

James Madison University
Department of Mathematics and Statistics
Calculus II – Math 236.3,5 Fall 2013

Section 1: MWF 9:05-9:55 Roop 327, Tu 9:30-10:45 Burruss 032
Section 2: MWF 10:10-11:00 Roop 327, Th 11:00-12:15 Burruss 033

Overview: Math 236 continues Calculus I and gives a solid coverage of integral calculus, infinite sequences and series, and power series. Calculus is essentially a rigorous formulation of rates of change, and as such forms the basis of much in the sciences and engineering.

Instructor: Dr. Stephen Lucas.

To contact me: In Person: Roop 112, Office Hours: MWF 8:30-9:00, MF 11:15-12:05, Tu 2-3 or by appointment. Phone: 568-5104, Email: lucassk@jmu.edu

Textbook: *Calculus* by Laura Taalman & Peter Kohn, Freeman Custom Publishing, 2012.

Website: Selected material will be made available on Blackboard as the semester progresses.

Calculators: A graphing calculator could be useful for this course. Calculators with symbolic manipulation abilities, such as the TI-89 or TI-92, are banned from tests and the final exam, and as such I do not recommend using them during the semester.

Homework, Exams and Grading: Homework problems will be assigned in each class, and those for the previous week should be handed in on the following *Wednesday*. Time will be made for discussion of homework questions in class every day. A roll of the dice will determine which ones will be graded. There will be three midterm tests, made up of reworked homework problems. I anticipate they will be on the Tuesdays September 24, October 22 and November 19. Your grade will be determined as follows: Homework 15%, Midterm tests 15% (each), Final Exam 40%. The final exam is timetabled for: Wednesday December 11 8:00-10:00 (Section 1) and Friday December 13 8:00-10:00 (Section 2). Final grades will be related to $A \geq 85$, $B \geq 65$, $C \geq 50$, but may vary depending on the class average and natural divisions between raw scores. Plus/minus grades will also be provided. Borderline cases will be decided based upon class participation, effort, and performance throughout the semester.

Attendance: Attendance is not mandatory. However, past experience suggests there is an extremely strong correlation between attendance and success. If you cannot make a class where homework is being collected, please give to a classmate to give to me on the day. If you miss handing in homework or a test without previously getting my permission, you will receive a zero for that homework or test. If there is a medical emergency and you cannot inform me beforehand, let me know as soon as possible. Any potential clashes should be brought to my attention as soon as possible.

Getting Help: If you need help, ask! The worst thing you can do in a math course is let things slide, since material at the beginning of the course is built upon later. It is best to contact me via email. If you wish to see me outside of office hours, please make an appointment beforehand. I can't guarantee that I will be available if you come and knock on my door at a random time. You can also get help from the Math and Science Learning Center (Roop 200), which is a resource specifically designed for helping students in courses like this one.

While new material will be presented every day, there will always be time for questions, particularly on Tuesdays, when we have seventy-five minutes available. I also encourage you to ask questions during class. If there is something you don't understand, it is quite likely others are having similar difficulties.

Some random advice

- Read each section of the book either before or after the corresponding lecture, but always before you attempt the homework questions.
- Do the homework problems as soon as possible after the relevant class. If you have trouble, ask questions! If you are having trouble it is likely that others in the class are also having difficulties. I will be generous with hints and solving related problems in detail.
- Don't just copy the answers in the back of the book. Include appropriate amounts of working. True/false questions ask for reasons, so don't just write "true" or "false". Graded homework will involve partial credit, and the majority of the marks will be for the working.
- Weekly submission of homework means you should work consistently through the semester. Don't just cram it all in a few days before a test. Try and spend roughly eight hours a week on all aspects of this course.
- Don't fall behind. If something doesn't make sense, ask me about it in lectures. It's quite likely that several other students don't understand what is causing you problems, so I can immediately try and explain it in another way. Lectures are not there for me to drone on endlessly; they are there for me to help you learn.
- If you get a bad grade in a homework assignment or test, don't panic. Instead, get help, and take the time to work out what you missed.
- Math is about understanding, not memorizing. If you are memorizing a lot of things you may be studying the wrong way.
- Working in groups is encouraged, since talking over problems is one of the best ways to learn. I have no problem with you working together on the homework problems. However, *simply copying someone else's homework solutions and handing it in is plagiarism*. Write out your own version.

Goals of the Course

1. To develop an understanding of the logical structure and style of mathematics by:
 - a) Using reason in an orderly, cogent fashion.
 - b) Writing clear, well organized solutions to problems.
 - c) Evaluating critically and using mathematical definitions.

Structure refers to the foundations of mathematics and to the techniques used to build on those foundations. Style refers to the clarity, elegance, efficiency, and precision desirable in mathematical expression.

2. To develop ability to use mathematical tools to solve problems and to transfer this knowledge to analogous situations by:
 - a) Using differentiation to solve problems involving optimization and rates of change.
 - b) Using integration to solve problems involving areas, volumes, and lengths, exponential growth, and motion problems.
3. To develop computational skills such as:
 - a) Calculating limits, derivatives, and integrals.
 - b) Finding maxima and minima of functions.
4. To develop an understanding of the theory of calculus and algebraic structures by knowing:
 - a) The definitions of limit, derivative, and continuous function.
 - b) The important results concerning continuous and differentiable functions including the Intermediate Value Theorem, Rolle's Theorem, the Mean Value Theorem, and the relationship between continuity and differentiability.
 - c) The theory of maxima and minima of functions.
 - d) The basic concept of integration including the definitions of integrals and the Fundamental Theorem of Calculus.

Proposed Math 236 Syllabus and Homework Problems

Fall 2013

Date	Section	Homework Problems
1: 1-M 8/26	Intro, Calc I Review	Calculus I Review Sheet
2: 1-Tu 8/27	Fundamental Theorem	
3: 1-W 8/28	4.5: Fundamental Theorem	19,23,31,35,59,65,71,1,2
4: 1-F 8/30	4.6: Areas	27,30,57,60,75,80,41,49,1,2
5: 2-M 9/2	4.7: Functions as Int	18,27,39,64,1,2
6: 2-Tu 9/3	5.1: Int by Sub	3,16,17,23,39,43,45,49,51
7: 2-W 9/4	5.1: Int by Sub	19,71,75,83,1,2
8: 2-F 9/6	5.2: Int by Parts	29,31,33,39,49,59,79,85,91,1,2
9: 3-M 9/9	Hyperbolic (never happened)	
10: 3-Tu 9/10	Cancelled Class	
11: 3-W 9/11	5.3: Complete Square	16,63,64, $1/(x^2-x+2)$, $1/(2x^2-x+3)$
12: 3-F 9/13	5.3: Long Division	5,9,10,11,43
13: 4-M 9/16	5.3: Partial Fractions	19,25,27,39,31,1,2
14: 4-Tu 9/17	Logarithm as Integral	
15: 4-W 9/18	5.4: Trig Integrals	19,21,23,25,27,29,33,37,39,41,43,45,47,85
16: 4-F 9/20	5.4: Trig Integrals	29,31,35,83,84,1,2
5-M 9/23	Review	
5-Tu 9/24	Midterm I	
17: 5-W 9/25	5.5: Trig Substitution	3,4,7,21,23,39,41,43,45,47,49,93,1,2
18: 5-F 9/27	5.6: Infinite Integrals	
19: 6-M 9/30	5.6: Vertical Asymp Integrals	5,6,21,27,33,41,45
20: 6-T 10/1	5.6: Comparison Test	13,57,59,1,2
21: 6-W 10/2	6.1: Volume by Slicing	3,20,31,33,35,36,55
22: 6-F 10/4	6.1: Volume by Slicing	
23: 7-M 10/7	6.2: Volume by Shells	
24: 7-Tu 10/8	6.2: Volume by Shells	
25: 7-W 10/9	6.3: Arc Length & Surface Area	
26: 7-F 10/11		

Date	Section	Homework Problems
27: 8-M 10/14	Mass and Density	
28: 8-Tu 10/15	Work and Force	
29: 8-W 10/16	Differentiable Equations	
30: 8-F 10/18	Sequences	
9-M 10/21	Review	
9-Tu 10/22	Midterm II	
31: 9-W 10/23	Special Sequences	
32: 9-F 10/25	Limits of Sequences	
33: 10-M 10/28	Limits of Sequences	
34: 10-Tu 10/29	Series	
35: 10-W 10/30	Geometric Series	
36: 10-F 11/1	Convergence Tests	
37: 11-M 11/4	Ratio & Root Tests	
38: 11-Tu 11/5	Alternating Series	
39: 11-W 11/6	Alternating Series	
40: 11-F 11/8	Power Series	
41: 12-M 11/11	Power Series	
42: 12-Tu 11/12	Taylor Series	
43: 12-W 11/13	Taylor Series	
44: 12-F 11/15	Power Series Convergence	
13-M 11/18	Review	
13-Tu 11/19	Midterm III	
45: 13-W 11/20	Taylor Theorem	
46: 13-F 11/22	Calculus with Power Series	
Thanksgiving Break		
47: 14-M 12/2		
48: 14-Tu 12/3		
14-W 12/4		
14-F 12/6		