
MATH FOR THE NATURAL SCIENCES

Spring 2021 | Syllabus | Math 118-01

CLASS INFORMATION

Professor

Lauren Williams, PhD

Meeting Times

MTWF 2:00 - 2:50

Meeting Location

Hirt 207

ZOOM OFFICE HOURS

Monday 12 - 12:50
Tuesday 9 - 10, 12 - 1:50
Wednesday 12 - 12:50
Thursday 9 - 10

CONTACT

Email

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Office

Old Main 404

Office Phone

(814) 824-2226

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.

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.

COURSE 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.

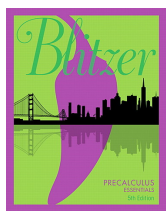
PREREQUISITES

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

- Began studying at Mercyhurst prior to Fall 2016
- Score of 54 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 January 29th. **Students that do not meet the prerequisites by this deadline may be dropped from the course.**

REQUIRED MATERIALS



Textbook

Precalculus Essentials by Robert Blitzer, 5th Edition. No other supplies are required for the course. 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.

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.

Calculators

You are not required to purchase a calculator for this course, and **you will not be permitted to use a calculator or other electronic device on any quizzes or exams.** You are strongly encouraged to avoid using a calculator while working on homework.

Moodle

At the beginning of the semester, you will receive a code to register for our course on Moodle. This is a free site created for this course by the Mercyhurst Mathematics Department. While most materials will also be posted on Blackboard, you will need to access Moodle for the course quizzes. You will receive an email to your Mercyhurst address with further information on creating your Moodle account.

IMPORTANT DATES

January

Jan 25: First Day of Class

Jan 29: Last Day to Add/Drop

February

Feb 17: Break, No Class

Feb 19: Exam 1

March

Mar 12: Exam 2

Mar 15: Fake Wednesday

Mar 16: Advising Day, No Class

Mar 30: Fall Registration Open

April

Apr 7: Break, No Class

Apr 2: Last Day to Declare P/F

Apr 9: Last Day to Withdraw

Apr 9: Exam 3

Apr 29: Break, No Class

May

May 4: Exam 4

May 6: Spring Classes End

May 7: Reading Day

May 12: Final Exam (1-3 pm)

COURSE COMPONENTS

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 available for 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 exams as shown on the course schedule. Information about how exams will be delivered and submitted will be given before each exam.

Your lowest exam grade, including a missed exam, will be replaced by your final exam grade (if better). This policy **does not** apply to exam grades of 0 due to academic dishonesty.

GRADES

Your final grade will be calculated as follows:

Component	Total Value
Quizzes (9 best)	30%
Exams (4)	50%
Final exam	20%

Mathematics Department Grade Scale:

Grade	F	D	D+	C	C+	B	B+	A
Percentage	0-59	60-69	67-69	70-76	77-79	80-86	87-89	90-100

QUIZ AND EXAM POLICIES

In addition to the usual University policies regarding academic honesty, please be sure to follow the specific requirements for this course when taking quizzes or exams:

You may...

- refer to your textbook and course materials while taking quizzes.
- contact me during an exam for clarification on an exam question, grading policy, etc.

You may NOT...

- refer to any materials besides the textbook or course materials. This includes solution manuals, web pages, etc. If it is not on Moodle, Blackboard, or in the textbook, do not use it while taking an exam!
- use mathematical software or apps such as Wolfram Alpha, CoCalc, Photomath, or any other utilities.
- ask for help or clarification from a classmate, friend, family member, online service such as Chegg, or anyone besides the instructor of the course.
- assist a classmate that requests help or information about a quiz or exam.

Violations of this policy may result in a grade of 0 on the quiz or exam. Severe or repeated instances of academic dishonesty will result in an academic dishonesty report to the University.

OTHER POLICIES

Missed Class

You do not need to let me know if you'll have to miss class. Just make sure you keep up to date with the schedule, and take advantage of the Zoom recordings of class if you are unable to attend in person.

Missed Quiz/Exam

If you know in advance that you will not be able to take a quiz or exam on the day it is scheduled, please discuss with me to make arrangements for an alternative time. Make up quizzes or exams will not be given for undocumented reasons unless arrangements are made in advance. However, keep in mind that a single missed quiz will be dropped from your final grade, and a missed exam will be replaced by your final exam grade.

Email

I will attempt to respond to emails promptly. For your own protection, please use your Mercyhurst email address. Emails received after 6 pm may not receive a reply until the next business day. If you have not received a response from me in over 24 hours on a weekday, feel free to send another - I may have missed your first message.

Books

The textbook we are using is the 5th edition of *Precalculus Essentials* by Robert Blitzer. If you are able to find the 4th edition for a lower price, that will work fine for the class (just note that the page numbers on the homework list will be off a bit). An edition of *Precalculus* by Robert Blitzer is also fine, as it's the same material with a few additional chapters.

Extra Credit

Out of fairness to all students in the class, I do not give extra credit opportunities to improve your final grade.

SEMESTER SCHEDULE

Any changes to quiz or exam dates will be announced in class and on Blackboard.

Monday	Tuesday	Wednesday	Friday
Jan 25 Class Intro	Jan 26 P.1 Algebraic Expressions and Real Numbers	Jan 27 P.2 Exponents and Scientific Notation	Jan 29 Practice Quiz Due P.3 Radicals and Rational Exponents
Feb 1 P.3 Radicals and Rational Exponents	Feb 2 P.4 Polynomials	Feb 3 P.5 Factoring Polynomials	Feb 5 Quiz P.5 Factoring Polynomials
Feb 8 P.6 Rational Expressions	Feb 9 P.6 Rational Expressions	Feb 10 P.7 Equations	Feb 12 Quiz P.9 Linear and Abs Value Inequalities
Feb 15 P.9 Linear and Abs Value Inequalities	Feb 16 Review Day	<i>Feb 17</i> <i>Break</i>	Feb 19 Exam 1
Feb 22 1.1/1.2 Graphs, Functions	Feb 23 1.2/1.3 More on Functions and Graphs	Feb 24 1.4, 1.5 Linear Functions and Slope	Feb 26 Quiz 1.6 Transformations of Functions
Mar 1 1.7 Combinations of Functions	Mar 2 1.8 Inverse Functions	Mar 3 1.9 Distance and Midpoint Formulas	Mar 5 Quiz 1.10 Modeling with Functions
Mar 8 2.1 Complex Numbers	Mar 9 2.2 Quadratic Functions	Mar 10 Review Day	Mar 12 Exam 2
Mar 15 2.3 Polynomials and Their Graphs	<i>Mar 16</i> <i>Advising Day</i>	Mar 17 2.3/2.4 Dividing Polynomials	Mar 19 Quiz 2.4 Dividing Polynomials
Mar 22 2.5 Zeros of Polynomial Functions	Mar 23 2.6 Rational Functions and Their Graphs	Mar 24 2.6 Rational Functions and Their Graphs	Mar 26 Quiz 2.7 Polynomial and Rational Inequalities
Mar 29 3.1 Exponential Functions	Mar 30 3.2 Logarithmic Functions	Mar 31 3.3 Properties of Logarithms	Apr 2 Quiz 3.4 Exp and Log Equations
Apr 5 3.4 Exp and Log Equations	Apr 6 Review Day	<i>Apr 7</i> <i>Break</i>	Apr 9 Exam 3
Apr 12 4.1 Angles and Radian Measure	Apr 13 4.2 Trigonometric Functions	Apr 14 4.3 Right Triangle Trigonometry	Apr 16 Quiz 4.4 Trig Functions of Any Angle
Apr 19 4.5 Graphs of sin and cos	Apr 20 4.6 Graphs of Other Trig Functions	Apr 21 4.7 Inverse Trig Functions	Apr 23 Quiz 4.7 Inverse Trig Functions
Apr 26 5.1 Verifying Trig Identities	Apr 27 5.1 Verifying Trig Identities	Apr 28 5.5 Trigonometric Equations	Apr 30 Quiz 5.5 Trigonometric Equations
May 3 Review Day	May 4 Exam 4	May 5 Final Review	<i>May 7</i> <i>Reading Day</i>
<i>May 10</i>	<i>May 11</i>	May 12 Final Exam	<i>May 14</i>

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. Working on additional problems is highly recommended.

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	84	2, 4, 6, 8, 10, 16, 18, 24, 26, 28, 34, 38, 42, 46, 52, 60, 62, 64, 70, 72, 88, 96
P.7	105	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	137	28, 30, 32, 38, 42, 50, 54, 58, 60, 62, 68, 70, 78
1.1	158	2-12 even, 14, 18, 42, 44, 46, 52
1.2	176	28, 30, 32, 40, 42, 55-64, 78, 80, 82, 84, 94, 126
1.3	195	2, 4, 6, 8, 10, 12, 14, 18, 20, 22, 34, 38, 40, 42, 56, 58, 60, 72, 122
1.4	213	2, 4, 6, 8, 10, 12, 14, 18, 22, 26, 30, 38, 40, 42, 48, 60, 64, 68, 85, 86, 118
1.5	225	6, 8, 10, 14, 16, 22, 24, 33, 34
1.6	241	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	258	2, 4, 8, 10, 16, 18, 20, 52, 54, 56, 58, 62, 64, 66
1.8	269	2, 4, 6, 10, 12, 14, 16, 22, 28, 29-34, 54, 56, 58, 60, 62, 64
1.9	280	2, 4, 6, 20, 22, 24, 32, 34, 40, 42, 46, 54, 56, 58, 60, 62, 66
1.10	291	20, 22, 26, 28, 30, 31, 47
2.1	314	2, 6, 8, 10, 14, 16, 20, 22, 24, 28, 30, 32, 34, 38, 46, 52, 58, 60, 82
2.2	330	1-4, 10, 12, 14, 16, 18, 26, 28, 40, 42, 44, 46, 100
2.3	348	15-18, 20, 22, 24, 26, 28, 30, 32, 34, 38, 42, 44, 110, 112
2.4	363	2, 4, 8, 12, 18, 20, 28, 44
2.5	377	2, 4, 6, 26, 28
2.6	398	2, 4, 22, 24, 26, 30, 34, 38, 40, 42, 44, 58, 62, 66, 74
2.7	412	2, 4, 8, 16, 32, 42, 46, 54, 62, 104, 106
3.1	448	19-24, 26, 28, 30, 32, 36, 38, 42, 44, 62
3.2	463	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	475	2, 4, 8, 12, 14, 16, 20, 26, 28, 32, 34, 38, 40, 42, 44, 48, 50, 54, 64, 66, 84, 86
3.4	488	5, 9, 16, 19, 21, 22, 33, 37, 41, 42, 43, 45, 63, 64, 71, 75, 79, 83, 87, 89, 91, 92, 94, 95, 97, 99, 102
4.1	532	14, 16, 18, 20, 22, 24, 26, 42-52 even, 58, 60, 62, 64, 66, 68, 70, 77-82, 126
4.2	547	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 30, 32, 34, 36, 40, 44
4.3	560	9-18, 22, 24, 26, 44, 46, 48
4.4	575	2, 4, 36, 38, 40, 42, 62, 68, 70, 72, 74, 88, 100, 102
4.5	595	2, 4, 6, 8, 14, 18, 38, 46, 48, 62, 64, 66
4.6	609	1-4
4.7	626	2, 4, 8, 14, 32, 34, 44, 48, 50, 54, 64, 68
5.1	658	2, 6, 8, 14, 18, 24, 30, 38, 52, 56
5.5	703	12, 16, 18, 26, 34, 40, 44, 50, 64, 68

MOODLE



Moodle is a Learning Management System, similar to Blackboard, that allows for flexible mathematics based quizzes. We will be using Moodle for all quizzes and for additional course resources. There is no fee for using Moodle.

Accessing Moodle

At the beginning of the semester, you will receive an email (delivered to your Mercyhurst email address) with information on enrolling in the Moodle course. You will be required to create a password. Be sure to keep this password safe, and do not share your login information with other students in the course.

There is a mobile app available for Moodle, but it is not recommended for use in this course. A computer (desktop or laptop) or tablet is strongly preferred, using the Moodle website as opposed to the app.

Question Styles

The quizzes and exams you'll take on Moodle are based on homework problems from the textbook. Some questions are multiple choice, and others will require you to enter a numerical answer. When necessary, specific instructions will be provided with a question. Questions will be asked one at a time, so you can focus on each individual question as you work.

Time Restrictions

You will be required to finish each quiz within 90 minutes. Any work you have completed will be submitted at the end of this period, even if you have not finished the assessment.

Availability Windows

Each quiz can only be submitted during its availability window. You will have a 24 hour period, from 12 am until 12 pm, in which to complete the quiz on the dates in this syllabus.

Please note that once you begin a quiz, you will be required to complete it within the given time period or before the end of the availability window, whichever comes first. For instance, if you begin a quiz at 11 pm, you will only have 1 hour to finish. Be sure to allow yourself enough time to finish each assessment before you begin.

Grades

Your quiz grades will be available immediately. Correct answers and detailed solutions will be available the day after the quiz is available. Grades will be transferred to Blackboard so you can keep track of your overall progress in the class.

Technical Support

The Moodle website has a support page with answers to many common questions:

<https://support.moodle.com/hc/en-us>.

If you have questions or issues with the course itself, or if you encounter any problems with a quiz, please notify me as soon as possible.

UNIVERSITY RESOURCES AND POLICIES

ADA Accommodations/Academic Support

Mercyhurst University is committed to making reasonable accommodations for qualified students, and employees with disabilities as required by law. 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 Sexual Misconduct/Sexual Harassment Reporting

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 Dr. Laura Zirkle, Interim Title IX Coordinator and VP for Student Life, titleix@mercyhurst.edu, 814-824-2362, Egan Hall 314.

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).

Academic Honesty

Students are required to uphold academic integrity throughout the course. In particular, the use of unauthorized materials or collaboration on quizzes or exams and other incidences of academic dishonesty will be handled according to the policies set forth in the Student Handbook.

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.

COVID-19 INFORMATION

This is going to be another unusual semester! While we cannot know what the next few months will bring, we must all work together to keep our campus community safe and healthy.

This page features information regarding policies of the University (in italics) as well as comments, suggestions, and requests that pertain to our class specifically.

A/B Meeting Schedule

If our class exceeds the maximum recommended capacity of our classroom under social distancing guidelines, we will be following the A/B schedule for our class meetings. This means that only half of you will attend in person classes each day, with the rest of you attending virtually through a live Zoom meeting. A schedule will be posted on Blackboard before the start of the semester indicating which group you're in and what days you should plan to come to the classroom.

Face Masks

As per the COVID-19 Prevention, Mitigation, and Response Policy, Mercyhurst University is requiring that all members of the campus community wear a cloth or disposable face covering over their nose and mouth when on campus. Please refer to the policy for specific details as to where and when face coverings are required. Students may use their own face coverings or those provided by the University. A student in need of a face covering should email covid19@mercyhurst.edu or call 814-824-3600 to find the nearest location where face coverings are available. The University's Mask/Face Coverings Policy will be enforced in this class.

Sanitation and Safety

In keeping with the COVID-19 Prevention, Mitigation, and Response Policy, students are expected to use hand sanitizer and to wipe down their desks using disinfectant wipes when they enter and exit the classroom. Classrooms have been provided with sanitizer and disinfectant wipes for student and faculty use.

Eating and Drinking 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 straw preferably, is permitted to be used in classrooms and labs to help prevent a student from becoming uncomfortably parched. Masks should be pulled only slightly away from the bottom of the face to take a quick drink and immediately replaced to covering the mouth and nose.

Class Dismissal and Congestion Prevention

In keeping with the COVID-19 Prevention, Mitigation, and Response Policy, faculty members and students should take steps to avoid crowding outside of classrooms, in hallways, and any enclosed area in university buildings. All rooms will be designated with signs indicating maximum capacity for specific instructional use. These must always be adhered to. Students waiting to enter classrooms or exiting classrooms should always maintain a minimum of 6 feet of distance from others. Class time endings may be adjusted when necessary to minimize overcrowding or congestion.

COVID-19 INFORMATION, CONTINUED

Seating Chart

In compliance with federal and state regulations, the University must be able to conduct contact tracing if there is a positive test or an outbreak; therefore, seating charts are mandatory for all in-person classes. Students will be required to sit in the same seat in the classroom each time they attend class. The seating chart will be available for review for purposes of contact tracing.

Paper Sharing Policy

We will not be exchanging paper this semester. Supplemental materials will be distributed and made available electronically. Assignments and exams will be submitted electronically as well. You are welcome to bring your own paper to class to take notes, but you may not pass paper to a classmate or to me.

Attendance and Missed Classes

Attendance at all classes is expected. However, it is important that students and course instructors adhere to the university's COVID-19 mitigation policies and strategies. As such, a student who misses class due to illness or suspected illness within the context of those policies will not be penalized and will be provided sufficient means to make up any missed course content or work and remain actively engaged in the class.

The word “attendance” has a broader definition than usual this semester. While attending class is preferred, please do not feel obligated to come if you are feeling ill. You are free to join and participate in the live Zoom meeting in lieu of attending a class meeting, regardless of your A/B schedule. If you're not up to joining in, please watch the recording of the class meeting and the associated video lectures when you're able to.

If you are unable to attend class (or join the live Zoom meeting) for more than a few days, please let me know as soon as possible. I am happy to work with you in building a plan that allows you the time off you need without risking your academic progress.

Potential Class Changes

It is my hope that we remain able to meet in person as scheduled for the entire semester. However, there is a very good chance that our plans will change, and without much notice.

If we are unable to continue meeting in person, you will still have the opportunity to “attend” class via Zoom during our regularly scheduled times. The course content on Blackboard was created to help fill in any unexpected gaps in meetings or attendance.

Our highest priority is to remain healthy and safe. We will all need to remain responsible, flexible, and understanding to make this semester a success, and I have full confidence that we will be able to achieve that goal.