

INSTRUCTOR

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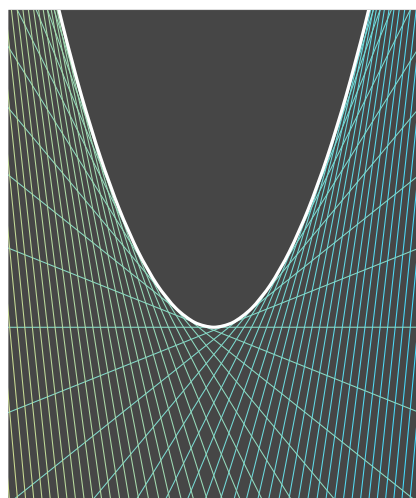
COURSE DESCRIPTION

This is the initial course in a sequence of courses on the fundamental ideas of the calculus of one variable. It is here that truly significant applications of mathematics begin. Topics included are functions, continuity, limits, derivatives, maxima and minima and antiderivatives.

COURSE OBJECTIVES

On successful completion of the course, students will be able to:

- recognize, define, and apply properties of functions, such as their domain, range, intercepts, and inverses;
- be able to evaluate a variety of limits;
- identify discontinuities of a function presented either graphically or algebraically;
- find the derivative of functions using the limit definition;
- find the derivative of sums, products, and quotients of composite polynomial, trigonometric, exponential, and logarithmic functions;
- understand conceptual relationships between derivatives, rates of change, and tangent lines;
- use properties of functions and derivatives to graph functions;
- apply differentiation procedures to solve related rates and extreme value problems;
- identify and evaluate limits involving indeterminate forms;
- compute definite and indefinite integrals using formulas and substitution;
- understand the relationship between the integral and the derivative; and
- read and interpret mathematical theorems, including checking that hypotheses are satisfied and reaching correct conclusions.



OFFICE HOURS

Monday 9:00 - 10:00
Monday 12:30 - 1:30
Tuesday 1:00 - 3:00
Wednesday 12:30 - 1:30
Thursday 8:00 - 9:00
and by appointment

COURSE WEBSITE: <http://integral-domain.org/lwilliams/Math170/>



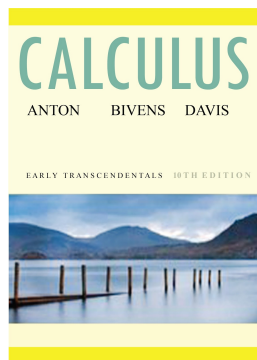
PREREQUISITES

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 70 or better on the ALEKS Mathematics Placement Assessment
- Passed Math 118 (Math for the Natural Sciences), or transfer credit for equivalent
- Passed both Math 111 (College Algebra) and Math 112 (Trigonometry and Functions), 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 Monday, August 26th. **Students that do not meet the prerequisites by this deadline may be dropped from the course.** You will be contacted via email by the instructor reminding you to show proof of meeting prerequisites before any action is taken.

REQUIRED MATERIALS



Textbook

Calculus, Early Transcendentals by Anton, Bivens, and Davis, 10th Edition. We will be covering chapters 0-5 in the textbook. No other supplies are required for the 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're welcome to do so.

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.

COURSE COMPONENTS

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. 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 lowest quiz grade, including a missed quiz, will be dropped when calculating your final grade.

If you miss a quiz, you must make arrangements to take it before the graded quizzes are returned to the class; this will typically be the next class meeting.

Exams

There will be four midterm exams given throughout the semester, in addition to the final exam. The material on the exams will be similar to topics covered on quizzes and homework. You will be given review guides for each exam. All exams should be considered to be cumulative; each exam will include some material from the previous exams.

If you need to miss class during a scheduled exam for a documented, excused reason (illness, family emergency, athletics), you will be able to make up the exam. You must schedule a time to retake any exam within one week of the day the exam was given in class.

Your lowest exam grade (including a missed exam) will be replaced by your final exam grade, if your final exam grade is better. A grade of 0 on an exam due to academic dishonesty will *not* be replaced by the final exam grade.

Final Exam

The final exam is cumulative, including material from all sections covered in class. Most questions on the final will be taken (with minor modifications) from homework, quizzes, and previous exams.

You are required to take the final exam for this course regardless of your average on earlier exams or quizzes. If you will not be able to take the final exam at its scheduled time, please make alternate arrangements as soon as possible. Final exams may be made up for excused absences only.

The final exam is scheduled for **Wednesday, December 11, 8:00 - 10:00 am.**

Progress

Quiz and exam grades will be posted on Blackboard throughout the semester.

GRADING

300 POINTS **Midterm Exams**
Four exams, 75 points each
Lowest replaced by final if better

100 POINTS **Quizzes**
Eleven quizzes, 10 points each
0.5 point for attendance
Lowest quiz grade dropped

100 POINTS **Final Exam**

500 POINTS **Total Possible**

Grading Scale

D	D+	C	C+	B	B+	A
298	333	348	383	398	433	448
60%	67%	70%	77%	80%	87%	90%

OTHER COURSE INFORMATION

- Please ask questions - in class, office hours, or tutoring - as soon as you feel stuck. Mathematics is a naturally cumulative subject. If you do not understand a particular topic, you will not understand topics that come after.
- There are other textbooks available in the library and in my office. Due to book prices, you may not want to invest in a second book, but it can be helpful to have alternate sources or see topics explained in other ways.
- I do not keep detailed lecture notes. It is highly recommended that you establish contacts among your classmates to get notes in case you miss class.
- I will attempt to answer email as quickly as possible, but please allow up to 24 hours for a response (particularly on weekends).
- Attendance is not required, but coming to class regularly will give you the best chance of earning your desired grade. You are responsible for any work material covered in your absence. Please contact me if you are absent for an extended period.
- You are neither expected nor required to purchase any materials for the course aside from the required textbook. Graphing calculators and mathematical software could be used to check your work, but should not be relied on to do the work for you.

LEARNING DIFFERENCES

Mercyhurst University is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. Students with disabilities requiring accommodations should consult with the Learning Differences Office to discuss eligibility for services or submit the online accommodation request to the Director of Equal Opportunity Programs (DEOP) at ada@mercyhurst.edu.

For students requiring accommodations for learning differences, it is the policy of Mercyhurst University that it is the student's responsibility to provide documentation of his/her disability to the DEOP.

Students are advised to request accommodations at the time of acceptance or prior to the start of the semester. Students may request accommodations at any time throughout the program, however accommodations are not retroactive.

ACADEMIC HONESTY

Students are required to uphold academic integrity throughout the course. In particular, plagiarism of any sort, unauthorized collaboration on exams, quizzes and other assignments, 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.

SEMESTER SCHEDULE

Monday	Tuesday	Wednesday	Friday
<i>Aug 19</i>	<i>Aug 20</i>	Aug 21 Class Intro, Overview	Aug 23 0.1, 0.2: Functions, New Functions from Old
Aug 26 <i>Add/Drop Deadline</i> 0.3: Families of Functions	Aug 27 0.4: Inverse Functions	Aug 28 0.5: Exp and Log Functions	Aug 30 Quiz 1.1: Limits, An Intuitive Approach
<i>Sep 2</i> <i>Labor Day</i>	Sep 3 1.2: Computing Limits	Sep 4 1.3: Limits at Infinity	Sep 6 Quiz 1.3: Limits at Infinity
Sep 9 1.5: Continuity	Sep 10 1.5: Continuity	Sep 11 1.6: Continuity of Trig, Exp, and Inverse	Sep 13 Quiz Review/Catch Up Day
Sep 16 2.1: Tangent Lines and Rates of Change	Sep 17 Review	Sep 18 Exam I	Sep 20 2.2: The Derivative Function
Sep 23 2.2: The Derivative Function	Sep 24 2.3: Intro to Differentiation Techniques	Sep 25 2.4: The Product and Quotient Rules	Sep 27 Quiz 2.5: Derivatives of Trig Functions
Sep 30 2.6: The Chain Rule	Oct 1 3.1: Implicit Differentiation	Oct 2 3.1: Implicit Differentiation	Oct 4 Quiz 3.2: Derivatives of Log Functions
Oct 7 3.3: Exp and Inverse Trig Functions	Oct 8 3.4: Related Rates	Oct 9 Quiz 3.4: Related Rates	<i>Oct 11</i> <i>Fall Break</i>
Oct 14 3.5: Local Linear Approximation	Oct 15 Review	Oct 16 Exam II	Oct 18 3.6: l'Hopital's Rule, Indeterminate Forms
Oct 21 3.6: l'Hopital's Rule, Indeterminate Forms	<i>Oct 22</i> <i>Advising Day</i>	Oct 23 4.1: Increase, Decrease, Concavity	Oct 25 Quiz 4.2: Relative Extrema, Graphing Polynomials
Oct 28 4.2: Relative Extrema, Graphing Polynomials	Oct 29 4.3: Rational Functions	Oct 30 4.3: Rational Functions	Nov 1 Quiz Review/Catch Up Day
Nov 4 4.4: Absolute Extrema	Nov 5 4.5: Applied Min/Max Problems	Nov 6 4.5: Applied Min/Max Problems	Nov 8 Quiz 4.6: Rectilinear Motion
Nov 11 4.8: Rolle's and Mean Value Theorems	Nov 12 Review	Nov 13 Exam III	Nov 15 <i>Last day to withdraw</i> 5.1: An Overview of the Area Problem
Nov 18 5.2: The Definite Integral	Nov 19 5.3: Integration by Substitution	Nov 20 5.3: Integration by Substitution	Nov 22 Quiz 5.5: The Definite Integral
Nov 25 5.6: The Fundamental Theorem of Calculus	Nov 26 5.9: Definite Integrals by Substitution	<i>Nov 27</i> <i>Thanksgiving Break</i>	<i>Nov 29</i> <i>Thanksgiving Break</i>
Dec 2 Quiz 5.9: Definite Integrals by Substitution	Dec 3 Review	Dec 4 Exam IV	Dec 6 Review, Last Class Meeting
<i>Dec 9</i> <i>Reading Day</i>	<i>Dec 10</i>	Dec 11 Final Exam 8:00 - 10:00	

HOMWORK LIST

Your homework will not be collected, but these problems (and similar questions) are likely to appear on quizzes and exams. Working on additional problems is highly recommended.

Sec.	Page	Problems
0.1	12	1, 3, 5, 7, 9, 15, 19, 23, 27, 29, 31a-c
0.2	24	1, 3, 5, 11, 13, 17, 25, 27, 29, 31, 33, 35, 39, 41, 49, 53, 61, 63
0.3	35	1, 3, 11, 15, 17, 19, 25, 29, 31
0.4	49	1, 3, 5, 9, 13, 17, 19, 25, 27, 31, 39, 41
0.5	61	1, 5, 9, 11, 13, 15, 17, 21, 23, 25, 27, 47, 57
1.1	77	1, 3, 5, 7, 9, 17-20, 21, 23, 25, 31
1.2	87	1, 3, 7, 11, 13, 15, 19, 21, 25, 31
1.3	96	1, 3, 5, 9, 13, 15, 21, 31, 33, 37, 43
1.4	106	You are not responsible for this section (but try 17 and 21 anyway!)
1.5	118	1, 3, 5, 7, 11, 13, 17, 21, 29, 31, 35, 45, 47
1.6	125	1, 7, 9, 13, 17, 19, 21, 23, 27, 31, 37, 49, 67
2.1	141	3, 11, 13, 15, 17, 23
2.2	152	1, 3, 7, 9, 11, 21, 23, 25, 29
2.3	161	1, 3, 5, 7, 9, 13, 15, 17, 21, 23, 29, 37, 39, 41, 43, 45, 49
2.4	168	1, 3, 5, 7, 11, 13, 19, 21, 23, 27, 29, 31, 33, 39
2.5	172	1, 5, 11, 15, 17, 21, 23, 27, 29, 31
2.6	178	3, 7, 9, 11, 15, 17, 19, 23, 27, 35, 37, 39, 45, 49, 51, 53, 77
3.1	190	3, 5, 7, 9, 11, 13, 15, 17, 27
3.2	195	1, 3, 7, 9, 13, 19, 23, 25, 27, 35, 37, 41
3.3	201	15, 17, 19, 21, 23, 25, 37, 43, 51, 65
3.4	208	1, 5, 13, 15, 17, 19, 25, 27
3.5	217	3, 5, 7, 23, 25, 29, 31, 43
3.6	226	1, 7, 9, 11, 13, 17, 21, 23, 27, 29, 33, 57
4.1	241	1, 5, 7, 9, 15, 17, 19, 21, 25, 29, 39
4.2	252	3, 5, 7, 9, 11, 19, 25, 27, 29, 33, 37, 41, 43, 45, 53
4.3	264	1, 3, 5, 9, 13, 19, 23, 25, 31
4.4	272	3, 7, 9, 11, 13, 21, 23, 25, 27, 31, 33
4.5	283	3, 5, 13, 19, 21, 23, 27, 29, 31, 37, 55
4.6	294	1, 3, 13, 17, 19, 33
4.8	308	1, 3, 5, 7, 15, 25, 41
5.1	321	7, 9, 13, 15, 17
5.2	330	5, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 43, 45
5.3	338	1, 3, 7, 9, 11, 15, 17, 21, 23, 27, 31, 33, 39, 41, 47, 53, 55, 61, 69, 71
5.5	360	13, 15, 19, 21, 23, 25, 33
5.6	373	7, 9, 13, 15, 17, 19, 23, 29, 31, 59, 61
5.9	393	1, 5, 9, 15, 17, 19, 21, 31, 33, 35, 37, 43, 45, 49, 53