

**BOROUGH OF MANHATTAN COMMUNITY COLLEGE**

The City University of New York

Department of Mathematics

**Title of Course:** \_FUNDAMENTAL OF MATHEMATICS I

**Class Hours:** 4

**MAT100**

**Semester** \_\_\_\_\_

**Instructor Information (Phone#, Office#, email)** \_\_\_\_\_

**Credits** 4

**Course Description** This course includes the study of several mathematical systems. The role of mathematics in modern culture and the role of postulative thinking in all mathematics are discussed. The course considers topics such as the nature of axiom, truth and validity, the notion of a set, groups, and counting principles.

**Prerequisites** Students must have taken (or been exempt from) MAT 010, MAT011, MAT012, and MAT 051.

MAT 100 is an optional course (instead of MAT150 or MAT200) for Liberal Arts students not majoring in mathematics, science, or any curriculum requiring the study of Calculus

<b>Course Student Learning Outcomes (Students will be able to...)</b>	<b>Measurements (means of assessment for student learning outcomes listed in first column)</b>
1. understand and use problem-solving strategies	1. Quizzes, homework, tests, projects.
2. determine the validity of a logical argument through the use of truth tables, Euler diagrams, and/or syllogisms.	2. Quizzes, homework, tests, projects.
3. determine the cardinality of a set and any of its subsets by way of deductive thought.	3. Quizzes, homework, tests, projects.
4. calculate intersections, unions, and complements of sets	4. Quizzes, homework, tests, projects.

<b>Optional Course Student Learning Outcomes (Students will be able to...)</b>	<b>Measurements (means of assessment for student learning outcomes listed in first column)</b>
1. calculate the probability of an event	1. Quizzes, homework, tests, projects.
2. appreciate and understand different numeration systems	2. Quizzes, homework, tests, projects.
3. understand the basic ideas involved in group theory and number theory	3. Quizzes, homework, tests, projects.
4. apply simple counting methods, including the Fundamental Counting Principle, permutations and combinations to find the cardinality of a set.	4. Quizzes, homework, tests, projects.
5. understand and apply basic principles of financial mathematics	5. Quizzes, homework, tests, projects.

Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)

	General Education Learning Outcomes	Measurements (means of assessment for general education goals listed in first column)
<input type="checkbox"/>	<b>Communication Skills-</b> Students will be able to write, read, listen and speak critically and effectively.	
<input type="checkbox"/>	<b>Quantitative Reasoning-</b> Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Problems measuring quantitative reasoning will be included in the final exam.
<input type="checkbox"/>	<b>Scientific Reasoning-</b> Students will be able to apply the concepts and methods of the natural sciences.	
<input type="checkbox"/>	<b>Social and Behavioral Sciences-</b> Students will be able to apply the concepts and methods of the social sciences.	
<input type="checkbox"/>	<b>Arts &amp; Humanities-</b> Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature.	
<input type="checkbox"/>	<b>Information &amp; Technology Literacy-</b> Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
<input type="checkbox"/>	<b>Values-</b> Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

**Required Text** *Mathematical Ideas*, Fourth Custom Edition for Borough of Manhattan Community College (taken from *Mathematical Ideas*, 11<sup>th</sup> (2008) and 13<sup>th</sup> editions (2016)), Miller, Heeren and Hornsby; Addison Wesley Longman Inc.

#### Evaluation and Requirements of Students

#### Mandatory Topics (these topics are to be covered in all classes):

- **Problem-solving:** Inductive and deductive reasoning, number patterns, problem-solving strategies. **Sections 1.1-1.3, 2 hours, pages 2-42.**
- **Sets:** Symbols and terminology, Venn diagrams, subsets, set operations, Cartesian products, cardinal numbers, and the cardinality of infinite sets. **Sections 2.1-2.4, 6 hours, pages 48-79.**
- **Logic:** Statements, quantifiers, truth tables, equivalent statements, conditionals, Euler diagrams. **Sections 3.1-3.6, 8 hours, pages 84-132.**

#### Optional Topics (at least two of the following will be covered):

- **Numeration Systems.** Historical numeration systems, arithmetic in the Hindu-Arabic system, conversion between number bases. **Sections 4.1-4.4, pages 140-172.**
- **Group Theory and finite mathematical systems.** **Sections 4.5-4.7, pages 172-199.**
- **Number theory:** Prime and composite numbers, greatest common factor, least common multiple, the Fibonacci sequence, and the Golden Ratio. **Sections 5.1-5.5, pages 208-244.**
- **Real Numbers.** Real numbers, order, absolute value, operations on real numbers, rational and irrational numbers. **Sections 6.1-6.5, pages 208-244.**

- **Counting by principles:** the systematic counting principle, the fundamental counting principle, permutations and combinations. **Sections 7.1-7.5, 9 hours, pages 322-368.**
- **Personal Financial Management.** The time value of money, installment buying, truth in lending, home ownership and financial investments. **Sections 8.1-5.5, pages 374-432.**

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