Math 118: Differential Calculus

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Office Hours Monday, Wednesday, Friday 10:45 – 11:45 am and Monday 2:15 – 4 pm or by appointment.

Course Description This course provides an introduction to calculus, with integrated precalculus review of relevant topics. Calculus topics include the study of limits, derivatives, and graphing. Precalculus topics, which will be presented and reviewed as they are needed, include factoring, trig. functions, exponents and inverse functions. An additional focus of the course will be the use of technology as a learning aid.

Learning Outcomes By the end of the course, successful students will be able to:

- apply techniques of differentiation to model and solve problems
- understand the role of calculus and the infinitesimal in modern mathematics
- calculate, by hand, rudimentary limits and derivatives
- understand and manipulate the various types of functions
- recognize the role of technology in Calculus, understand when it should be used, and be aware of its limitations

Course Materials Textbook: *Calculus: Early Transcendental Functions* Smith and Minton, 4th edition
Devices: Graphing calculator

Important Dates We will have four in-class tests and a final exam. Each test will focus on the material learned since the last test, but will (necessarily) contain previous material. The final will be comprehensive. **If you have a conflict with one of these dates please email me ASAP.**

Test 1	**Wednesday 9/21, in class**
Test 2	**Friday 10/14, in class**
Test 3	**Monday 11/14, in class**
Test 4	**Wednesday 12/7, in class**
Final Exam	**Wednesday 12/14, 8:30 – 11:30 am**

Course Grades The final course grade is determined in the following way:

MCSP Conversations & In-Class Quizzes	**15%**
Inquire Quizzes	**10%**
Mathematica Projects	**15%**
Tests (10% each)	**40%**
Final Exam	**20%**

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below. Attendance and class participation will be considered when determining marginal grades.

		B+	88-89	C+	78-79	D+	68-69		
A	92-100	B	82-87	C	72-77	D	62-67	F	0-59
A-	90-91	B-	80-81	C-	70-71	D-	60-61		

MCSP Conversations The MCSP Department offers a series of talks designed to appeal to a broad audience. You are invited be involved with all of these meetings; however participation in at least two of these sessions is mandatory. After attending, you will submit within one week of the presentation a one page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal response to the experience. These reaction papers will be each be counted as a quiz.

Quizzes We will have a short weekly quiz on the calculus material we've learned. There will be no make-up quizzes, but at the end of the semester your lowest quiz score will be dropped.

Inquire Quizzes To help you practice the precalculus techniques learned during our reviews, there will be a quiz on Inquire for each precalculus review topic covered.

Mathematica Projects Throughout the semester, we will explore the applications of technology to the study of calculus by doing a series of Mathematica projects. These projects will introduce you to the software package Mathematica and allow you to take advantage of its graphical and computational capabilities to reinforce your understanding of calculus.

Daily Problems After each section I will assign some problems from the book for practice. These will not be collected – the answers are in the back and they are your chance to make sure you understand the material and to get help if you realize you need it. Feel free to work with other students on these problems.

Attendance Policy Class attendance is expected. If you do have to miss class, you are responsible for learning all material covered that day. If you have not discussed your absence with me beforehand, you will be unable to make up any work missed.

Expected Work Policy This course expects you to spend at least 12 hours of work each week inside and outside of class.

Electronic Devices You can use **only** your graphing calculator during class. (This means no cell phones - please set them on silent and leave them in your bag.)

Extra Resources Subject tutoring from other students is available through the Center for Teaching and Learning (in Fintel Library).

Special Needs If you have a disability that may require an accommodation in this course, please let me know and provide your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation I make. (Check with the Center for Teaching and Learning for their scheduling guidelines.)

Academic Integrity I expect all of you to follow the Academic Integrity policies of Roanoke College. All graded work should be your own work! If you ever have questions about how these policies apply to our class please contact me. Any violations of these policies will automatically be turned over to the Academic Integrity Council.

Course Schedule

The following schedule is approximate and subject to change except for the test dates. It should give you an idea of the timing of the topics covered and assignments. Sections of the book marked with a * will include precalculus review using Chapter 0 of the course text.

Day	Date	Topic	Assignments
W	A 31	1.1: Preview of Calculus	
F	S 2	1.2: Intro to Limits	
M	S 5	Intro to Mathematica	Project 1
W	S 7	1.3: Computing Limits	
F	S 9	1.3/1.4	
M	S 12	1.4: Continuity	
W	S 14	1.5: Limits with Infinity	Project 2
F	S 16	1.5	
M	S 19	Review	
W	S 21	**Test 1**	
F	S 23	1.6*: Formal Definition of Limits	
M	S 26	1.6/2.1	
W	S 28	2.1: Tangent Lines and Velocity	
F	S 30	Motion Detector Activity	Project 3
M	O 3	2.2*: Derivatives	
W	O 5	2.2	Project 4
F	O 7	2.3*: Computing Derivatives	
M	O 10	2.3	
W	O 12	Review	
F	O 14	**Test 2**	
		Fall Break	
M	O 24	2.4*: Product and Quotient Rules	
W	O 26	2.4/2.5	Project 5
F	O 28	2.5: Chain Rule	
M	O 31	Which Rule to Use?	
W	N 2	2.6*: Trig Derivatives	
F	N 4	2.6	Project 6
M	N 7	2.7*: Exponential Derivatives	
W	N 9	2.7	
F	N 11	Review	
M	N 14	**Test 3**	
W	N 16	2.8*: Implicit Differentiation	
F	N 18	2.8/2.10	Project 7
M	N 21	2.10: Mean Value Theorem	
		Thanksgiving Break	
M	N 28	3.1: Linear Approximation	
W	N 30	3.1/3.2	Project 8
F	D 2	3.2: L'Hopital's Rule	
M	D 5	Review	
W	D 7	**Test 4**	
F	D 9	Review	
W	D 14	**Final Exam** 8:30 – 11:30 am	