Math 121: Calculus and Analytic Geometry I
Section B

Fall 2021   **Rick Gorvett**
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9:00 – 9:50 am MWF   **Phone: (401) 232-6452**
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Course Overview

Math 121 is the first of a three-course calculus sequence. This course covers a variety of foundational concepts and techniques in **differential and integral calculus**. These concepts underlie much of the mathematics used in the sciences, economics, and business, in addition to the math-related professions.

The primary goals of this course involve:
- Learning and experiencing a mathematical **way of thinking**.
- Recognizing and **understanding problems** in a variety of careers and situations that can be addressed using calculus.
- Learning and practicing techniques to solve such problems and quantify the underlying dynamics.

Specific mathematical learning objectives of this course include:
- Understand and apply the concept of a limit
- Understand the concept of rate of change, both average and instantaneous
- Understand the concept of a derivative
- Use and apply the rules of differentiation
- Graph functions using first and second derivatives
- Formulate and solve certain types of optimization problems
- Understand and determine integrals of functions
- Determine definite integrals

Accessibility Statement

To ensure that disability-related concerns are properly addressed throughout the semester, students with disabilities who require reasonable accommodations to participate in this class are asked to contact me within the first two weeks of class.

Recommended Text

Calculus Late Transcendentals Combined, 10th Edition by Howard Anton, Irl C. Bivens, Stephen Davis, Wiley& Sons, Inc. ©2012, ISBN: 978-0-470-64772-1

Please note that there are a number of other calculus resources available, many of them online and free. As long as the topics and subtopics are appropriate and relevant, you may find one or more of these other resources useful.

Course Schedule

Some key dates for the class are noted below:

September 8 (Wednesday)	First day of class: Introduction and Motivation
September 29 (Wednesday)	**Exam # 1**
October 11 (Monday)	Columbus Day – No Class
October 27 (Wednesday)	**Exam # 2**
November 17 (Wednesday)	**Exam # 3**
November 24 – 26 (Wed. – Fri.)	Thanksgiving Recess – No Classes
December 10 (Friday)	Last Day of Class
December 16 (Thursday), 10 am	**Exam # 4**

Grading

Course grades will be determined based on the following weights:

Homework and other assignments	20 %
Exams	80 % (4 exams @ 20% each)

There will likely be a total of 7-8 Homework Assignments over the course of the semester. Each assignment will count towards your final grade, with half of the score for each assignment determined by completion, and half by spot-checking some or all of the problems. Full solutions will be posted on the class Canvas site after the due date.

Four exams will be given, with each exam focusing on the material covered since the prior exam. The extent to which any exam is "cumulative" will be explained in class in advance of the class. Please note that the final exam schedule is prescribed by the university; in general, instructors are not permitted to change the final exam timing of their courses.

Class attendance is expected, and will be regularly noted; serious attendance problems may result in a grade that is lower (possibly even failing) than that indicated by the weighting system above and the grade scale below.

This class employs a ***zero-tolerance approach to cheating***. (Cheating includes, but is not limited to, giving or receiving aid on an exam, or participating in the submission of an assignment by one student on behalf of another student.)

Grading Scale

The default grading scale for this class, on a percentage or 100-point basis, is as follows:

93 - 100 ..... A   90 - 92 ..... A-

87 - 89 ..... B+   83 - 86 ..... B   80 - 82 ..... B-

77 - 79 ..... C+   73 - 76 C   70 - 72 ..... C-

67 - 69 ..... D+   60 - 66 ..... D

≤ 59 ..... F

However, please note that this grading scale may be adjusted as the class progresses – i.e., ultimately the grading scale may be curved to better fit the particular exam difficulty and class performance that emerges during the semester.

Class Website

The class Canvas site will be used extensively to share information. On this site, you will be able to:

- See class announcements
- Download lecture notes and other information
- Download homework assignments
- Download answers to homework assignments
- Download sample or old exam questions and solutions
- Find links to relevant external material
- Check your scores on assignments and exams

Tentative Course Outline

I.   LIMITS AND CONTINUITY
    A. Limits (intuitively)   (Section 1.1)
    B. Computing Limits   (Section 1.2)
    C. Limits at Infinity; End Behavior of a Function   (Section 1.3)
    D. Limits (rigorously) - optional   (Section 1.4)
    E. Continuity   (Section 1.5)
    F. Continuity of Trig Functions   (Section 1.6)

II.   THE DERIVATIVE
    A. Tangent Lines and Rate of Change   (Section 2.1)
    B. The Derivative Function   (Section 2.2)
    C. Techniques of Differentiation   (Section 2.3)
    D. Product and Quotient Rules   (Section 2.4)
    E. Derivatives of Trig Functions   (Section 2.5)
    F. The Chain Rule   (Section 2.6)
    G. Implicit Differentiation   (Section 2.7)
    H. Derivatives of Exponentials and Logs   (Section 6.2 & 6.3)
    I. Related Rates   (Section 2.8)

III.   THE DERIVATIVE IN GRAPHING AND APPLICATIONS
      A. Increasing/Decreasing and Concavity   (Section 3.1)
      B. Relative Extrema   (Section 3.2)
      C. Absolute Max and Min   (Section 3.4)
      D. Applied Max and Min Problems   (Section 3.5)
      E. Rolle's Theorem; Mean Value Theorem   (Section 3.8)

IV.   INTEGRATION
      A. The Indefinite Integral   (Section 4.2)
      B. Integration by Substitution   (Section 4.3)
      C. Integrals of Exponentials and Logs   (Section 6.2 & 6.3)
      D. Area of Plane Regions as Limits   (Sections 4.1 & 4.4)
      E. The Definite Integral   (Section 4.5)
      F. The Fundamental Theorem of Calculus   (Section 4.6)
      G. Evaluating Definite Integrals by Substitution   (Section 4.9)

V.   APPLICATIONS OF THE DEFINITE INTEGRAL
      A. Area Between Two Curves   (Section 5.1)
      B. Volumes By Slicing   (Section 5.2)
      C. Average Value of a Function   (Section 4.8)

Tentative Schedule of Topics

Week of September 6	Introduction; Review of Certain Fundamentals
Week of September 13	Limits and Continuity
Week of September 20	Limits and Continuity (cont.)
Week of September 27	Derivatives
Week of October 4	Derivatives (cont.)
Week of October 11	Derivatives (cont.)
Week of October 18	Maxima and Minima
Week of October 25	Indefinite Integrals
Week of November 1	Definite Integrals
Week of November 8	Definite Integrals (cont.)
Week of November 15	Definite Integrals (cont.)
Week of November 22	Fundamental Theorem of Calculus
Week of November 29	Applications of Integrals
Week of December 6	Applications of Integrals (cont.)

COVID-19

All protocols specified by Bryant University, as described at https://covid.bryant.edu/, are in-effect and enforced in this class. In particular, masks are required in the classroom, until the university indicates that such precaution is no longer necessary.

Inclusivity

In this class, it is my fervent intention that all individuals – regardless of gender, race, nationality, ethnicity, sexual orientation, socio-economic status, or religion – are equally welcomed and valued, and will be given the same opportunities to learn, contribute, and succeed.

Based on the Bryant University Catalog:

ACADEMIC BEHAVIOR

A student's education is the result of individual initiative and industry. A student indisposed to such an academic commitment will not gain an education at Bryant University. Each Bryant student, accordingly, understands that to submit work that is not his or her own is not only a transgression of University policy but a violation of personal integrity. A high standard of conduct in academic experiences is expected of each student.

The academic community, therefore, does not tolerate any form of "cheating" – the dishonest use of assistance in the preparation of outside or in-class assignments. Such violations, which include forms of plagiarism, are subject to disciplinary action.

To preserve its commitment to the high standards of intellectual and professional behavior, Bryant University rewards intellectual excellence and expects intellectual honesty.

Academic dishonesty includes but is not limited to:

- plagiarism in any form;
- using an illegal cheat sheet during a quiz or examination;
- copying from another student's examination, term paper, or lab report;
- intentionally missing (or delay taking) an exam to gain an unfair advantage;
- submitting the same paper or report in more than one course without permission of the instructors;
- falsification or invention of data;
- unauthorized access to or the use of the computerized work of others;
- obtaining questions for an examination from another student who had already taken it;
- obtaining answers for an examination from another student who had already taken it;
- misappropriation of examination materials or information;
- changing a response after a paper, examination, or quiz is graded, then reporting a misgrade and asking for credit for the altered response;
- taking an examination for another student;
- giving illicit aid on exams, papers, or projects.

Lack of knowledge of the above is unacceptable as an excuse for dishonest efforts. Any form of cheating could result in failure of a test, failure of the course, or some other action.