

Math 123

Calculus with Analytic Geometry 1

Syllabus

Instructor:

Name
Office:
Phone:
E-mail:

Office Hours:

TBD
Others by arrangement.

Course Information:

Time:
Location:
Text: *Calculus, Early Transcendental Functions, (Fourth ed.)*, by
Larson, Hostetler and Edwards
Prerequisites: Pass the placement test with grade of 70% or higher or a grade of
C or better in MA 114
Course Coordinator: Cdr. Dan Joseph
Department Head: Col. Lee Dewald

Course Description:

Plane analytic geometry with single variable differential calculus. Limits, derivatives, applications of derivatives, derivatives of transcendental functions and basic integration formulas. Prerequisites: Pass the Calculus Placement test with grade of 70% or higher, or achieve a grade of C, or higher, in MA 114.

Overview:

If the world was a static place there would be no need for calculus. However, this is not the case and the study of calculus is integral to many different topics. In this course we will study the limit process, differential calculus, applications of differential calculus and basic antidifferentiation. Upon successful completion of this course you will be able to do the following:

1. Identify various types of functions and their graphs.
2. Define the limit of a function and find the limit when it exists.
3. Define continuity at a point and be able to determine if a function is continuous.
4. Define the derivative and be able to compute the derivative.
5. Use derivatives to compute velocity, speed and acceleration.
6. Use values of the first and second derivatives to graph a function.
7. Define and use derivative tests to find extreme values.

8. Prove and use the Mean Value Theorem.
9. Define differential equations and use them to do math modeling.
10. Formulate and solve max-min problems.
11. Define and use differentials to linearize problems.
12. Compute indefinite integrals (antiderivatives).

You will learn these skills by covering the following sections of the text:

Chapter 2: Limits and Their Properties, Sections 2.1 – 2.5

Chapter 3: Differentiation, Sections 3.1 – 3.7

Chapter 4: Applications of Differentiation, Sections 4.1 – 4.8

Chapter 5: Integration, Sections 1, 5, 7, 8

In addition to learning specific skills you will also be learning to think in a logical, creative, mathematical way. This way of thinking will benefit you long after you have forgotten the specific skills that we cover in class. In part, learning this way of thinking will be facilitated by several application scenarios that we will cover during this semester. These scenarios will, to different extents, require you to work through the mathematical modeling process that is so important in real world applications.

Finally, we will focus on six different learning outcomes.

1. Understand quantitative relationships, make geometric observations, and formulate sound estimations.
2. Work with abstract concepts, mathematical variables, and symbols.
3. Solve mathematical equations.
4. Read, interpret, and create graphical information.
5. Use appropriate mathematical technology.
6. Understand the effective, appropriate, and efficient use of mathematical techniques for real-world problems.

Grading:

Tests: 56% (Four tests at 14% each)

Coursework: 14%

Final Exam: 30%

Attendance Policy:

The following is the attendance policy at VMI. Academic excellence is best achieved through consistent class attendance. The maximum allowed percentage of class absences is 30%. No categories of absences (academic, athletic, guard, 3.0 cuts, etc.) will be exempt from that percentage. When a cadet reaches 20% absences, the instructor issues a written warning and the cadet must sign a receipt that he/she is aware of the absences incurred. Upon reaching 30% absences the cadet is referred to the Dean for appropriate action. Normally a cadet who exceeds the 30% absences will be required to withdraw from the course with a W or a WF.

Calculator/Computer Algebra System (CAS) usage:

Unless otherwise stated, you may use a calculator to perform basic calculations such as arithmetic and trigonometric calculations on any assignment. You may not, however, use the calculus, graphing, or programming capabilities on your calculator for any assignments other than coursework. The use of these functions on coursework must be documented as help received.

Work for Grade:

"**Work for grade**" is defined as any work presented to an instructor for a formal grade or undertaken in satisfaction of a requirement for successful completion of a course or degree requirement. All work submitted for grade is considered the cadet's own work. "**Cadet's own work**" means that he or she has composed the work from his or her general accumulation of knowledge and skill except as clearly and fully documented and that it has been composed especially for the current assignment. No work previously submitted in any course at VMI or elsewhere will be resubmitted or reformatted for submission in a current course without the specific approval of the instructor.

In all work for grade, failure to distinguish between the cadet's own work and ideas and the work and ideas of others is known as **plagiarism**. Proper documentation clearly and fully identifies the sources of all borrowed ideas, quotations, or other assistance. The cadet is referred to the VMI authorized handbook for rules concerning quotations, paraphrases, and documentation.

In all written work for grade, the cadet must include the words "**HELP RECEIVED**" conspicuously on the document, and he or she must then do one of two things: (1) state "none," meaning that no help was received except as documented in the work; or (2) explain in detail the nature of the help received. In oral work for grade, the cadet must make the same declaration before beginning the presentation. Admission of help received may result in a lower grade but will not result in prosecution for an honor violation.

Cadets are prohibited from discussing the contents of a quiz/exam until it is returned to them or final course grades are posted. This enjoinder does not imply that any inadvertent expression or behavior that might indicate one's feeling about the test should be considered a breach of honor. The real issue is whether cadets received information, not available to everyone else in the class, which would give them an unfair advantage. If a cadet inadvertently gives or receives information, the incident must be reported to the professor and the Honor Court. Each cadet bears the responsibility for familiarizing himself or herself thoroughly with the policies stated in this section, with any supplementary statement

regarding work for grade expressed by the academic department in which he or she is taking a course, and with any special conditions provided in writing by the professor for a given assignment. If there is any doubt or uncertainty about the correct interpretation of a policy, the cadet should consult the instructor of the course. There should be no confusion, however, on the basic principle that it is never acceptable to submit someone else's work, written or otherwise, formally graded or not, as one's own.

The violation by a cadet of any of these policies will, if he or she is found guilty by the Honor Court, result in his or her being dismissed from VMI. Neither ignorance nor professed confusion about the correct interpretation of these policies is an excuse.

Departmental Work for Grade Policy:

The faculty of the Department of Mathematics and Computer Science fully supports the Institute Work for Grade Policy as passed by the Academic Board and approved by the Superintendent. Because of this, every faculty member in our department will promptly contact any cadet who has submitted work for grade without the expression “**HELP RECEIVED**” followed by the word “none” or an explanation of the nature of the help received. The faculty member will inform the cadet that the work will not be graded until the cadet adds the required “**HELP RECEIVED**” statement to the work.

Writing Center:

The use of the Writing Center is approved for all courses offered by the Department.

Tutoring, Peer Collaboration, Academic Center:

It is our department's policy that any work submitted for grade precludes the aid of any tutors or peer collaboration unless specifically stated otherwise by the instructor in the course syllabus. Tutors and peer collaboration are authorized for assigned work that is not graded, such as homework or drill exercises.

Use of Computer Aids:

Computer Science Courses

In these courses the cadets may make use of editors, compilers, and any other approved software packages. Spelling, style and grammar checkers are also approved for cadet use.

Mathematics Courses

In these courses, the use of software packages is **not** permitted unless specifically stated otherwise by the instructor in the course syllabus. However, spelling, style, and grammar, checkers are approved for cadet use.

The use of a calculator is to be determined by the instructor as appropriate for each course.

Your Responsibility:

Make sure that you understand all of the policies in this document, especially the policies concerning work for grade. If you do not understand or if you disagree with any part of this document you must contact the instructor immediately.

A suggested day-by-day guide for covering the material in MA 123.

Day	Section	Sample Assignments
1	2.1 A Preview of Calculus	(p. 67) 1, 2, 5, 6
2	2.2 Limits - Graphically and Numerically	(p. 74) 5, 7, 13, 15, 19, 21, 24
3	2.3 Limits – Analytically	(p. 87) 3, 11, 15, 21, 29, 31, 35, 37, 41, 43, 47, 53, 57, 69, 71, 127
4	2.4 Continuity/One Sided Limits	
5	2.4 Continued	(p. 98) 1, 3, 5, 7, 9, 11, 15, 25, 29, 31, 33, 35, 39, 43, 49, 51, 65, 69, 83
6	2.5 Infinite Limits	(p. 108) 1, 3, 5, 11, 29, 41, 47, 68
7	3.1 Derivative/Tangent Line	
8	3.1 Continued	(p. 123) 1, 7, 18, 25, 31, 43, 45, 48, 53, 81 – 86, 91
9	Review	
10	Test 1	
11	3.2 Diff. Rules and Rates of Change	(p 136) 1, 7, 13, 17, 23, 25, 27, 33, 35, 41, 53, 55, 59, 68, 93, 95, 97, 99
12	3.2/3.3 Product/Quotient Rules	
13	3.3 Continued	(p. 147) 3, 9, 15, 19, 23, 37, 47, 51, 75, 77, 91, 122
14	3.4 Chain Rule	
15	3.4 Continued	(p. 161) 9, 19, 31, 49, 63, 103, 117, 123, 139, 141,
16	3.5 Implicit Differentiation	
17	3.5 Continued	(p.171) 1, 7, 9, 13, 21, 37, 45, 55, 59, 71, 73
18	3.6 Inverse Trig Functions	(p. 179) 21, 22, 25, 29, 31, 71
19	Review	
20	Test 2	
21	3.7 Related Rates	
22	3.7 Continued	(p. 187) 1, 9, 15, 23, 25, 31

23	4.1 Extrema on an Interval	(p. 209) 1, 5, 7, 11, 25, 29, 33, 61,
24	4.2 Roll's Thm/Mean Value Thm	(p. 216) 1, 5, 9, 13, 33, 35, 37, 43
25	4.3 First Derivative Test (Inc/Dec)	(p. 226) 5, 17, 21, 33, 63, 65, 67, 69, 71, 87
26	4.4 Second Derivative Test (Concavity)	(p. 235) 3, 5, 13, 19, 33, 49, 67
27	4.5 Limits at Infinity	(p. 245) 3, 5, 7, 15, 17, 19, 33

<u>Day</u>	<u>Section</u>	<u>Assignment</u>
28	4.6 Summary of Curve Sketching	(p. 255) 1 – 4, 5, 15, 29, 33, 35, 69
29	Review	
30	Test 3	
31	4.7 Optimization Problems	
32	4.7 Continued	(p. 265) 5, 19, 21, 25, 29, 41, 43, 59
33	4.8 Differentials	(p. 276) 1, 5, 15, 17, 31, 37
34	5.1 Antiderivatives/Indefinite Integration	
35	5.1 Continued	(p.291) 1, 7, 17, 23, 33, 35, 43, 53, 59, 65, 71, 77
36	5.5 U-Substitution	
37	5.5 Continued	(p.340) 9, 13, 15, 19, 25, 31, 47, 51, 59, 61, 67, 71, 85
38	5.7 Natural Log Function	(p. 358) 1, 5, 9, 11, 13, 19, 33
39	5.8 Inverse Trig Functions	(p. 366) 3, 5, 7, 11, 15
40	Review	
41	Test 4	
42	Review	