or estimate whether you have enough gas to reach your destination, you will be well-served in performing these calculations mentally, rather than having to pull out your calculator.

Throughout the semester, we will having Mental Math Practica. Each will be a list of 50 math problems that you need to solve mentally That means no scratch work and no calculators. You will be given 10 minutes to answer as many of the questions as you can — I do *not* expect everyone to finish the practica.

Your score for each practicum will be computed as follows:

- Each correct answer gets 2 points.

- A correct answer with scratch-outs, erasures or scratch work gets 1 point.

- Each blank answer gets 0 points.

- Each incorrect answer gets −2 points.

We will discuss as a group how the practica score will translate to a grade for the class.

3.5   Midterms and Final Exam

The midterms will be in-class exams on **Wednesday, February 8**, **Friday, March 2**, and **Wednesday, April 11**. The final exam will take place on **Thursday, May 3 at 1:30am**. All will be closed book, although the specific constraints for the exams will be outlined as the time approaches.

Calculators may be used on the exam. HOWEVER: calculators must only include basic functions (no programmable calculators or graphing calculators allowed) and cannot have internet or cellular access (no cell phones, smart phones, iPods, etc.). A limited number of calculators will be provided on a first-come, first-served basis.

4   Other Issues

4.1   Class attendance

You are expected to arrive on-time and prepared to every class meeting. As a general rule, I do not distinguish "exused" and "unexcused" absences.

- If you miss a class for any reason, you will get a zero for the classroom engagement score for the day.

- *You are responsible* for any class information provided in class. If you know that you will be missing a class (due to sports or other activities), let me know ahead of time. If there are special activities/handouts/etc. for that class, we can arrange to get you the information to help prepare for the next class.

- If you know that you will be missing a midterm, be sure to inform me as soon as possible so that we can discuss possible alternatives. Note that family vacations or personal travel plans are *not* valid reasons to reschedule a midterm.

- *Get to know your classmates!* If you will miss a class on a day that homework is due, have a classmate bring your homework in for you. As a rule, late work will not be accepted. Note that you can submit work via e-mail from home.

- If you miss more than 3 classes during the semester — for *any* reason — you will get an automatic 5% penalty on your final course grade. Each additional absence, regardless the reason, will accrue an additional 5% penalty to the final course grade.

- There will be no class on Friday, March 30, due to the art department's trip to New York City. You are *not* required to attend this trip.

4.2   Academic Honesty

Students are expected to adhere to the Academic Honesty policy as described in the Student Handbook (http://www.moravian.edu/studentLife/handbook/academic/academic2.html). Any violations of this will result in severe penalties on the assignment, a report to the Dean, and the very real possibility of failing the course.

Working together

When faced with difficulty in mathematics, it helps to work through problem with a colleague. I welcome and encourage you to work with friends, tutors and myself in working through the reading and completing homework assignments. In the first weeks of class, I will encourage you to exchange e-mail address or cell phone numbers.

When you work through the problems connected with each reading, you are welcome and encouraged to work with your friends and classmates. Feel free to exchange ideas as your work through the reading problems.

HOWEVER: when writing your homework response, you must *work on your own*. The final response you write on your homework should be yours and yours alone. I recommend that while you may complete the scratch work for all of your homework with a classmate, you should write the final copy of your homework when you are alone.

4.3   Learning Disability Accommodations

Students who have documented learning disabilities and wish to request accomodations for this class should contact the Learning Services Department. Accommodations cannot be provided unless official documentation is received from the appropriate campus office.

4.4   Final reminders, tips, and disclaimers

- **Visit my office:** I am more than happy to help work through the readings, address any questions you have about the problem sets, or talk with you about the progress of the course. Feel free to stop by to ask questions about being a mathematics major, about life at Moravian, or just to let me know what's on your mind.

  You can also communicate with me via e-mail (hartshorn@math.moravian.edu).

- This syllabus is subject to change through the semester. The most recent version of the syllabus can be found at `http://www.math.moravian.edu/hartshorn/125/`.

- Final determination of your course grade is subject to my discretion as professor of the course.