

**Department of Mathematics**

<b>Title of Course:</b> Analytic Geometry & Calculus III	<b>Class hours:</b> 4
<b>Course:</b> MAT 303	<b>Lab hours:</b> 2
<b>Semester:</b>	<b>Instructor:</b>
<b>Credits:</b> 4	<b>Tel #:</b>
	<b>Office:</b>
	<b>Email:</b>

**Course Description:** This is the third course of a three semester integrated study of analytic geometry and the concepts of differential and integral calculus. In this course the student is introduced to further concepts of function, limits, series, and integrals. An introduction to differential equations is given.

MAT 303 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:** Calculus II (MAT302) or the equivalent with departmental approval.

**Student Learning Outcomes:**

- 1) Students will be able to apply a variety of tests for determining the convergence or divergence of infinite series as well as intervals of convergence for power series; to find Taylor series representations of basic functions.
- 2) Students will be able to find parametric equations of curves in Cartesian and polar coordinates
- 3) Students will be to calculate and apply dot and cross products of vectors in 2 and 3 dimensions, to differentiate and integrate vector-valued functions
- 4) Students will be able to find and apply partial derivatives
- 5) Students will be to set up and evaluate integrals in higher dimensions

**Required Text:** R.E.Larson, R.P. Hostetler, B.H.Edwards. Calculus - Alternate Sixth Edition; Houghton Mifflin Co; 1998

**Use of Technology:** Students would be using the computers throughout the semester to have a visual idea of the different topics covered during the class lessons. The software that will be used during the semester is MAPLE.

**Evaluation & Requirements of Students:** At the beginning of the semester, the instructor will advise the student 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 10:

10.1 Sequences	559 – 571
10.2 Series and convergence	572 – 581
10.3 The Integral Test and p-series	581 – 586
10.4 Comparison of Series	586 – 592
10.5 Alternating Series	592 – 599
10.6 The Ratio and Root Test	599 – 605
10.7 Taylor Polynomials and Approximations	605 – 616
10.8 Power Series	616 – 624
10.9 Representation of functions by Power Series	624 – 631
10.10 Taylor and Maclaurin Series	631 – 642

#### Chapter 12:

12.1 Plane curves and parametric equations	679 – 686
12.2 Parametric equations and calculus	687 – 694
12.3 Polar coordinates and polar graphs	694 – 701
12.5 Area and arc length in polar coordinates	708 – 716

#### Chapter 13:

13.1 Vectors in the Plane	727 – 737
13.2 The dot product of two vectors	738 – 746
14.1 Space coordinates and vectors in space	785 – 795
14.2 The cross product of two product of two vectors in space	795 – 802
14.3 Lines and planes in space	803 – 812
14.4 Surfaces in space	812 – 822
14.5 Curves and Vector-valued functions in space	822 – 829
14.6 Tangent vectors, normal vectors and curvature in space	830 – 837

#### Chapter 15:

15.1 Introduction of functions of several variables	841 – 852
15.2 Limits and continuity	853 – 862
15.3 Partial derivatives	862 – 871
15.4 Differentials	878 – 887
15.5 Chain Rules for functions of several variables	887 – 897
15.6 Directional derivatives and gradients	897 – 905
15.7 Tangent planes and normal lines	905 – 913
15.8 Extrema of functions of two variables	913 – 919

#### Chapter 16:

16.1 Iterated integrals and area in the plane	931 – 938
16.2 Double integrals and volume	938 – 947
16.4 Centers of mass and moments of inertia	954 – 960
16.5 Surface Area	961 – 966
16.6 Triple integrals and applications	966 – 976
16.7 Cylindrical and Spherical Coordinates	976 – 983
16.8 Triples integrals in cylindrical and spherical coordinates	983 – 990

<b>TOPICS (continued)</b>	<b>TEXT PAGES</b>
<b>Chapter 17: (optional)</b>	
17.1 Vectors fields	1001 – 1012
17.2 Line integrals	1012 – 1024
17.3 Conservative vector fields and independence of path	1024 – 1033
17.4 Green’s Theorem	1033 – 1041
17.6 Surface Integrals	1052 – 1061
17.7 Divergence Theorem	1061 – 1068
17.8 Stokes’ Theorem	1068 – 1073
<b>Chapter 18:</b>	
18.1 Definitions and basic concept	1077 – 1081
18.2 Separation of variables in first-order equations	1081 – 1089
18.3 Exact first-order equations	1089 – 1095
18.4 First-order linear differential equation	1096 – 1104

**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 for 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. BMCC is committed to providing equal access to all programs and curricula to all students.

**BMCC Policy on Plagiarism and Academic Integrity Statement:**

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 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 side, [www.bmcc.cuny.edu](http://www.bmcc.cuny.edu). For further information on integrity and behavior, please consult the college bulletin (also available online).