BOROUGH OF MANHATTAN COMMUNITY COLLEGE
City University of New York

Department of Mathematics

Mathematics Literacy **with Computational Support**	**Class hours: 6**
MAT 014	**Instructor Information:**
Semester:	**Name:**
Credits: 0	**Email:**
	Office:

Course Description:
This developmental course provides an alternative and accelerated pathway to the college level liberal arts mathematics courses. The course will focus on applications of numerical reasoning to make sense of the world around us. Applications of arithmetic, proportional reasoning and algebra are emphasized. Lessons focusing directly on supporting students' computational skills are embedded in the course according to relevance to the following topic. This course **cannot** be used as a pre-requisite for MAT056 and is not suited for Science, Technology, Engineering or Math (STEM) students.

Pre/Co-Requisites:
Pre-Requisite: ESL 062 & ACR 094
Students must not have passed or been exempt from MAT 8 or been exempt by score on college placement test.

Student Learning Outcomes and Assessment:

I.   Quantitative Reasoning Learning Outcomes
1. Students will demonstrate quantitative reasoning to analyze problems, critique arguments, and draw and justify conclusions using the following skills and concepts: Q.1 Performing arithmetic operations Q.2 Using proportional reasoning, geometric concepts of area and volume, statistical and probabilistic reasoning Q.3 Understanding how quantities change including, but not limited to multiplicative vs. additive and relative vs. absolute Q.4 Estimating both in terms of mathematical calculations, and in contexts where estimation of values is essential because exact measures are unknown Q.5 Making comparisons based on relative magnitude Q.6 Understanding the magnitude and representations of numbers Q.7 Understanding and using concepts of measurement: units, precision, accuracy, error Q.8 Creating and using models (tables, words, graphs and equations) of real world situations Q.9 Checking answers and determining the reasonableness of results Q.11 Reading and interpreting quantitative information from a variety of real-world sources Q.12 Knowing where to find relevant data and how to evaluate its appropriateness for purpose and validity of source Q.13 Organizing and translating between and among various representations of quantitative information Q.14 Analyzing and using quantitative information to support an argument Q.15 Recognizing, making and evaluating quantitative assumptions
2. Students will communicate quantitative results in writing and orally using appropriate language, symbolism, data and graphs.
3. Students will use technology appropriately as a tool, including using computers and the internet to gather, research and analyze quantitative information, using spreadsheets, data simulations and other appropriate technology, and knowing when and how to use calculators appropriately.
4. Students will exhibit confidence in quantitative reasoning through perseverance and ability to transfer prior knowledge in unfamiliar contexts

II.   Mathematics Learning Outcomes

1. Computational Skill: Students will develop computational skills and understanding in order to support their success in mathematics learning outcomes 2-5. Therefore, students will be able to:

   C.1 Round large numbers and decimal numbers according to a specified degree of precision, as well as identify appropriate levels of precision in making approximations.

   C.2 Understand and interpret fractional quantities, including forming fractions from information in applied contexts, simplifying fractions, and converting from fractions to decimals and percents.

   C.3 Understand and interpret percents, including forming percents from information in applied contexts, calculating percents of quantities, and converting from percents to decimals and fractions.

   C.4 Construct multi-step mathematical expressions involving values in a spreadsheet, based on applied contexts, and carry out these calculations according to the order of operations. Apply given formulas involving multiple operations to specified values.

   C.5 Form and interpret ratios, expressing ratios in fraction, decimal, and percent form, and converting between these forms according to the applied context.

   C.6. Form and interpret values in scientific notation, understanding the mathematical basis for scientific notation and converting between scientific notation and standard form.

   C.7 Interpret and understand signed numbers in applied contexts and perform calculations involving signed numbers.

   C.8 Understand the multiplication and division of fractions, including applications in which multiplication or division of fractions is needed, and carrying out these computations.

   C.9 Understand the addition and subtraction of fractions and mixed numbers, including applications.

2. Numeracy: Students will develop and apply the concepts of numeracy to investigate and describe quantitative relationships and solve problems in a variety of contexts. Therefore, students will be able to:

   N.1 Demonstrate operation sense and communicate verbally and symbolically the effects of common operations on numbers.

   N.2 Demonstrate an understanding of and competency in using magnitude in the context of place values, fractions, and numbers written in scientific notation.

   N.3 Use estimation skills, knowing how and when to estimate results, to solve problems, detect errors, and check accuracy.

   N.4 Apply quantitative reasoning to perform calculations in applications involving quantities or rates.

   N.5 Demonstrate measurement sense.

   N.6 Demonstrate an understanding of the mathematical properties and uses of different types of mathematical summaries of data (e.g., measures of central tendency) and mathematical models.

   N.7 Read, interpret, and make decisions based on data from graphical displays (e.g., line graphs, bar graphs, scatterplots, histograms).

3. Proportional Reasoning: Students will represent proportional relationships and solve problems that require an understanding of ratios, rates, proportions, and scaling. Therefore, students will be able to:

   P.1   Recognize proportional relationships from verbal and numeric representations.

   P.2   Compare proportional relationships represented in different ways.

   P.3   Apply quantitative reasoning strategies to solve real-world problems with proportional relationships based on an understanding that derived quantities can be described with whole numbers, fractions, or decimals, or in a combination of these, and that to fully explain these relationships, units must be used.

4. Algebraic Reasoning: Students will reason using the language and structure of algebra to investigate, represent, and solve problems. Therefore, students will be able to:

   A.1   Understand various uses of variables to represent quantities or attributes.

   A.2   Describe the effect that a change in the value of one variable has on the value(s) of other variables in the algebraic relationship.

   A.3   Construct and use equations or inequalities to represent relationships involving one or more unknown or variable quantities to solve problems.

Required Text and Readings:
Mathematics Literacy with Basic Arithmetic, BMCC Edition 1.3. This curriculum materials was re-designed by BMCC QW Committee from The Carnegie Foundation & The Charles A. Dana Center's Quantway I, V. 1.0. Students are required to purchase access to WebAssign, the online homework assessment platform.

Evaluation and Requirements of Students:
The final grade in this course will be a passing grade of S, or a failing grade of R. To pass the course, the student must attain a cumulative score of 70 % or more.

Grade Distribution:

Homework:	25%
Class Participation:	15%
Exams:	30%
Final Exam:	30%

Placement into MAT 041:
Certification in Computational Fluency (Module 0 exam) provides the opportunity for students who receive an R grade in MAT 014 to place into MAT 041 in subsequent semesters. This certification is achieved on the basis of a grade of 70% or better in the Computational Fluency Certification Exam (Module 0 exam).

Student Services:
1. Math Lab
The Math Lab is located in S535. 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.

2. Learning Resource Center (LRC)
To help make your college career a success, the Learning Resource Center (LRC) offers students academic support services to strengthen academic skills and meet their learning needs. LRC offers tutorial and instructional computer lab services and course-specific, non-print supplemental instructional materials. The LRC is located in room S-500 and all services are available free of charge to registered BMCC students. For more info visit http://www.bmcc.cuny.edu/lrc/

3. E-Tutoring
E-tutoring is available to all BMCC students. If you e-mail your question, you will receive response within 24 hours Monday to Friday except when classes are not in session. Questions submitted over the weekend, if not answered within

24 hours, will be answered on the following Monday. For further information, please call e-tutoring at 212-220-1380, send an email to e-tutoring@bmcc.cuny.edu or visit http://www.bmcc.cuny.edu/etutoring/

College Attendance Policy:

1. Absences
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 this course, you are allowed five hours of absence (not seven days). In the case of excessive absence, the instructor has the option to lower the grade or assign an "F", "R", or "WU" grade.

2. Class Attendance
If you do not attend class at least once in the first three weeks of the course and once in the fourth or fifth weeks, the Office of the Registrar is required to assign a grade of "WU". Attendance in both regular and remedial courses is mandated by policy of the City University of New York. Instructors are required by New York State law to keep an official record of class attendance.

3. Lateness
Classes begin promptly at the times indicated in the Schedule of Classes. Arrival in classes after the scheduled starting time constitutes a lateness. Latecomers may, at the discretion of the instructor, incur an official absence.

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

Weeks	Topics Covered	Lesson #
Week 1	About How Much?	0.1
	How Much Should My Rent Be?	0.2
	Order Matters	0.3
Week 2	How Large is Large?	0.4
	A Taxing Set of Problems	0.5
	What Fraction should I Get?	0.6
Week 3	Finding the Center	0.7
	Module 0 Review & Module 0 Assessment	**Exam 0**
Week 4	Introduction to Quantitative Reasoning	1.1
	What is Percent?	1.2
	Affordable Care Act,	1.3
Week 5	Whose Footprint Is Bigger?	1.4
	Interpreting Statements About Percentages	1.5
Week 6	Module 1 Review & Module 1 Assessment	**Exam 1**
	How Crowded Are We?	2.1
Week 7	Counting our votes	2.2
	Measuring Population Change	2.3
	Picturing Data with Graphics	2.4
Week 8	What Is Average?	2.5
	What Is the Chances?	2.6
Week 9	Module 2 Review & Module 2 Assessment	**Exam 2**
	What is the Correct Dose?	3.1
Week 10	The Facts on the Ground	3.2
	The Fixer Upper	3.3
Week 11	Balancing Blood Alcohol	3.4
	A Return to Proportional Reasoning	3.5
	Module 3 Review	
Week 12	Module 3 Assessment	**Exam 3**
	Modeling Money	4.1
	More Linear Modeling	4.2
Week 13	Compounding Interest Makes Cents	4.3
	How Fast?	4.4
Week 14	The Rising Seas	4.5
	Module 4 Review & Assessment	**Exam 4**
Week 15	Final Assessment Review	
Week 16	Final Exam	**Final**