

Department of Mathematics

Title of Course: Analytic Geometry & Calculus

Course: MAT 301

Semester:

Credits: 4

Class hours: 4

Lab hours: 2

Instructor:

Tel#:

Office:

Email:

Course Description: An integrated course in analytic geometry and calculus applied to functions of a single variable. A study of functions; limits; continuity; related rates; differentiation of algebraic and transcendental functions; Rolle's Theorem; The Mean Value Theorem; Maxima and Minima; curve sketching; differentials; and introduction to integration.

MAT 301 has a computer laboratory component. Students utilize computer software such as graphing packages, a computer algebra system, and a mathematical word processor to complete laboratory assignments associated with their calculus course.

Prerequisites / Co-requisites: Precalculus (MAT 206) or the equivalent with departmental approval.

Student Learning Outcomes:

Course Student Learning Outcomes	Measurements
1. Students will be able to calculate the limit analytically and geometrically. They will use the limit to determine continuity.	1. Homework assignments and/or take home projects; Quizzes and/or Midterm Exams; Final Exam; Lab Projects.
2. Students will be able to use the concept of the limit to compute the derivative. Students will be able to calculate the derivative for algebraic and transcendental functions. Students will use implicit and explicit differentiation to solve applied problems.	2. Homework assignments and/or take home projects; Quizzes and/or Midterm Exams; Final Exam; Lab Projects
3. Students will be able to compute higher order derivatives and apply this to curve sketching and optimization problems.	3. Homework assignments and/or take home projects; Quizzes and/or Midterm Exams; Final Exam; Lab Projects.
4. Students will be able to use the Fundamental Theorem of Calculus to compute the definite integral.	4. Homework assignments and/or take home projects; Quizzes and/or Midterm Exams; Final Exam; Lab Projects.

General Education Outcomes and Assessment:

General Education Learning Outcomes	Measurements
Communication Skills - Students will be able to write, read, listen and speak critically and effectively.	Assignments and/or take home projects; exams and/or Midterm Exam; Final Exam and Lab Projects.
Quantitative Reasoning - Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Assignments and/or take home projects; exams and/or Midterm Exam; Final Exam and Lab Projects.
Information & Technology Literacy - Students will be able to collect, evaluate and interpret information and effectively use information technologies.	Assignments and/or take home projects; exams and/or Midterm Exam; Final Exam and Lab Projects.

Required Text: Calculus, 10th Edition, Ronald E. Larson and Bruce H. Edwards; Brooks/Cole, Cengage Learning, 2014.

Use of Technology:

Students will be using MAPLE™, a computer algebra system which will help them visualize various concepts developed in class.

Evaluation and Requirements of Students:

At the beginning of the semester, the instructor will advise students of the determination of the final grade which will be based on class work, tests, and the final examination. Students are required to attend all scheduled classes.

Outline of Topics

TOPICS	TEXT PAGES
Chapter P: Preparation for Calculus	
P.3 Functions and Their Graphs	19 – 30
Chapter 1: Limits and Their Properties	
1.1 A Preview of Calculus	42 – 47
1.2 Finding Limits Graphically and Numerically	48 – 58
1.3 Evaluating Limits Analytically	59 – 69
1.4 Continuity and One-Sided Limits	70 – 82
1.5 Infinite Limits	83 – 89
Chapter 2: Differentiation	
2.1 The Derivative and the Tangent Line Problem	96 – 105
2.2 Basic Differentiation Rules and Rates of Change	106 – 117
2.3 Product and Quotient Rules and Higher Order Derivatives	118 – 128
2.4 The Chain Rule	129 – 139
2.5 Implicit Differentiation	140 – 146
2.6 Related Rates	148 – 156
Chapter 3: Applications of Differentiation	
3.1 Extrema on an Interval	162 – 169
3.2 Rolle’s Theorem and the Mean Value	170 – 176
3.3 Increasing and Decreasing Functions and the First Derivative Test	177 – 185
3.4 Concavity and the Second Derivative Test	187 – 194
3.5 Limits at Infinity	195 – 205
3.6 A Summary of Curve Sketching	206 – 214
3.7 Optimization Problems	215 – 223
3.8 Newton’s Method (OPTIONAL)	225 - 230
3.9 Differentials	231 – 237

Outline of Topics (Continued)

TOPICS	TEXT PAGES
Chapter 5: Logarithmic, Exponential, and Other Transcendental Functions	
5.1 The Natural Logarithmic Function: Differentiation	318 – 327
5.2 The Natural Logarithmic Function: Integration	328 – 336
5.3 Inverse Functions	337 – 345
5.4 Exponential Functions: Differentiation and Integration	346 – 355
5.5 Bases Other than e and Applications	356 – 364
5.6 Inverse Trigonometric Functions: Differentiation	366 – 374
Chapter 4: Integration	
4.1 Antiderivatives and Indefinite Integration	244 - 253
4.4 The Fundamental Theorem of Calculus	277 - 279

College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

Academic Adjustments/Students with Disabilities:

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities (Room N320; 220-8180). BMCC is committed to providing equal access to all programs and curricula to all students.

BMCC Policy Statement on Plagiarism:

Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure of how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's web site, www.bmcc.cuny.edu.

