

# Syllabus for MA 114 - 01

## Functions

Dr. Joe A. Stickles, Jr.  
Spring 2008

**Situation:** The voltage of a certain conductor decreases over time according to the law of uninhibited decay. If the initial voltage is 40 volts, and 2 seconds later it is 10 volts, what is the voltage after 5 seconds?

We will answer this and many other questions using *algebra* and *trigonometry*. Other questions from the textbook we might encounter this semester include:

- A truck rental company rents a moving truck for one day by charging \$29 plus \$0.07 per mile. What is the cost of renting the truck if the truck is driven 110 miles?
- A ball is thrown upward at an initial velocity of 80 feet per second from an initial height of 6 feet. What is the maximum height of the ball?
- David has available 400 yards of fencing and wishes to enclose a rectangular area. What is the largest possible area David can enclose?
- A projectile is fired at an inclination of  $45^\circ$  to the horizontal with a muzzle velocity of 100 feet per second. How far from the firing point will the projectile hit the ground?
- The weight of an object above the surface of Earth varies inversely with the square of the distance from the center of Earth. If Maria weighs 125 pounds when she is at sea level, what is her weight at the top of Mt. McKinley?
- What is the length of the edge of a cube if its volume could be doubled by an increase of 6 centimeters in one edge, an increase of 12 centimeters in a second edge, and a decrease of 4 centimeters in the third edge?
- How much should a \$10,000 face value zero-coupon bond, maturing in 10 years, be sold for now if its rate of return is to be 8% compounded annually?
- How fast would you have to travel on the surface of Earth at the equator to keep up with the Sun?
- From a parking lot, you want to walk to a house on the ocean. The house is located 1500 feet down a paved path that parallels the ocean, which is 500 feet away. Along the path you can walk 300 feet per minute, but in the sand on the beach you can only walk 100 feet per minute. How much time will it take you to walk directly from the parking lot to the house?
- Cadillac Mountain, elevation 1530 feet, is located in Acadia National Park, Maine, and is the highest peak on the east coast of the United States. It is said that a person standing on the summit will be the first person in the United States to see the rays of the rising Sun. How much sooner would a person atop Cadillac Mountain see the first rays than a person standing below at sea level?

## 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:** *Precalculus, Enhanced with Graphing Utilities*, Fourth Edition  
by Sullivan and Sullivan  
**Calculator:** Graphing calculator required - TI-83 or TI-84 recommended

**Catalog Description:** Study of functions and graphs. Includes linear, polynomial, rational, exponential, logarithmic, and trigonometric functions and systems of equations.

**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 to provide students with many fundamental concepts of algebra and trigonometry and applications of these topics to real-world situations. Additionally, this course is designed to deliver the prerequisites necessary for learning calculus in the future. 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 many of the underlying fundamental principles of algebra, 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%	Exam 4	10%
Homework Quizzes	10%	Exam 5	10%
Exam 1	10%	Exam 6	10%
Exam 2	10%	Final Exam	20%
Exam 3	10%		

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. Homework problems are listed on the last page of this syllabus and should be worked after we have completed the corresponding section in class. These problems will not be collected. However, homework quizzes will be given each Friday we have class, and the problems on these quizzes will be exact problems from the list. Also, many questions on the exams will be strikingly similar to those given in the homework.

**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 lowest three homework quiz scores will be dropped. **Absolutely no project scores will be dropped.** The lowest of your six 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!

**Make-ups:** No late work will be accepted **for any reason**. No make-ups for 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.

**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](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](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 precalculus!

### Course Outline

	Monday	Tuesday	Wednesday	Thursday	Friday
Section	Jan. 14	15	16	17	18
		1.1	1.2		1.3
Section	21	22	23	24	25
	MLK Day	1.4	1.5		Review
Section	28	29	30	31	Feb. 1
	Exam 1	2.1	2.2		2.3
Section	4	5	6	7	8
	2.4	2.5	2.6		Review
Section	11	12	13	14	15
	Exam 2	3.1	3.2		3.3
Section	18	19	20	21	22
	3.4	3.5	3.6		3.7
Section	25	26	27	28	29
	Review	Exam 3	4.1		4.2
Section	Mar. 3	4	5	6	7
	4.3	4.4	4.5		4.6
Section	10	11	12	13	14
	4.7	4.8	Review		Exam 4
Section	17	18	19	20	21
	Spring	Break	No	Class	!!!
Section	24	25	26	27	28
	No Class	5.1	5.2		5.3
Section	31	Apr. 1	2	3	4
	5.4	Advising Day	5.5		5.6
Section	7	8	9	10	11
	Review	Exam 5	6.1		6.2
Section	14	15	16	17	18
	6.3	6.4	6.5		6.7
Section	21	22	23	24	25
	6.8	Review	Exam 6		7.1
Section	28	29	30	May 1	2
	7.2	7.3	7.4		8.1
Section	5	6	7	8	9
	8.3	Review	Study Day		

## Homework Problems List for MA 140

- Section 1.1 - p. 8: 11, 13, 15, 17, 35, 39, 41, 43, 49, 53, 57, 59, 63, 65, 67, 77, 81  
Section 1.2 - p. 21: 13, 19, 21, 23, 25, 29, 31, 33, 35, 37, 41, 45, 47, 53, 57, 59, 65, 69, 71, 79, 81  
Section 1.3 - p. 26: 5, 7, 11, 15, 19, 21, 23, 25, 27, 31, 33, 35  
Section 1.4 - p. 40: 7, 9, 13, 17, 21, 23, 35, 29, 35, 37, 39, 43, 45, 49, 51, 57, 59, 63, 67, 71, 73, 77, 79, 83, 87, 89, 91  
Section 1.5 - p. 49: 7, 11, 13, 17, 21, 23, 27, 29, 31, 33, 35, 45
- Section 2.1 - p. 68: 17, 19, 21, 23, 29, 31, 35, 37, 39, 45, 49, 51, 55, 57, 63, 67, 71, 73, 75, 79, 83, 87, 89  
Section 2.2 - p. 75: 9, 11, 13, 17, 19, 23, 25, 29, 37, 39  
Section 2.3 - p. 88: 11-19 odd, 23, 25, 27, 31, 35, 37, 39, 43, 47, 49, 55, 59, 63, 65, 71, 75  
Section 2.4 - p. 101: 13, 15, 19, 23, 31, 33, 35, 43, 49  
Section 2.5 - p. 114: 9-16 all, 19, 21, 23, 25, 31, 33, 37, 41, 43, 45, 49, 53  
Section 2.6 - p. 126: 7-18 all, 19, 23, 29, 33, 39, 41, 53, 55, 59, 61, 67, 69, 77, 81
- Section 3.1 - p. 163: 11-18 all, 21, 27, 33, 37, 41, 45, 51, 53, 57, 61, 65, 67, 71, 73, 77, 81, 85  
Section 3.2 - p. 182: 13, 15, 17, 19, 21, 23, 31, 33, 35, 37, 39, 41, 43, 47, 49, 53, 55, 59, 61, 63, 71, 75, 79, 83, 87  
Section 3.3 - p. 195: 13, 15, 17, 21, 25, 27, 31, 33, 37, 43, 45, 49  
Section 3.4 - p. 207: 9, 13, 15, 19, 25, 31, 35, 41, 47, 51, 55, 59, 67  
Section 3.5 - p. 217: 5, 9, 11, 13, 15, 21, 25, 33, 37, 41, 45, 51, 59, 61, 65  
Section 3.6 - p. 230: 15, 17, 19, 21, 27, 31, 35, 37, 41, 47, 49, 53, 59, 63, 67, 73, 81, 83, 85  
Section 3.7 - p. 237: 9, 11, 15, 19, 21, 25, 27, 29, 33, 37, 39
- Section 4.1 - p. 253: 7, 9, 13, 17, 19, 23, 25, 31, 35, 39, 41, 47, 51, 55, 57, 61, 63, 69  
Section 4.2 - p. 267: 9, 11, 15, 19, 21, 25, 29, 31, 33, 35, 39, 45, 49, 53, 57, 63, 67, 73, 75, 79  
Section 4.3 - p. 282: 15, 19, 21, 23, 25, 29-36 all, 39, 47, 51, 55, 57, 59, 63, 65, 69, 73, 79  
Section 4.4 - p. 296: 11, 15, 17, 19, 23, 27, 29, 31, 35, 37, 39, 41, 43, 47, 51, 53, 59, 63, 67-74 all, 75, 81, 87, 89, 93, 97, 101, 105, 107, 117, 121  
Section 4.5 - p. 307: 9, 13, 15, 19, 21, 23, 25, 29, 33, 35, 37, 39, 43, 47, 49, 53, 55, 59, 63, 67, 71, 81, 85, 89  
Section 4.6 - p. 313: 7, 11, 13, 15, 17, 21, 25, 29, 31, 37, 43, 47, 55, 59, 61, 65  
Section 4.7 - p. 322: 5, 9, 15, 19, 27, 35, 39, 41, 45, 47  
Section 4.8 - p. 334: 3, 7, 9, 13, 17, 19, 23, 27
- Section 5.1 - p. 366: 13, 15, 19, 21, 25, 27, 31, 33, 37, 41, 43, 49, 53, 55, 61, 63, 67, 69, 73, 75, 77, 81, 83, 85, 89, 91, 95, 97, 99, 103, 109, 115  
Section 5.2 - p. 384: 13, 17, 19, 21, 25, 27, 31, 35, 37, 41, 43, 47, 51, 53, 55, 57, 63, 65, 71, 77, 79, 81, 85, 89, 91, 95, 97, 113, 115, 121  
Section 5.3 - p. 399: 13, 15, 17, 23, 29, 31, 33, 37, 39, 41, 45, 47, 51, 53, 57, 63, 67, 73, 75, 77, 81, 85, 87, 91, 93, 97, 99, 113, 117, 119  
Section 5.4 - p. 414: 19, 20, 21, 25, 27, 33, 35, 37, 39, 43, 45, 47-56 all, 65, 67, 69, 71, 73, 75, 79, 81, 83, 91  
Section 5.5 - p. 423: 17-20 all, 23, 25, 27, 31, 35, 37, 39, 43, 45  
Section 5.6 - p. 434: 5, 7, 9, 11, 15, 17, 19, 25, 29

Section 6.1 - p. 457: 15, 17, 19, 21, 23, 25, 29, 33, 35, 37, 39, 41, 45, 47, 49, 51, 53, 55, 63

Section 6.2 - p. 464: 9, 11, 15, 19, 23, 27, 29, 35

Section 6.3 - p. 471: 11, 13, 17, 23, 25, 29, 33, 35, 39, 41, 45, 49, 55, 59, 65, 69, 75, 79, 83, 87, 95, 97, 99, 103

Section 6.4 - p. 481: 9, 11, 15, 19, 23, 25, 27, 31, 33, 37, 39, 47, 49, 53, 57, 61, 67, 71, 73, 77, 79, 89

Section 6.5 - p. 490: 7, 9, 11, 13, 15, 19, 23, 25, 35, 39, 49, 55, 57, 59, 61, 67, 75, 79

Section 6.7 - p. 500: 7, 9, 11, 15, 19, 21, 23, 27, 29, 33, 37, 39, 41, 45, 49, 55, 57, 59

Section 6.8 - p. 508: 5, 7, 13, 15, 23, 29, 21, 35, 39, 55, 59, 63

Section 7.1 - p. 526: 9, 13, 15, 17, 21, 23, 27, 33, 37, 39, 41, 47, 51, 53, 57, 61, 65

Section 7.2 - p. 538: 11, 13, 15, 19, 23, 27, 31, 33, 35, 39, 43, 45, 49, 55

Section 7.3 - p. 546: 11, 13, 15, 19, 23, 25, 27, 31, 35, 37, 41

Section 7.4 - p. 552: 7, 9, 15, 19, 21, 23, 33, 37

Section 8.1 - p. 579: 13, 15, 17, 19, 23, 25, 29, 33, 37, 43, 47, 53, 57, 61, 65, 69, 73, 77, 79

Section 8.3 - p. 606: 13, 17, 21, 25, 27, 31, 35, 37, 43, 47, 55, 59