


Math 118
**Math for the
Natural
Sciences**
Spring 2023



MERCYHURST
UNIVERSITY

Course Syllabus

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.

The course will cover the fundamental concepts of college algebra, precalculus, and a preparation for calculus. 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.

Objectives

Upon successful completion of this course, a student will be prepared to succeed in calculus and subsequent sciences courses. In particular, students will be able to:

- 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.

Section Information

MTWF 8 - 8:50

Hirt 103

4 Credits

Instructor

Lauren Williams, PhD

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(814) 824-2226

Old Main 404



Office Hours

Monday 10 - 11

Monday 2 - 3

Tuesday 9 - 11

Wednesday 2 - 3

Friday 12 - 12:50

and by appointment

Prerequisites

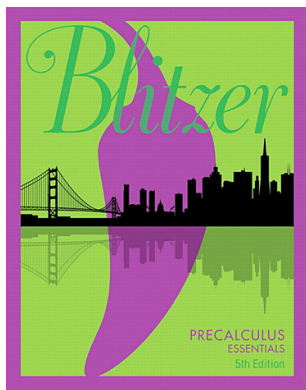
To remain enrolled in this course, you must satisfy at least one of the following criteria:

- Score of 50 or better on the ALEKS Mathematics Placement Assessment
- Passed Math 111 (College Algebra), or transfer credit for equivalent

If none of these apply, you should make arrangements to take the ALEKS Math Placement Assessment before the Add/Drop deadline on Friday, January 20st.

Office Hours

Drop in with any questions or just to chat during office hours - no appointment or notice required. If you need to meet with me outside those times, please email me to arrange a time. Zoom appointments on evenings and weekends are also possible with prior notice.



Required Textbook

Precalculus Essentials by Robert Blitzer, 5th Edition. If you have a different edition of the textbook, it is up to you to make sure the sections and assigned problems are the same. A similar text, simply called "Precalculus", has the same material along with a few additional sections and can also be used for this course.

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

No other materials are required for this course.

Homework

A list of all recommended homework problems from the textbook is included in this syllabus. While your work for these problems will not be collected, practicing the material as much as possible is the best (and only) way to learn it. You are strongly encouraged to work through additional problems as well. You should plan to spend approximately 8-12 hours per week on studying for this course outside the classroom based on the suggested 2-3 hour per credit rule.

Stay up to date with homework, and get help if you cannot understand a problem after trying it on your own. Don't 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 any future mathematics and science courses. A weak spot in this foundation will lead to a bigger problem in the future.

If you're stuck on a homework problem, please let me know. I can help in class, via email, or in office hours, and I'd be happy to create additional notes or videos to explain a tricky problem or topic. I will post any such materials to the course site on Blackboard for the benefit of all students in the class.

Quizzes

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 as well as more conceptual questions about the topics you'll see each week.

There will be a total of 10 quizzes during the semester. Your lowest quiz grade will be dropped when calculating your final grade, including a missed quiz (so only your best 9 quiz grades will be counted towards your final grade).

Exams

We will have four unit exams and a cumulative final exam. Exams will be given in class. No calculators or other electronic devices will be permitted on exams.

Your lowest exam grade, including a missed exam, will be dropped when calculating your final grade. This policy *does not* apply to exam grades of 0 due to academic dishonesty.

Exam 1	Tuesday, February 14	Chapter P
Exam 2	Tuesday, March 14	Chapter 1
Exam 3	Tuesday, April 4	Chapters 2 and 3
Exam 4	Tuesday, May 2	Chapters 4 and 5
Final Exam	Monday, May 8 (8-10 am)	All Sections

Grading

Quizzes 30%

- Lowest quiz grade, including a missed quiz, will be dropped when calculating your quiz average
- Based on recommended homework problems and class examples
- In person and closed book

Exams 50%

- Four unit exams of equal weight towards grade
- Lowest exam grade dropped
- Not cumulative (within reason)
- In person and closed book

Final Exam 20%

- Monday, May 8, 8 - 10 am
- Cumulative
- Required, regardless of current course grade
- Based on homework and class examples
- In person and closed book

Mathematics Department Grading Scale

F	D	D+	C	C+	B	B+	A
0%	60%	67%	70%	77%	80%	87%	90%

Course Policies

Attendance

- Attendance is not required, but highly encouraged. You do not need to notify me of an absence *unless* you will be missing a quiz or exam.
- If you know ahead of time that you will not be able to attend class on the date of a quiz or exam, please make arrangements for an alternative time with me *before* that day. This will give me the opportunity to return graded work to the entire class promptly. Please see me if you have any extended absences.

Academic Honesty

- Your grade in this class should be a reflection of your understanding of the material. Academic dishonesty is a disservice to your classmates, instructors, future employers and colleagues, and ultimately, yourself.
- You may not use any notes, textbooks, or electronic devices of any kind (calculator, phone, computer, smart watch, etc) on quizzes or exams.
- You may not use the work of another classmate, with or without their knowledge, on quizzes or exams. This includes communicating during the assessment or simply copying from a nearby classmate.
- The first instance of academic dishonesty in this class will result in a grade of O on that assessment. This O will not be dropped or replaced as a low or missed grade, meaning your final grade will be impacted.
- A second or further instance of academic dishonesty will result in a report to the University as well as an F in this course if you remain enrolled past the withdrawal deadline.

Tips for Success

- Attend class whenever possible. Attendance is not required nor part of your grade, but is instrumental in keeping up with material and remaining engaged in the class.
- Give it time. You're expected to spend approximately 12-15 hours per week on this course, *in addition* to class meetings. Some students will need to devote more time to the course than others. Mathematics is not a fast subject to learn, and requires a lot of practice. Work on a few problems each day, and don't leave it all for the night before an exam.
- Find motivation. Mathematics can be useful in any field, and knowing how it fits into your intended career can help you push through the inevitable obstacles you'll face in the course.
- Skim through relevant sections in the textbook before the class lectures. This will help in your understanding of the lectures, and alert you to any topics you'll need to focus on while in class.
- Form a study group with other people in the class. You may not need to meet regularly, but work on arrangements (where/when/how) *before* you need to.
- Mathematics is naturally cumulative. You will not be able to solve a trigonometry problem without strong algebra skills, for instance. When you're having trouble with a problem, try to determine exactly where you're having the problem and review earlier sections in the book as needed.
- Construct a reference sheet with definitions, important theorems, and useful formulas. Add to it throughout the semester, and keep it nearby when working on homework. Keep practicing until you no longer need your sheet.
- If you're stuck on homework problems or lecture material, come to office hours with questions. You should make an attempt to work on any problems on your own or with a classmate first. I will fully explain any problems that will not be collected as part of an assignment, and give suggestions for graded problems.

University Policies and Information

Food and Drink in the Classroom

In light of the COVID-19 situation, eating is not permitted in classrooms, labs, or other academic spaces. A water bottle or cup with a lid (and preferably a straw) is permitted to be used in classrooms and labs.

ADA

Mercyhurst University values inclusion and is committed to the goal of providing equal opportunities for all. Mercyhurst abides by federal, state, and local laws in admissions, employment, academic programs, and all services provided.

Mercyhurst University is committed to complying with its obligations under the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act and the Fair Housing Act to ensure that a person with a disability is granted reasonable accommodations, when such accommodations are necessary, to afford that person equal opportunity to obtain a Mercyhurst education and use university facilities. Please refer to the HUB

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Services tab, then ADA Accommodations from the dropdown for instructions to request an accommodation. You may also contact Susan Reddinger, ADA Coordinator, ADA@mercyhurst.edu, 814-824-2362, Egan Hall 200.

For students with questions about Academic Support, please refer to the HUB

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Academic Resources tab, then Academic Support for more information.

Title IX Information

Mercyhurst is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence. Please refer to the HUB:

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Resources tab, then Title IX - Sexual Respect from the dropdown for more information. If you would like to file a sexual misconduct complaint, please contact Ann Miller, Title IX Coordinator and Compliance Officer, titledix@mercyhurst.edu, 814-824-2363. Please be aware that in compliance with Title IX, educators must report incidents of sexual assault/harassment, stalking, and domestic/dating violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to the Title IX Coordinator (or any of the Deputy Title IX Coordinators).

Course Evaluations

Near the end of the semester, you will be asked to complete an online course evaluation. The evaluation will be completed in class during the last two weeks of the semester using any laptop, tablet, or mobile device. The response tool allows you to note aspects of the course that helped you learn, as well as aspects that might be modified to help future students learn more effectively. You will receive an email letting you know when the evaluation window for our class is open. Please note that these course evaluations are anonymous and instructors do not see the results until after the grades for the course are submitted.

Math 118 Course Schedule

MONDAY	TUESDAY	WEDNESDAY	FRIDAY
Jan 16 <i>First Class Meeting</i> Class Overview	Jan 17 Section P.1	Jan 18 Section P.1	Jan 20 <i>Add-Drop Deadline</i> Section P.2
Jan 23 Section P.3	Jan 24 Section P.4 <i>Quiz</i>	Jan 25 Sections P.4/P.5	Jan 27 Section P.5
Jan 30 Section P.6	Jan 31 Section P.6/P.7 <i>Quiz</i>	Feb 1 Section P.7	Feb 3 Section P.9
Feb 6 Section P.9	Feb 7 Section 1.1/1.2 <i>Quiz</i>	Feb 8 Section 1.3	Feb 10 Section 1.4/1.5
Feb 13 Catch Up & Review	Feb 14 <i>Exam</i>	Feb 15 Section 1.6	Feb 17 Section 1.7
Feb 20 Section 1.8	Feb 21 Section 1.9 <i>Quiz</i>	Feb 22 Section 1.10	Feb 24 Section 1.10
Feb 27 Section 2.1/2.2	Feb 28 Section 2.2/2.3 <i>Quiz</i>	Mar 1 Section 2.3	Mar 3 Section 2.4
Mar 6 <i>No Class</i> Spring Break	Mar 7 <i>No Class</i> Spring Break	Mar 8 <i>No Class</i> Spring Break	Mar 10 <i>No Class</i> Spring Break
Mar 13 Catch Up & Review	Mar 14 <i>Fall Registration Starts</i> <i>Exam</i>	Mar 15 Section 2.4/2.5	Mar 17 Section 2.6
Mar 20 Section 2.6	Mar 21 <i>No Class</i> Advising Day	Mar 22 Section 2.7 <i>Quiz</i>	Mar 24 Section 2.7
Mar 27 Section 3.1/3.2	Mar 28 Section 3.2/3.3 <i>Quiz</i>	Mar 29 Section 3.3/3.4	Mar 31 Section 3.4
Apr 3 Catch Up & Review	Apr 4 <i>Exam</i>	Apr 5 <i>No Class</i> Easter Break	Apr 7 <i>No Class</i> Easter Break
Apr 10 <i>No Class</i> Easter Break	Apr 11 Section 4.1 <i>Quiz</i>	Apr 12 Section 4.2	Apr 14 Section 4.3
Apr 17 Section 4.4	Apr 18 Section 4.4 <i>Quiz</i>	Apr 19 Section 4.5	Apr 21 <i>Last Day to Declare P-F</i> Section 4.5/4.6
Apr 24 Section 4.7	Apr 25 Section 5.1 <i>Quiz</i>	Apr 26 Section 5.1	Apr 28 <i>Last Day to Withdraw</i> Section 5.5
May 1 Section 5.5	May 2 <i>Exam</i>	May 3 Semester Review	May 5 <i>Last Class Meeting</i> Semester Review
May 8 <i>Finals Week</i> <i>Exam</i>	May 9 <i>Finals Week</i>	May 10 <i>Finals Week</i>	May 12 <i>Finals Week</i>

Math 118 Homework List

Your homework will not be collected, but these problems (and similar questions) are likely to appear on quizzes and exams. Answers to most of the questions are available in the back of the textbook.

Sec.	Page	Problems
P.1	17	9, 11, 15, 20, 21, 25, 29, 31, 43, 49, 57, 59, 69, 91, 93, 95, 99, 101, 107, 109, 111, 113, 115, 117, 119, 159, 160
P.2	30	1, 3, 5, 12, 21, 29, 33, 37, 39, 41, 43, 47, 51, 55, 57, 59, 61, 63, 65, 67, 107, 109, 111, 113, 143, 145
P.3	45	1, 3, 5, 11, 13, 21, 25, 29, 31, 35, 37, 41, 43, 47, 49, 51, 53, 61, 65, 71, 73, 79, 81, 87, 89, 91, 93, 95, 97, 99, 101, 103, 107, 109, 111, 113, 119
P.4	56	13, 17, 21, 29, 39, 45, 51, 65, 69, 77, 85, 87, 89, 93, 95, 107, 109, 111, 113
P.5	68	11, 13, 15, 23, 29, 37, 41, 45, 47, 55, 59, 65, 71, 79, 83, 93, 97, 103, 117
P.6	84	5, 9, 15, 17, 27, 29, 33, 39, 41, 43, 51, 53, 55, 56, 63, 65, 67, 69, 71, 72, 73, 75, 79, 80, 81, 83, 85, 87, 107, 117
P.7	105	11, 15, 21, 25, 35, 37, 39, 41, 47, 51, 71, 73, 75, 79, 91, 99, 101, 103, 105, 107, 109, 111, 113, 115, 121, 123, 127, 131, 167, 169
P.9	137	5, 15, 27, 31, 33, 41, 51, 55, 59, 65, 73, 75, 77, 79, 81, 91, 95
1.1	158	23, 55, 57, 59, 79-82, 83-86
1.2	176	13, 15, 29, 33, 35, 43, 45, 59, 61, 62, 71, 73, 75, 81, 87, 89, 93, 95, 122-125, 126
1.3	195	1, 3, 5, 11, 13, 39, 45, 47, 51, 53, 61, 63, 77, 85, 87, 89, 90, 91, 92
1.4	213	7, 15, 27, 31, 33, 37, 43, 59, 67, 85
1.5	225	1, 5, 9, 11, 25, 29, 41
1.6	241	17, 19, 21, 23, 27, 33, 35, 36, 45, 47, 52, 53, 55, 57, 59, 67, 69, 71, 77, 146, 147, 151, 152
1.7	258	9, 27, 35, 53, 59, 63, 67, 73, 75, 83, 85, 91, 93, 95, 96, 124
1.8	269	3, 5, 7, 17, 19, 25, 27, 28, 29-34, 35, 37, 53, 55, 57, 59, 63
1.9	280	43, 49, 53, 55, 57, 63
1.10	291	15, 18, 19, 23, 25, 27, 31, 33, 39, 41, 44, 46, 64, 65, 66
2.1	314	5, 7, 17, 21, 27, 37, 51
2.2	330	1-4, 5-8, 11, 17, 31, 39, 41, 57, 65, 71
2.3	348	3, 5, 7, 9, 13, 15-18, 23, 25, 27, 31, 37, 43, 47, 57, 67, 69
2.4	363	9, 11, 13, 15, 27, 29, 43, 44, 45
2.5	377	23, 24, 25, 27, 29, 43, 45, 46, 47, 49, 53, 58
2.6	398	5, 7, 15-20, 25, 27, 29, 31, 37, 39, 49, 57, 65, 95
2.7	412	17, 25, 27, 35, 37, 39, 41, 43, 53, 55, 61, 63, 65, 67, 69
3.1	448	19-24, 35, 39, 41, 52, 61, 63, 64, 73, 88, 90, 91, 93
3.2	463	1, 7, 9, 13, 21, 23, 27, 33, 43, 47-52, 65, 73, 83, 85, 87, 89, 91, 93, 97, 99, 101, 107, 109, 111, 151
3.3	475	5, 9, 13, 29, 30, 37, 41, 57, 68, 69, 83, 88, 93, 94, 96, 97, 99, 137
3.4	488	5, 9, 16, 19, 21, 22, 33, 37, 41, 43, 45, 63, 71, 75, 79, 83, 87, 89, 91, 93, 95, 97, 99, 101
4.1	532	15, 19, 25, 29, 41, 43, 45, 47, 63, 65, 69, 77, 80, 81
4.2	547	3, 5, 7, 17, 19, 23, 31, 35, 41, 55, 57, 59, 63, 67, 71, 77, 107
4.3	560	1, 7, 9, 11, 19, 29, 33, 35, 53, 55, 56, 57
4.4	575	1, 9, 11, 13, 16, 19, 25, 29, 31, 66, 67, 78, 85, 87, 91, 93, 95, 99
4.5	595	5, 11, 39, 57, 61, 65, 66
4.6	609	1, 2, 3, 4
4.7	626	1, 9, 11, 15, 25, 29, 33, 35, 39, 41, 43, 45, 55, 57, 61, 63, 65, 67, 71, 79
5.1	658	13, 21, 25, 27, 29, 32, 35, 37, 41, 43, 45, 47, 49, 51, 54, 55, 57, 59, 67
5.5	703	9, 23, 25, 27, 39, 45, 67, 99, 100, 101, 105, 106, 113, 115, 117, 160