

Syllabus for MA 125 - 02
Math in the World
Dr. Joe A. Stickles, Jr.
Spring 2008

Situation: To finance your education, you accumulate \$50,000 in student loans. If the interest rate is 6% per year and the repayment period is 10 years, how much interest will you pay on this loan?

We will answer this and many other questions using mathematical techniques you probably have not seen before. Other questions we might encounter this semester include:

- Approximately how pennies would you need create a stack of pennies one mile high?
- In a survey of 100 people, 11 like Coke, Pepsi, and Sprite; 13 like Pepsi and Sprite, but not Coke; 19 like only Coke and Sprite, but not Pepsi; 59 like Coke; 51 like Pepsi; and 25 like Sprite. How many people like Coke and Pepsi but not Sprite?
- If all mathematicians are eccentrics, and if all eccentrics are rich, does it follow that all mathematicians are rich?
- How have other cultures expressed the idea of numeration?
- How are different bases of counting systems used in computers?
- If a cubit is the distance from your elbow to your fingertips, what would be a rough estimate of the dimensions and volume of Noah's Ark?
- If 1 pound of seed costs \$5.85 and covers 150 square feet, how much would it cost to seed a rectangular lawn that measures 100 ft by 30 ft?
- You finance a \$285,000 home for 30 years. If the loan has an interest rate of 8%, how much interest will you pay to the bank?
- If you want to retire in 40 years with \$1,000,000 in the bank, how much should you deposit each month into an account earning 5% interest compounded monthly?
- A \$25,000,000 lottery prize is to be paid in \$1,000,000 installments over the next 25 years. If the current rate of return is 10%, what is the present value of this prize?
- A game involves drawing a single card from an ordinary 52-card deck. You receive \$0.50 if you draw an ace, you receive \$0.25 if you draw a face card, and you receive \$1 if you draw the two of spades. If it costs \$0.10 to play this game, would you expect to win or lose money over the long run?
- How many seven-digit phone numbers are there possible in a single area code?
- What is the difference between measures of central tendency and measures of dispersion?
- Is grading on a curve fair?

Important Information

Instructor: Dr. Joe A. Stickles, Jr. (PLEASE call me Joe!)
Office: SH 203C
Office Hours: 10-11 T, 1-3 MTW, by appointment, or any other time
I am in my office
Office Phone: 424-6290
E-Mail: jstickles@millikin.edu
Homepage: <http://faculty.millikin.edu/~jstickles>
Textbook: *Mathematics beyond the Numbers* by Gilbert and Hatcher
Calculator: A scientific calculator is required.

Catalog Description: Surveys and explores a broad spectrum of mathematical topics with an emphasis on observing the many practical uses of mathematics in our modern society. Concentrates on mathematical literacy, not manipulative techniques. Topics have included voting methods, apportionment, money, paths and networks, tilings and polyhedra, fractals, codes, game theory, environmental mathematics, and ethnomathematics.

Quantitative Reasoning Goals: A student who successfully completes a Millikin QR course will demonstrate the ability to:

1. use deductive reasoning in a formal, symbolic, axiomatic system, and
2. apply the theorems of the system to solve appropriate problems.

The learning goals of the quantitative reasoning requirement are part of broader aims of this requirement. Through this requirement Millikin hopes to:

- (a) To offer the basic quantitative reasoning skills necessary for success in every profession. All work involves understanding the basics of numerical, statistical, or logical analysis. This type of thinking is fundamental to understanding the world and no career is exempt from this way of knowing.
- (b) To prepare students to be competent citizens by developing the quantitative skills necessary to understand fundamental reasoning that involves numbers, statistics, or logical reasoning. Citizens must be able to understand e.g., graphs, detect faulty statistical analysis, or spot basic flaws in reasoning. These courses serve democracy by developing such skills.

Course Description: This course is designed to introduce non-majors to topics of mathematics they probably have not seen before and to topics that pertain to everyday scenarios. In addition to being able to solve the problems posed on the front page and other application problems, students should be able to use mathematical notation and terminology correctly, to understand the underlying fundamental principles of the material covered, and to show they have learned the material suggested by the catalog description at the completion of this course.

Instruction: All days will begin with a hearty “Hello!” from your instructor and a short discussion on how things are going. Most days will include a lecture of new material. Many examples and exercises will be worked during this time. Students are greatly encouraged to ask frequent questions during this lecture time. Class discussions on topics will also occur frequently, and students will be allowed from time to time to work on exercises in groups during class time.

Prerequisites: MA106 or placement score of at least 3

Expectations: Here are some of the things you can expect from me:

- An occasional bad joke (usually a math pun) to lighten the mood
- Enthusiasm for the material
- A desire to help you any way I can in and out of class

Here are some of the things I expect from you:

- High standards for your work
- High standards for my teaching
- Hard work
- Having fun

Grading: The weights in determining your final grade are as follows:

Reading assignments	10%
Quizzes and projects	20%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	25%

Reading assignments are given over the section to be covered during the next lecture. They are designed to familiarize you with the terminology, notation, and concepts in that section. The word “quiz” may mean a variety of things - an announced in-class quiz, an announced in-class homework quiz, an in-class group activity, an out-of-class activity, or a take-home quiz. There will be several of these given during the course of the semester. The projects are meant to acquaint you with some aspects and applications of mathematics we will not have time for in lecture. They may be individual or collaborative in nature. Hopefully, you will find these projects fun and enlightening. Ungraded homework will typically be assigned daily. The problems on the homework quizzes will be taken directly from these ungraded homework problems. Also, many questions on the quizzes and exams will be strikingly similar to those given in the homework. Exam dates will be announced in class, and they will be announced at least one week in advance.

Make-ups: No late work will be accepted **for any reason**. No make-ups for in-class quizzes or exams will be given **for any reason**. If you miss class for a documented, university-approved, excused absence (e.g., sickness requiring you to see a doctor, death in the family, etc.), you will be excused from turning in any assignment due that day (except for projects) or from taking an exam you missed. In these cases, you **MUST** e-mail or call me **BEFORE** class begins to let me know of your situation, and you **MUST** provide documentation that the absence is an excused absence. In case you miss an exam, your score on the final exam will replace that score.

Please note that a university-sponsored trip does **NOT** fall under these guidelines. If you know you are going to miss class for a trip, you **MUST** turn-in any assignment that will be due while you are gone **BEFORE** you leave, and you **MUST** take any exam you will miss **BEFORE** leaving.

Grading Scale: The grading scale is anticipated to be as follows:

Percentage (x) of Points Earned	Grade	Percentage (x) of Points Earned	Grade
$90\% \leq x$	A	$60\% \leq x < 70\%$	D
$80\% \leq x < 90\%$	B	$60\% > x$	F
$70\% \leq x < 80\%$	C		

I may change the cutoffs to be lower than they appear, but they will be no higher. Plus and minus grades will not be assigned until the end of the semester, and they will be used only in borderline situations. Your lowest three reading assignment scores and your lowest three quiz scores will be dropped. **Absolutely no project scores will be dropped.** The lowest of your three exam scores will be replaced by your final exam score if your final exam score is higher than this lowest score. If your final exam score is the lowest score, then all grades will stand as they are; none will be replaced.

Participation and attendance are not explicit parts of your grade. However, in borderline cases I may raise your grade to the next level if you have been to class and participated regularly. For example, you have a 78% at the end of the semester. You have been in class every day and participated regularly in class. I would be inclined to assign you a grade of B- instead of C+. I will NOT lower anyone's grade due to lack of attendance or participation. For example, if you earn an 80% in this class, you will get a B, no matter what your attendance record. Of course, my hope is that class will be so much fun you would not dream of missing it!

Studying: You will need at least 6 hours per week of study in addition to the 3 contact hours to aspire to a good grade in this course. Please give yourself even more time than that to study for exams and to do your homework. This course moves at warp speed. So, it is very hard to catch up if you get behind. I cannot encourage you enough to come to my office hours when you have questions about what when on in class or about the homework. Mathematics requires practice and repetition to understand and master, and you cannot expect only attendance at lecture to get you through.

Disability Accommodation Policy: Please address any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. If you are seeking classroom accommodations under the Americans with Disabilities Act, you should submit your documentation to the Office of Academic Development at Millikin University, currently located in Staley Library 014.

Academic Honesty Policy: All students are expected to uphold professional standards for academic honesty and integrity in their research, writing, and related performances. Academic honesty is the standard we expect from all students. Read the Student Handbook for further details about offenses involving academic integrity at: http://www.millikin.edu/handbook/judicial_system.asp. Staley Library also hosts a web site on Preventing Plagiarism, which includes the complete university policy. It is located at: http://www.millikin.edu/staley/research/prevent_plagiarism.asp. Visit and carefully read the Preventing Plagiarism web site.

The Faculty has the right and the responsibility to hold students to high ethical standards in conduct and in works performed, as befits a scholar at the university. Faculty members have the responsibility to investigate all suspected breaches of academic integrity that arise in their courses. They will make the determination as to whether the student violated the Academic Integrity Policy. Should the faculty member determine that the violation was intentional and

egregious, he or she will decide the consequences, taking into account the severity and circumstances surrounding the violation, and will inform the student in writing, forwarding a copy of the letter to the Registrar and to the Dean of Student Development.

This letter will be destroyed when the student graduates from the University unless a second breach of integrity occurs, or unless the first instance is of sufficient magnitude to result in failure of the course, with an attendant XF grade recorded in the transcript. If an XF is assigned for the course, the faculty letter of explanation becomes a permanent part of the student's record. If a second violation occurs subsequent to the first breach of integrity, the Dean of Student Development will begin disciplinary and judicial processes of the University, as outlined in the Student Handbook.

If a student receives an XF for a course due to academic dishonesty, this remains as a permanent grade and cannot be removed from the transcript. However, students may repeat the course for credit toward graduation. Some programs and majors have more explicit ethical standards, which supersede this Policy, and violation of which may result in dismissal from some programs or majors within the University. If you have difficulty with any assignment in this course, please see me rather than consider academic dishonesty.

Final Notes: Mathematics is not a spectator sport. You need to come to class regularly and participate, do your homework, read the book, and asks lots of questions. I AM HERE TO HELP!!! Ask questions in class and come to my office hours. Stop by my office just to chat about the weather, baseball (preferably about the Cubs), or life in general if you like. Above all, I want us to have a fun semester of learning mathematics!