MATH 118 Math for the Natural Sciences
Spring 2016 · Syllabus

Class Information

Instructor: Dr. Lauren Williams
Class Meeting: MWF 10:30 - 11:35, Hirt 209
Office: Old Main 404 (Tower)
Office Phone: (814) 824-2226
Office Hours: Mon 2:15 - 3:30, Tues 11:45 - 1, Wed 2:15 - 3:30, Thur 11:30 - 2
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Course Description

This course has been designed for students who plan to take calculus but may be deficient in some aspects of their mathematical preparation. While many of the topics covered are similar to those covered in a typical college precalculus course, there is more emphasis on the application, a faster pace is maintained, and a greater depth of understanding is required. It is expected that students have taken intermediate algebra and precalculus prior to this class; as stated, this course is intended to fix deficiencies.

The course will cover the fundamental concepts of college algebra, precalculus, and a preparation for calculus. More specifically; the topics will include factoring, integer and rational exponents, simplifying algebraic expressions, solving equations and inequalities, basic trigonometry, function notation, polynomial and rational functions, exponential and logarithmic functions, trigonometric and inverse trigonometric functions, graphs of functions and applications.

Course Objectives

Upon successful completion of this course a student will be mathematically prepared to succeed in a college calculus course, and subsequent science courses. In particular:

- demonstrate a working knowledge of the basics of the language of mathematics,
- have acquired study habits necessary for continued success in your subsequent science and mathematics courses,
- apply your understanding of algebra as required in both calculus and applications in sciences,
- organize all of your mathematical tools, techniques, procedures, and problem solving skills further developed in this course. This will enable you to utilize the appropriate tools to restate, setup, and then solve problems in calculus and beyond,
- continue to develop your mathematical skills and thought processes subsequent to this course, given the solid foundation you built in this course.

Textbook

Precalculus Essentials, by Robert Blitzer, 4th Edition. Be sure to check the edition when purchasing your textbook; other editions have similar material, but the assigned problems may be different.

No other materials are required for this class. You do NOT need to purchase a subscription to MyMathLab or pay to access any other online resources.

You will not be expected to bring your textbook to class. If you prefer to purchase an electronic version of the text, you're welcome to do so.

Homework

When we finish a section in the book, you should immediately begin working on the homework problems from the attached list (also available on the course website). Your work will not be collected. However, actually working through these problems is the key to your success in this class. Attending every class is not enough; mathematics can only be learned through practice. You should plan to spend a significant amount of time on the homework. It is expected that you spend approximately 8-12 hours per week studying the material outside our class meetings, according the the typical 2-3 hour per credit rule of thumb.

Stay up to date with homework, and get help if you cannot understand a problem after trying it on your own. **Do not ignore a problem that you are struggling with.** Our class is focused on the foundations of mathematics that you will need in this course and in Calculus. A weak spot in this foundation will lead to a bigger problem in the future.

If you are having trouble with a topic, please come talk to me during office hours, ask questions in class, seek help from a classmate, or go to the department tutors for assistance. You are expected to try to work on all problems on your own first; when coming to my office, be prepared to show me what you've already tried.

Quizzes

You will be given quizzes on the material regularly. Keeping up with the homework will ensure that you are prepared for the quizzes, which will feature problems very similar to those in the homework. The dates for quizzes is provided in the attached schedule; note that exact topics covered on a quiz is subject to change if we are behind.

Quiz grades will not be based strictly on whether or not you found the correct answer. Your work must also be written clearly, and with proper notation, to receive full credit. Your two lowest quiz grades will be dropped from your average, including any missed quizzes. Make up quizzes will only be given for excused absences. All make ups must be completed before the next scheduled quiz.

Exams

We will have four unit exams. Use of notes, textbooks, calculators, electronic devices, or other materials will not be permitted during an exam.
Exam Dates:
Tuesday, February 23
Wednesday, March 16
Tuesday, April 12
Tuesday, May 3

All exams are cumulative; each exam will include some material from the previous exams. Mathematics is a cumulative effort, and mastering each topic is only possible if you have mastered earlier concepts.

Your lowest exam grade will be replaced by your final exam grade, if your final exam grade is better. There are no make up exams; a missed exam grade will be replaced by your final exam grade. A second missed exam will receive a grade of 0, so please check your schedules carefully and ensure that you can attend all exams. If you are an athlete, or will be missing an exam for another school function, please let me know well in advance.

The final exam will be cumulative, and is scheduled for **Wednesday, May 18th, 8:00-10:00 am**.

Final Grades

Grades will be calculated as follows:

> 60% - Exam Average (lowest replaced by final, if better)
> 20% - Quizzes (two lowest dropped)
> 20% - Final Exam

Quiz and exam grades will be posted on Blackboard, so you can keep track of your progress at any time. There are no opportunities for extra credit or additional points, and a curve will not be applied to the grades.

Grading scale:

F	D	D+	C	C+	B	B+	A
0-59	60-64	65-69	70-77	78-83	84-89	90-93	94-100

Support of the Mercy Mission

This course supports the mission of Mercyhurst University by creating students who are intellectually creative. Students will foster this creativity by: applying critical thinking and qualitative reasoning techniques to new disciplines; developing, analyzing, and synthesizing scientific ideas; and engaging in innovative problem solving strategies.

Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences Program secretary at 824-3017, to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

Additional (Free) Resources

- **Khan Academy Algebra II**: https://www.khanacademy.org/math/algebra2
  Includes material on manipulating functions, polynomials, rational functions, complex numbers, and modeling.

- **Khan Academy Trigonometry**: https://www.khanacademy.org/math/trigonometry
  Includes material on right triangle trigonometry, trig functions and graphs, and solving trig equations.

- **Wolfram Alpha**: http://www.wolframalpha.com
  A great way to check your work. Free, with subscription available to access step-by-step solutions to problems.

- **College Algebra Textbook**: http://stitz-zeager.com/szca07042013.pdf
  Free textbook by Carl Stitz and Jeff Zeager. Covers functions, graphing, polynomials, rational functions, modeling, exponential and logarithmic functions, and more, with practice exercises and some solutions.

- **Trigonometry Textbook**: http://stitz-zeager.com/szct07042013.pdf
  Free textbook by Carl Stitz and Jeff Zeager. Covers functions, graphing, polynomials, rational functions, modeling, exponential and logarithmic functions, and more, with practice exercises and some solutions.

- **Precalculus Textbook**: http://www.opentextbookstore.com/precalc/1.5/Precalc.pdf
  Free textbook by David Lippman and Melonie Rasmussen. Covers just about everything in Math 118, in the same sequence.

Math 118 Math for the Natural Sciences Homework List - Spring 2016

Sec.	Page	Problems
P.1	17	2, 6, 12, 14, 20, 22, 24, 28, 30, 32, 34, 40, 42, 54, 56, 60, 62, 64, 86, 88, 90, 94, 96, 100, 112, 114, 118, 120, 122, 159, 160
P.2	30	2, 4, 6, 8, 16, 18, 20, 22, 24, 26, 28, 34, 40, 48, 52, 54, 56, 62, 64, 108, 110, 112, 114, 136, 138, 148, 150
P.3	45	2, 4, 6, 8, 10, 12, 16, 20, 22, 26, 28, 32, 34, 38, 42, 46, 50, 56, 62, 68, 70, 72, 78, 84, 88, 90, 92, 96, 98, 112, 138
P.4	56	10, 12, 18, 22, 28, 32, 42, 44, 46, 56, 60, 70, 80, 84, 88, 90, 94, 96, 107, 108, 110
P.5	68	2, 6, 10, 12, 16, 18, 22, 26, 32, 40, 42, 46, 50, 54, 58, 60, 66, 70, 76, 78, 82, 90, 104
P.6	83	2, 4, 6, 8, 10, 16, 18, 24, 26, 28, 34, 38, 42, 46, 52, 60, 62, 64, 70, 72, 88, 96
P.7	103	2, 4, 8, 12, 16, 18, 20, 30, 36, 38, 44, 46, 48, 52, 54, 56, 58, 60, 62, 66, 76, 80, 116, 120, 126
P.9	131	28, 30, 32, 38, 42, 50, 54, 58, 60, 62, 68, 70, 78
1.1	150	2-12 even, 14, 18, 42, 44, 46, 52
1.2	168	28, 30, 32, 40, 42, 55-64, 78, 80, 82, 84, 94, 126
1.3	182	2, 4, 6, 8, 10, 12, 14, 18, 20, 22, 34, 38, 40, 42, 56, 58, 60, 72, 122
1.4	199	2, 4, 6, 8, 10, 12, 14, 18, 22, 26, 30, 38, 40, 42, 48, 60, 64, 68, 85, 86, 118
1.5	211	6, 8, 10, 14, 16, 22, 24, 33, 34
1.6	227	2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 28, 30, 54, 56, 58, 60, 62, 64, 86, 90, 146, 149, 150, 151, 152, 154
1.7	242	2, 4, 8, 10, 16, 18, 20, 52, 54, 56, 58, 62, 64, 66
1.8	254	2, 4, 6, 10, 12, 14, 16, 22, 28, 29-34, 54, 56, 58, 60, 62, 64
1.9	264	2, 4, 6, 20, 22, 24, 32, 34, 40, 42, 46, 54, 56, 58, 60, 62, 66
1.10	276	20, 22, 26, 28, 30, 31, 47
2.1	298	2, 6, 8, 10, 14, 16, 20, 22, 24, 28, 30, 32, 34, 38, 46, 52, 58, 60, 82
2.2	313	1-4, 10, 12, 14, 16, 18, 26, 28, 40, 42, 44, 46, 100
2.3	330	15-18, 20, 22, 24, 26, 28, 30, 32, 34, 38, 42, 44, 110, 112
2.4	343	2, 4, 8, 12, 18, 20, 28, 44
2.5	356	2, 4, 6, 26, 28
2.6	377	2, 4, 22, 24, 26, 30, 34, 38, 40, 42, 44, 58, 62, 66, 74
2.7	391	2, 4, 8, 16, 32, 42, 46, 54, 62, 104, 106
3.1	423	19-24, 26, 28, 30, 32, 36, 38, 42, 44, 62
3.2	437	2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 24, 26, 28, 47-52, 54, 56, 82, 84, 86, 88, 90, 94, 96, 98, 106
3.3	461	2, 4, 8, 12, 14, 16, 20, 26, 28, 32, 34, 38, 40, 42, 44, 48, 50, 54, 64, 66, 84, 86
4.1	505	14, 16, 18, 20, 22, 24, 26, 42-52 even, 58, 60, 62, 64, 66, 68, 70, 77-82, 126
4.2	520	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 30, 32, 34, 36, 40, 44
4.3	533	9-18, 22, 24, 26, 44, 46, 48
4.4	548	2, 4, 36, 38, 40, 42, 62, 68, 70, 72, 74, 88, 100, 102
4.5	568	2, 4, 6, 8, 14, 18, 38, 46, 48, 62, 64, 66
4.6	581	1-4
4.7	598	2, 4, 8, 14, 32, 34, 44, 48, 50, 54, 64, 68
5.1	630	2, 6, 8, 14, 18, 24, 30, 38, 52, 56
5.5	674	12, 16, 18, 26, 34, 40, 44, 50, 64, 68

Solutions are on Blackboard. Try the odd numbered problems for more practice (answers are in the back of the book).

Math 118 Math for the Natural Sciences Course Schedule - Spring 2016

Monday	Tuesday	Wednesday	Friday
		Feb 3 Class Intro	*Feb 5* Section P.1
Feb 8 Section P.2	*Feb 9* Section P.3 / Quiz P.1	*Feb 10* Section P.4	*Feb 12* Section P.5 / Quiz P.2, P.3
Feb 15 Section P.6	*Feb 16* Section P.6 / Quiz P.4, P.5	*Feb 17* Section P.7	*Feb 19* Section P.9 / Quiz P.6, P.7
Feb 22 Review	*Feb 23* Exam I	*Feb 24* Section 1.1	*Feb 26* Section 1.2
Feb 29 Section 1.3	*Mar 1* Section 1.4 / Quiz 1.1, 1.2	*Mar 2* Section 1.5	*Mar 4* Section 1.6 / Quiz 1.3, 1.4
Mar 7 Section 1.7	*Mar 8* Section 1.8 / Quiz 1.5, 1.6	*Mar 9* Section 1.9	*Mar 11* Section 1.10 / Quiz 1.7, 1.8
Mar 14 Section 1.10	*Mar 15* Review	*Mar 16* Exam II	*Mar 18* Section 2.1
Mar 21 No Class	*Mar 22* No Class	*Mar 23* No Class	*Mar 25* No Class
Mar 28 No Class	*Mar 29* Section 2.2 / Quiz 2.1	*Mar 30* Section 2.3	*Apr 1* Section 2.4 / Quiz 2.2
Apr 4 Section 2.5	*Apr 5* Section 2.6 / Quiz 2.3, 2.4	*Apr 6* Section 2.6	*Apr 8* Section 2.7 / Quiz 2.5
Apr 11 Review	*Apr 12* Exam III	*Apr 13* Section 3.1	*Apr 15* Section 3.2
Apr 18 Section 3.3	*Apr 19* Section 3.3 / Quiz 3.1, 3.2	*Apr 20* Section 4.1	*Apr 22* No Class
Apr 25 Section 4.2	*Apr 26* Section 4.3 / Quiz 3.3, 4.1	*Apr 27* Section 4.4	*Apr 29* Section 4.5 / Quiz 4.2, 4.3
May 2 Review	*May 3* Exam IV	*May 4* Section 4.6	*May 6* Section 4.7 / Quiz 4.5
May 9 Section 5.1	*May 10* Section 5.5 / Quiz 4.7	*May 11* Section 5.5	*May 13* Review
May 16 No Class		*May 18* Final Exam	