

Math 212-04 Syllabus, Fall 2009

Introduction to Calculus

Department of Mathematics & Computer Science
Virginia State University

I. Professor and Contact Information

Instructor: Dr. Paul Brodhead

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Office: Hunter McDaniel Building (HM) 303Sd

Office Hours: MWF 9-10, TR 930-11, and by appointment

Questions should be organized in advance. You must be prepared to show your attempts at solving (a) problem(s) when you ask questions during office hours.

II General Course Information

Times and Locations: MWF 1:00-1:50 in HM 14S

Attendance is Mandatory (see below).

Catalogue Description of the course: Calculus for Non-Science and Non-Mathematics majors. Fundamental concepts of limits, continuity, differentiability and integrability of functions and their application to problems in various disciplines. This course cannot be taken as a Mathematics elective by Mathematics majors.

Prerequisite: MATH 122

Text: S.T. Tan, *College Mathematics for the Managerial, Life, and Social Sciences*, Thomson Brooks/Cole Publishing company, 7th Edition, 2008.

Topics to be Covered

- Limits and its derivatives (Sections 11.4, 11.5, 11.6)
- Basic Differentiation Rules & Applications (12.1-12.5, 12.6)
- Further applications of the derivatives (13.1, 13.2, 13.4, 13.5)
- Exponential and Logarithmic functions, Some Applications in Mathematical Modeling (14.3, 14.4, 14.5)
- Integration (15.1, 15.3)

The midterm exam will cover sections 11.4-11.6, 12.1-12.5, and 13.1.

Calculators: You are permitted to use any of the following graphing calculators: TI83, TI83Plus, TI84, TI84Plus.

III Learning Outcomes

Knowledge: The student will learn the

- Concept of the limit of a function at a point, its existence and its various rules.

- Concept of the continuity of a function at a point and on an interval, the derivative of a function at a point, its geometrical meaning and the various techniques of computing the derivatives such as the Power rule, the Sum and Difference rules, the Product and the Quotient rules, the Chain rule and higher order derivatives.
- Exponential and Logarithmic functions and their derivatives
- Concept of an antiderivative, the rules of integration, the definite integral and the area between two curves.

Skills: The student will develop the skill to

- Explain the continuity/discontinuity from the graph of a function
- Find the derivative of a function using the definition and using various differentiation rules.
- Identify whether the derivative of a function exists or not.
- Effectively use a graphing calculator to determine the limit, continuity, increasing/decreasing nature, & maxima/minima of a function.

Abilities: The students will be

- Able to understand the mathematical, graphical and physical significance of Calculus terminology like critical points, point of inflection, rate of change, and maxima & minima.
- Able to describe various properties of a function using the derivative.
- Able to formulate and solve the calculus-based optimization and area problems in their respective disciplines.
- Able to solve various problems arising in Business and Economics such as marginal functions, elasticity of demand, etc. using Calculus.

IV Grades and Policies

Attendance: Mandatory. I will take roll at random times and a final attendance grade will be computed based on attendance. The attendance grade will be also be used to help determine what to do with borderline grades. If you are absent, then you are responsible for the material covered. Arrange to copy another student's notes and be informed of any announcements.

Homework: Online homework will be assigned, and due, throughout the semester. On occasion I may also assign, and collect, written homework, or give a quiz. Your Homework Grade for the semester consists of the composite score from the online and written homework, and from any quizzes; see below for more.

Exams: There will be six exams throughout the semester: Exam I, Exam II, Exam III (Midterm Exam), Exam IV, Exam V, and Exam VI (Final Exam) Hereafter, *mini-exams*, will only refer to any of Exams I, II, IV, & V.

Exams will not be given early to accommodate any travel and/or holiday plans. No make-up exams will be given. Make-up exams will be given only under excruciating circumstances such as serious illness or family emergencies. Proof may be required. If you are a student athlete, or you need to travel for an academic reason, then you must make arrangements in advance to take tests at an alternate time, possibly early.

Grading: Scores are amalgamated at the end of the semester, and your final grade is based on the total. The process used to combine these scores is as follows. First,

exams, homework, and the attendance/participation grades are normalized to a common scale according the following percentages:

- 30% Mini-exams (Best 3 of 4 exams, from Exams I, II, IV, & V)
- 25% Midterm Exam (i.e., Exam III)
- 30% Final Exam (i.e. Exam VI)
- 10% Homework (i.e., online and written assignments, and quizzes)
- 5% Attendance & Participation

These scores are added to get a first approximation to the grade. A final grade is based on this approximation, but the final grade might be pushed up or down based on score trends, preponderance of evidence, attendance, etc. or the special conditions in the next paragraph.

Special Conditions: First, a student cannot pass by only receiving a passing grade the midterm, or only receiving a passing grade on the mini-exams (i.e. Exams I, II, IV, & V). For example, if a student receives an F on the final and mini-exams and the numerical average still turns out to be a D, the student will receive an F.

Second, a student will not receive a letter grade lower than the Final Exam letter grade unless the Final was borderline and the other scores *were appreciably worse*. For example, a student with a middle B on the final exam will not earn worse than a C for the semester. However, a student with a borderline B/C on the final, and midterm and mini-exam scores so low as to drag the cumulative average down to a D will earn a D for the semester.

Grading Rubrics: Exams and/or quizzes will be written to conform as much as possible to the following rubrics:

- A C student should master the basics of content of each course topic.
- A B student should in addition be able to handle harder problems, including multipart problems that cross topics and applications.
- An A student should also understand the theory—definitions and derivations.

Midterm Grade: By the middle of the term, you will have had two mini-exams, the Midterm Exam, and some—but not all—points from Homework Grade and Attendance & Participation Grade. Your midterm grade, which is an estimate of your progress, in the middle of the semester, will be computed as follows: 25% Exams I, 25% Exam II, 35% Midterm Exam, 10% current Homework Grade, 5% current Attendance & Participation Grade.

Academic Expectations

- **In the Classroom.** Expect to have material covered at a much faster pace than in high school. You are expected to come prepared to class as detailed below.
- **Outside the Classroom.** Lecture time is at a premium, so it must be used efficiently. You cannot be taught everything in the classroom. Much of your learning must take place outside the classroom. At a minimum you should plan on studying two or more hours outside the classroom for each hour in class. You should attempt all the homework that is assigned and try additional problems in areas where you feel weak.
- **Textbook.** You are expected to read the textbook for comprehension. It gives a detailed account of the material of the course. It also contains many examples of problems worked out, and these should be used to supplement

those you see in the lecture. Use pencil and paper to work through the material and to fill in omitted steps.

Read the appropriate section(s) of the book before the material is presented in lecture. Then the faster-pace lecture will make more sense. After the lecture carefully re-read the textbook along with your lecture notes to cement your understanding of the material.

- **Exams.** Exams are written to determine how well you understand the basic principles underlying the methods and if you are able to apply these principles to novel as well as routine situations. Some problems on an exam may seem new, but all will be solvable using principles from the material on which you are being tested.
- **Solutions to Problems.** It is your responsibility to communicate clearly in writing up solutions for homework, quizzes, and exams. Your results must display your understanding well and be written in a correct, complete, coherent, and well organized fashion. The rules of language still apply in mathematics, and apply even when symbols are used in formulas, equations, etc. Neatness counts.

In conclusion, it is your responsibility to learn the material. Most of this learning must take place outside the classroom. The instructor's job is primarily to provide a framework, with some of the particulars, to guide you in doing your learning of the concepts and methods that comprise the course. It is not to "program" you with isolated facts and problem types.

I may cover material that is not in the book and give additional examples and exercises. Please feel free to speak up if there are any ambiguities about the expectations. Do not wait until the last day of class.

Academic Honesty: No student shall claim or submit the work of another as one's own. No dishonesty will be tolerated.

All University policies on specific academic regulations concerning cheating, plagiarism, absenteeism, etc. will be adhered to in this course. These policies are stated in the [VSU Undergraduate Catalog](#) and the [VSU Student Handbook](#).

Special Needs: Students with learning or other disabilities who are covered under the American Disabilities Act should privately inform the teacher of this fact so that appropriate instructional arrangements can be made.

Important Dates: It is your responsibility to know about the important dates, such as to drop or withdraw from a course, holidays, final exam, etc.

Respect: Be respectful of your fellow students and instructor(s). For example:

- Turn off your cell phone (or at least the ringer) before coming to class. Furthermore, do not use your cell phone *for any reason* during class.
- Remove all earphones, headphones, and similar devices during class.
- Do not get up and leave in the middle of class, except in the case of *extreme emergency*. If you know you will have to leave early, please notify me in advance and sit near the exit so as to not disturb others when you leave.
- Close all computing devices (e.g. laptops) and do not use them in the classroom during lecture.

V Resources

Mathematics Tutoring Laboratory (Room 7S). The Department of Mathematics and Computer Science will provide a mathematics tutoring laboratory in Room 7S, Hunter McDaniel Building for students who need extra help. The Mathematics Laboratory will open the first day of class. The hours of operation are 9:00 AM - 6:00 PM, Monday through Friday; a schedule is forthcoming.

Bibliography/Reading List

- **Bittinger M. L.**, Calculus and Its Applications, Prentice Hall, 8th Ed., 2004.
- **L. J. Goldstein, D. C. Lay, D. I. Schneider**, Calculus and Its Applications, Prentice Hall, 10th Ed., 2004.
- Any book in the library with “Business Calculus” in its title, and that uses Calculus in the modeling of business problems, may be used as a reference.