CALCULUS 1

MATH 152 (4 CREDITS)
DORDT COLLEGE – SPRING 2018

INSTRUCTOR INFORMATION

Name:	Dr. Melissa Lindsey
Email Address:	melissa.lindsey@dordt.edu
Office Phone:	712-722-6740
Office Location:	SB 1609 (1st floor of the science building)
Office Hours:	Monday, Tuesday, Thursday, Friday 10:00 – 10:50, or by appointment

CLASS INFORMATION

Meeting Location:	SB 1637	(1st floor of the science building)
Meeting Times:	Monday, Friday 12:00 pm – 12:50 pm	
	Tuesday, Thursday 11:00 am – 11:50 am	

COURSE DESCRIPTION

CATALOG DESCRIPTION

A study of the basic concepts and techniques of calculus for students in all disciplines. Topics include limits, differentiation, integration, and applications. This course is intended for students without any previous calculus credit.

PREREQUISITE

Grade of C- or higher in Math 115 or equivalent

REQUIRED TEXTS AND MATERIALS

TEXTBOOKS

Calculus: Early Transcendentals, 8th edition by Stewart

TECHNOLOGY

1. **Canvas** will be the primary tool I use to communicate with you regarding course materials, announcements, and your grades. You should make sure that you are in the habit of checking our course page on canvas for what is expected of you each day to be prepared for class.

2. **WebAssign** is an online homework platform and the main way in which you will be completing your after-class work. If your textbook did not come with a web-assign access code, you will need to also purchase access to WebAssign. You may enroll in our WebAssign course using the key

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3. **Graphing calculators** are an important tool when exploring calculus. The use of calculators is allowed (and sometimes encouraged) during class and when working on assignments, but will not be permitted on tests.

LEARNING OUTCOMES

At the end of the semester, students will be able to

1. Demonstrate mastery of the mathematical concepts which have driven the development of our understanding of the inner working of creation and technology over the past 400 years. (RO, CD)

2. Learn how to work with and apply techniques of limits, differentiation, and integration using standard methods of calculus. (CS)

3. Apply these tools and concepts to mathematical and real-world problems in a variety of settings. (CS, CR)

ASSESSMENTS

1. **Pre-class guided activities** –To prepare you for the content covered in class, I will assign daily(ish) guided activities to introduce you to a new topic before you come to class. These will be marked for effort and completeness only.

2. **WebAssign** – In order to help you self-assess whether or not you mastered the content covered in class you will be completing a few problems after class using WebAssign. These assignments will be due at 11:59pm the day of the following class period.

3. **Mastery based exams** – There are 30 learning targets in this course (listed in the section titled 'Learning Targets'). Each learning target will be assessed on at least two exams. Each problem will earn a grade of E – "exceeds expectations", M – "meets expectations", R – "reassess – some progress shown, but the problem is incorrect or incomplete", or F – "failure to make progress". If you want to reattempt a learning target to improve your grade after the second exam it appears on, you will have the opportunity to do so outside of regularly scheduled class time.

4. **Derivative Gateway Exam –** One of the topics that we are going to spend a majority of the semester exploring is the derivative of a function. In order to properly explore and answer questions about applications, it is important that you differentiate a function quickly and correctly. To this end, you will take an exam consisting of taking 12 derivatives. You must correctly differentiate at least 10 of the 12 functions given to pass.

5. **Project** – Towards the end of the semester, you will have the opportunity to think deeply about one of the big ideas of the course. The project will require a typed solution with clear mathematical exposition on the given problem. Details of the project will be given in class on Friday April 6. You will submit the project on Canvas by 11:59pm on Saturday April 21.

6. **Reformational Reflection** – You will be assigned a brief essay in which you reflect on the course from a Reformed perspective. Details will be handed out in class on Friday March 8. You will submit your reflection on Canvas by 11:59pm on Saturday April 7.

7. **Final** – The final exam will be comprehensive and will be used to determine how your base grade is modified (add a plus, leave unchanged, add a minus, drop a letter grade). The details are listed in the section on Grading.

GRADING

The letter portion of your course grade will be determined by the level at which you have achieved mastery on each of the assessments described on the previous page. In particular, the letter portion of your grade will correspond to the highest row in the following table which is fully completed.

Grade	Pre-Class Activities (out of 40 ish)	WebAssign (% earned)	Gateway Exam	Learning Targets Passed		Project	Reformational Reflection
				With an M or E	With an E		
A	34	85%	Passed	26	15	Passed	Passed
B	34	85%	Passed	26	7	Not Required	Passed
C	34	70%	Passed	23	0	Not Required	Passed
D	34	50%	Passed	15	0	Not Required	Not Required

The final exam will consist of 10 problems (each graded out of 10 points) related to the 10 learning targets that have been determined to be the essential to master prior to continuing on to Calculus II. These learning targets are marked with a * on the list of learning targets. The final exam will modify your base grade in the following way:

- If you earn 85 points or more, your base grade will have a **plus** attached to it (unless it is an A; Dordt does not award A+ grades).
- If you earn 65 – 84 points, your base grade will be **unmodified**.
- If you earn 50 – 64 points, your base grade will have a **minus** attached to it.
- If you earn 49 points or less, your base grade will **drop by a full letter grade.**

Note that if your base grade is an F, your course grade will be an F regardless of your performance on the final checkpoint.

REASSESSMENTS AND REVISIONS

There are two goals of the assessments in this course. **The first goal** is to hold you accountable for being an active and engaged member of our classroom learning community. This is where the pre-class activities and WebAssign come into play. Since these are intended to keep you on pace with the course material, late submissions will not be accepted. However, there is some grace built in to the grading rubric in these categories to account for the occasional missed assignment.

The second goal of the assessments is to measure how well you are meeting the learning outcomes of the course. However, I am primarily concerned with your ability to demonstrate mastery of the learning outcomes *eventually* during the semester, so the opportunity to reattempt or to revise and resubmit is available for the other assessment categories.

Reattempts: If you do not pass the gateway exam or a learning target during the scheduled exam times in class, you will be able to reattempt them outside of class. If you have not earned at least an R on a learning target, you must complete an additional WebAssign assignment related to the learning target to earn a reassessment. During non-exam weeks, you will be allowed to sign up on Tuesday to reassess the gateway exam or up to two learning targets on Thursday immediately following class (from 11:50 – 12:15).

Revise and Resubmit: If your initial submission for the project or the reformational reflection does not meet the requirements for passing, I will provide you feedback and ask you to revise and resubmit. You will have one week from after the assignment is graded to submit your revision. As long as you are making forward progress, we will continue this process as many times as necessary up until finals week.

COURSE FORMAT

As indicated in the Assessment Section, you will be doing calculus in three different settings: Before Class, During Class, and After Class. Details of what is expected of you during each of those times are included below.

Before Class	I will assign pre-class activities to prepare you to engage with the more challenging parts of the content in class. If you do not complete these activities you will not be prepared to learn in class and you will impede the learning of your classmates. It is imperative as a member of our classroom community that you make a good faith effort to compete the pre-class activities. It is okay if you are confused or don't understand something. Coming to a class with a question about the pre-class work is entirely different than coming to class without having thought about it at all. You must be in class on time and prepared to learn to earn credit for the pre-class activity.
During Class	Our time together in class will be spent in three different ways: 1. Spending 0 – 5 minutes making sure we've answered any lingering questions regarding the pre-class activities. 2. Spending 35 – 45 minutes working on group activities designed to help you develop a deep understanding of calculus concepts and equip you to be able to demonstrate mastery of the learning targets. 3. Spending 5 – 10 minutes coming together at the end of class to make sure we're all on the same page about what we learn that day.
After Class	To give you additional individual practice working on problems related to the learning targets you will complete online assignments using WebAssign after each class period. If you are struggling to complete a significant portion of a homework assignment on WebAssign, this is an indicator that you need additional help to understand the topic at hand. Please seek out help using the resources listed below as soon as possisble. The longer you wait, the harder it will be to get back on track.

GETTING HELP

- Ask your classmates! Both in and outside of class, your classmates are a wonderful resource on your journey through calculus.
- Ask me! In and out of class, I am here to help you understand and learn the course content. Whether it's in class, during office hours, or via email, I want you to be asking questions to make sure that your learning is on track. Please note that I will respond to emails within 24 hours. If you wait until the last minute to ask a question regarding a WebAssign problem, you likely will not get an answer before it is due.
- The Academic Enrichment Center is located in the lower level of the library. You can sign up for free weekly tutoring appointments there! The majority of campus utilizes the AEC; you should too!
- Drop in tutoring is available in CL-91 from 7:00 pm – 9:00pm Monday through Thursday.

ATTENDANCE

You are an important part of our learning community and you are expected to be in class every day. Unexcused absences will prevent you from earning whatever points were available that day. In particular, if you miss class for an unexcused reason on a day when there is a pre-class activity due, you will not be able to earn points for that pre-class activity. If you miss class for an unexcused reason on a day when there is a test, you a make-up test will not be given.

DORDT COLLEGE STUDENT'S RIGHT TO ACCOMODATIONS POLICY

Any student who needs access to accommodations based on the impact of a documented disability should contact the Coordinator of Services for Students with Disabilities (CSSD):

Marliss Van Der Zwagg, Academic Enrichment Center
marliss.vanderzwagg@dordt.edu, (712) 722-6490

DORDT COLLEGE ACADEMIC DISHONESTY POLICY

Dordt College is committed to developing a community of Christian scholars where all members accept the responsibility of practicing personal and academic integrity in obedience to biblical teaching. For students, this means not lying, cheating, or stealing others' work to gain academic advantage; it also means opposing academic dishonesty. Students found to be academically dishonest will receive academic sanctions from their professor (from a failing grade on the particular academic task to a failing grade in the course) and will be reported to the Student Life Committee for possible institutional sanctions (from a warning to a dismissal from the college). Appeals in such matters will be handled by the student disciplinary process. For more information see the student handbook.

LEARNING TARGETS

The learning targets are a (broad) description of the problems you will see on exams. They are sorted by what chapter they appear in in Calculus: Early Transcendentals 8th Edition by Stewart. Learning Targets marked with a * will be covered on the Final Exam.

Chapter 2

1. Identify a limit graphically.
2. Compute a limit using algebraic methods.
3. Determine where a function is continuous and discontinuous.
4. Evaluate limits involving infinity, including finding the horizontal and vertical asymptotes of a function.*
5. Given a graph of a function, answer questions about the derivative of the function and vice versa.*
6. Use the definition to find the derivative of a function.

Chapter 3

7. Use the derivative to find the equation of the line tangent to the graph at a point.
8. Compute a derivative using implicit differentiation.
9. Solve a related rates problem.
10. Use differentials in application problems.
11. Find the linear approximation of a function and use it in an application.*

Chapter 4

12. Find the critical numbers of a function.
13. Compute the absolute maximum and minimum values of a function on a closed interval.
14. Identify intervals where a function is increasing and decreasing.
15. Use the first derivative test to find local extrema
16. Determine the intervals where a function is concave up and down.
17. Identify the inflection points of a function.
18. Use the second derivative test to find local extrema.
19. Graph a function using calculus.*
20. Solve an optimization problem.
21. Use L'Hospital's Rule to evaluate limits of indeterminate forms.*
22. Use anti-derivatives to solve a differential equation.

Chapter 5

23. Compute a Riemann sum of a polynomial function or a function presented graphically.
24. Use properties of the definite integral to evaluate definite integrals.
25. Use Part 1 of the Fundamental Theorem of Calculus to calculate a derivative.
26. Use Part 2 of the Fundamental Theorem of Calculus to calculate a definite integral.*
27. Compute an indefinite integral.*
28. Use the method of substitution to compute indefinite integrals.*
29. Use the method of substitution to compute definite integrals.*

Chapter 6

30. Find the area between two graphs*

PLANNED COURSE SCHEDULE*

Date	Topic	Section in Stewart
Tuesday January 16	How do we measure velocity?	2.1
Thursday January 18	ALEKS assessment	
Friday January 19	The Limit of a Function	2.2
Monday January 22	Limit Laws	2.3
Tuesday January 23	Limit Laws	2.3
Thursday January 25	Continuity	2.5
Friday January 26	No Class	
Monday January 29	Limits Involving Infinity	2.6
Tuesday January 30	Derivatives and Rates of Change	2.7
Thursday February 1	Derivative as a Function	2.8
Friday February 2	Derivative as a Function	2.8
Monday February 5	Derivatives of Polynomials and Exponentials	3.1
Tuesday February 6	Derivatives of Polynomials and Exponentials	3.1
Thursday February 8	Exam 1	
Friday February 9	Maximum and Minimum Values	4.1
Monday February 12	Product and Quotient Rules	3.2
Tuesday February 13	Derivatives of Trigonometric Functions	3.3
Thursday February 15	Mean Value Theorem	4.2
Friday February 16	No Class -- Reading Day	
Monday February 19	The Chain Rule	3.4
Tuesday February 20	The Chain Rule	3.4
Thursday February 22	Intervals of Increasing/Decreasing and The First Derivative Test	4.2/4.3
Friday February 23	Intervals of Concavity and The Second Derivative Test	4.3
Monday February 26	Curve Sketching	4.5
Tuesday February 27	Curve Sketching	4.5
Thursday March 1	Exam 2	
Friday March 2	Implicit Differentiation	3.5
Monday March 5	Derivatives of Logarithms	3.6
Tuesday March 6	Related Rates	3.9
Thursday March 8	Gateway Exam Attempt 1	
Friday March 9	Related Rates	3.9
Monday March 12	No Class – Spring Break	
Tuesday March 13	No Class – Spring Break	

Thursday March 15	No Class – Spring Break	
Friday March 16	No Class – Spring Break	
Monday March 19	No Class – Spring Break	
Tuesday March 20	Linear Approximation and Differentials	3.10
Thursday March 22	Linear Approximation and Differentials	3.10
Friday March 23	Optimization	4.7
Monday March 26	Optimization	4.7
Tuesday March 27	Catch Up/Review	
Thursday March 29	Exam 3	
Friday March 30	L'Hôspital's Rule	4.4
Monday April 2	L'Hôspital's Rule	4.4
Tuesday April 3	Gateway Exam Attempt 2	
Thursday April 5	Antiderivatives	4.9
Friday April 6	Areas and Distance	5.1
Monday April 9	Areas and Distance	5.1
Tuesday April 10	The Definite Integral	5.2
Thursday April 12	Exam 4	
Friday April 13	Indefinite Integrals	5.3
Monday April 16	The Fundamental Theorem of Calculus	5.4
Tuesday April 17	The Fundamental Theorem of Calculus	5.4
Thursday April 19	Substitution	5.5
Friday April 20	Substitution	5.5
Monday April 23	Catch Up/Review	
Tuesday April 24	Exam 5	
Thursday April 26	No Class – Ideafest	
Friday April 27	Area Between Curves	6.1
Monday April 30	Area Between Curves	6.1
Tuesday May 1	Average Value of a Function	6.5
Thursday May 3	Exam 6	
Friday May 4	Review for Final Exam	
Wednesday May 9	Final Exam: 10:30 am – 12:30 pm	

*This schedule is tentative. I reserve the right to adjust the schedule if necessary to meet the needs of our learning community. I will give at least 24 hours advanced notice of any minor schedule changes (order/pace of topics) and I will give notice at least one week in advance of any major schedule changes (exam dates).