BOROUGH OF MANHATTAN COMMUNITY COLLEGE
City University of New York

Department of Mathematics

College Algebra **Class hours: 6**

MATH 156, Section _____ **Laboratory Hours per Week: 2**

Semester:_____ **Credits: 4**

Instructor Information (Phone #, Office #, email):_____

Course Description

This course covers topics such as solving polynomial, exponential, logarithmic, radical and rational equations. Algebraic, exponential, and logarithmic functions are introduced. A variety of applications will be emphasized.

Pre-requisites: Placement by the CUNY proficiency index or Math 51 or Math 12. Students who have passed Math 56 or Math 56.5 or Math 206.5 or Math 214.5 are not eligible to take this course.

Student Learning Outcomes and Assessment:

Course Student Learning Outcomes	Measurements
1. Students should be able to perform operations and solve equations involving algebraic and transcendental expressions in the real numbers, including polynomial, rational, radical, exponential, and logarithmic expressions and equations, linear inequalities, systems of equations.	**1.** Homework, quizzes, midterm, project(s), final exam.
2. Students should be able to represent equations in the real numbers graphically, and translate between graphical and algebraic forms, and use both graphical and algebraic forms to solve problems.	**2.** Homework, quizzes, midterm, project(s), final exam.
3. Students should be able to graph, interpret and analyze quadratic and other higher order polynomial functions.	**3**. Homework, quizzes, midterm, project(s), final exam.
4. Students should be able to evaluate, graph, interpret, and analyze functions both algebraically and geometrically.	**4**. Homework, quizzes, midterm, project(s), final exam.
5. Students should be able to solve problems in applied fields such as biological and physical sciences, business and social sciences.	**5.** Homework, quizzes, midterm, project(s), final exam.

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.	Homework, quizzes, online problem assignments, midterm, final exam.
Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Homework, quizzes, online problem assignments, midterm, final exam.
Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.	Homework, quizzes, online problem assignments, midterm, final exam.

Course Requirements

1 Textbook: Abramson, Jay. College Algebra. OpenStax, 2017.

A free, peer-reviewed online textbook. https://cnx.org/contents/mwjClAV_@15.1:iKCx0cHP@10/Preface

You may choose to download the PDF, and print at your own leisure. To do so, go to the above page, click on "Get this Book!" and click on PDF.

2. Technology: A scientific calculator is required. Graphing calculators and cell phone calculators are not allowed.

Math Lab

The Math Lab is located in S535. It is dedicated to helping students improve their understanding of mathematics at any level. You will need a valid BMCC student ID to visit the Math Lab. Tutors are available in the Math Lab for free to all BMCC students. The Math Lab has worksheets with practice problems in stock, as well as computer- and video-based tutoring. Your instructor can require you to attend to tutoring in the Math Lab and can also track how often you visit it and for how long. The Math Lab is typically open any day of the week when BMCC has classes in session; for current hours and more information about the Math Lab, see the webpage https://www.bmcc.cuny.edu/academics/departments/math/mathematics-lab-tutoring/.

Evaluation and Requirements of Students

At the beginning of the semester, the instructor will advise the student of the determination of the final grade. The criteria can include, but are not limited to, the final exam, class work, examinations, quizzes, and projects. A suggested grade distribution follows below.

Suggested Final Grade Distributions:

Homework:	20%
Quizzes/Exams/Projects:	20%
Midterm:	25%
Final Exam:	35%
Total:	100%

Suggested Schedule and Outline of Topics:

Week Number	Topics	Chapter and Page Number		Topic Details
Week 1	Introduction to course, Real Numbers and Properties of Exponents	1.1 1.2	Pg. 2 – 14 Pg. 17 – 28	Properties of real numbers, sets; properties of exponents.
Week 2	Properties of Radicals and Rational Exponents	1.3	Pg. 31 – 38	Simplify, add, subtract, multiply and divide radicals; rational exponents and equivalent radical form.
Week 3	Polynomial operations and Factoring	1.4 1.5	Pg. 41 – 47 Pg. 49 – 51	Add, subtract, multiply and divide polynomials; factoring GCF, factoring by grouping.

Week 4	Factoring and Rational Expressions	1.5 1.6	Pg. 51 – 55 Pg. 58 – 60	Factor trinomials, sum and difference of two cubes, difference of two squares; simplify rational expressions, multiply and divide rational expressions.
Week 5	Rational Expressions and Complex Numbers	1.6 2.4	Pg. 60 – 63 Pg. 111 – 117	Add and subtract rational expressions, simplify complex rational expressions; add, subtract, multiply, divide and simplify complex numbers.
Week 6	Solving quadratic equations; Solving other equations (linear, radical, polynomial, rational, of quadratic form)	2.5 2.6	Pg. 119 – 128 Pg. 131 – 140	Solving quadratic equations by factoring, by using the quadratic formula, by using the square root method, by completing the square; solving linear, radical, absolute value, rational, and equations reducible to quadratic form.
Week 7	Solving Inequalities-Linear and Absolute Value; **MIDTERM**	2.7	Pg. 142 – 148	Solve linear inequalities, graph solution set, use interval notation to express solution set; solve absolute value inequalities, graph solution set, use interval notation to express solution set.
Week 8	Rectangular Coordinate System and graphing linear equations	2.1 2.2	Pg. 74 – 83 Pg. 92 – 99	Graph ordered pairs, lines, definition of intercepts, slope, parallel and perpendicular lines; distance and midpoint formula; standard form and graphs of circles; find the equation of a line given certain conditions; applications of linear equations
Week 9	Solving systems of linear equations and applications	7.1	Pg. 576-588	Graph systems of linear equations, use substitution and elimination method to solve; applications of systems of linear equations
Week 10	Functions and Function Notation	3.1 3.2	Pg. 160 – 175 Pg. 180 – 192	Evaluate functions and piece-wise functions, algebraically and graphically, use function notation, use the vertical line test, determine if a relation represents a function; find the domain and range of a function algebraically and geometrically; graphs of basic functions.
Week 11	Graphs of functions and Quadratics	3.2 cont'd 5.1	Pg. 180 – 192 Pg. 344 – 356	Graph piece-wise functions; express quadratics in standard form, find vertex, intercepts and axis of symmetry, applications.
Week 12	Polynomial functions	5.2 5.3	Pg. 360 – 371 Pg. 375 – 389	Graph polynomial functions using proper end behavior and express in factored form; finding all zeros, and intercepts; use multiplicities and turning points to graph a polynomial; build a polynomial based on zeros, and multiplicity of each zero.
Week 13	Exponential and Logarithmic functions and Applications	6.1 6.2 6.3	Pg. 464 – 475 Pg. 479 – 487 Pg. 491 – 496	Evaluate exponential functions, solve basic exponential equations using the one-to-one property, applications; graph basic exponential equations; change from logarithmic form to exponential form and vice-versa; evaluate basic logarithmic functions, solve basic logarithmic equations, applications.
Week	Graphs of Logarithms	6.4	Pg. 499 – 512	Graph basic logarithmic functions use properties of

14	and Logarithmic Properties	6.5	Pg. 516 – 525	logarithmic functions to expand and condense; evaluate logarithmic expressions using log properties.
Week 15	Final Exam Review, **Final Exam**			

Class Participation
Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student's responsibility to be familiar with and follow the participation policies for each course.

BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

Single Stop www.bmcc.cuny.edu/singlestop, room S230, 212-220-8195. If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, come by the Single Stop Office for advice and assistance. Assistance is also available through the Office of Student Affairs, S350, 212-220- 8130.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

Office of Compliance and Diversity www.bmcc cuny.edu/aac, room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC's policies and resources, or to request additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

Office of Accessibility www.bmcc.cuny.edu/accessibility, room N360 (accessible entrance: 77 Harrison Street), 212-220-8180. This office collaborates with students who have documented disabilities, to coordinate support services, reasonable accommodations, and programs that enable equal access to education and college life. To request an accommodation due to a documented disability, please visit or call the office.

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. For further information on integrity and behavior, please consult the college bulletin (also available online).