New York City College of Technology
Mathematics Department

COURSE CODE: MAT 1190

TITLE: Quantitative Reasoning

PREPARED BY: Nadia Benakli and QR Fellows

Number of class hours, lab hours if applicable, credits 3 class hours, 3 credits

COURSE DESCRIPTION:
Students develop and apply mathematical, logical, critical thinking, and statistical skills to solve problems in real-world contexts. They acquire skills in the fields of algebra, geometry, probability, statistics, and mathematical modeling. The course incorporates opportunities within the classroom to develop students' reading, writing, oral, and listening skills in a mathematical context.

COURSE CO/PREREQUISITE (S):

CUNY Proficiency in reading and mathematics.

REQUIRED TEXTBOOKS and/or MATERIALS

1. Title: Math in Society

Author: David Lippman

Publisher: Independent

available at https://open.umn.edu/opentextbooks/textbooks/math-in-society

2. Title: Introductory Statistics

Authors: Barbara Illowsky, Susan Dean, et al.

Publisher: OpenStax

available at https://open.umn.edu/opentextbooks/textbooks/introductory-statistics-2013

A scientific calculator is required.

COURSE INTENDED LEARNING OUTCOMES/ASSESSMENT METHODS

LEARNING OUTCOMES	ASSESSMENT METHODS
1. Apply mathematical, logical, critical thinking, and statistical skills to solve problems in real-world	**1.** Group activities, written report.

contexts.	
2. Represent mathematical information symbolically, visually, numerically, and verbally.	**2.** Individual oral presentations, in-class group activities.
3. Estimate mathematical quantities as well as evaluate the accuracy of estimates, and adjust estimates when necessary.	**3.** Classroom discussion, in-class estimation group assignments.
4. Represent and know how to read, collect and organize data in an assortment of appropriate written and graphical forms.	**4.** Classroom discussion, in-class group assignments (e.g., students read a newspaper article on a current issue, collect and analyze data related to the issue in the article, and write a report.), learning logs.
5. Recognize and understand functions as a way of modeling correspondence between two variables (linear and exponential).	**5.** Individual short essay related to functions (e.g., population growth, economics, climate change).
6 Describe the behavior of common functions in words, graphically, algebraically and in tables.	**6.** Written report and group presentation (e.g., an analysis of the garbage patch in the Pacific Ocean), learning logs.

GENERAL EDUCATION LEARNING OUTCOMES/ASSESSMENT METHODS

LEARNING OUTCOMES	ASSESSMENT METHODS
1. Demonstrate the ability to work collaboratively and independently on assignments in and outside a classroom setting.	**1.** Classroom discussions, group assignments and individual oral presentations.
2. Understand and employ both quantitative and qualitative analysis to solve problems.	**2.** Classroom Discussion, Group Activities, Group Presentations, Quizzes, Tests, Final Exam.
3. Develop reading, writing competencies, and listening skills.	**3.** Biweekly reading and writing assignments, individual and group presentation, classroom discussion. Each homework assignment requires written responses.
4. Work with teams. Build consensus. Use creativity.	**4.** Group Projects and Presentations.

ACADEMIC INTEGRITY POLICY STATEMENT

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering

models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty
is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Session	Topics	References (MS = Math in Society; IS = Introductory Statistics)	Problems
1	percents	MS p. 1-3	MS p. 18 ex. 1-6
2	relative change	MS p. 3-6	MS p. 18 ex 7-12
3	proportions, rates, unit conversions	MS p. 6-10	MS p. 20 ex. 27-32, 35-40
4	geometry	MS p. 10-12	MS p. 22 ex. 51, 56, 63
5	problem solving, estimation	MS p.12-16	MS p. 23 ex. 60-62, 64-67
6	taxes	MS p. 30-31	MS p. 34 project 2 calculating taxes
7	Exam 1		
8	linear growth	MS p. 173-177 (examples 1,2)	MS p. 193 ex. 1-6
9	exponential growth	MS p. 178-181	MS p. 193 ex. 7-10
10	simple interest	MS p. 197-198	MS p. 222 ex. 1-5
11	compound interest	MS p. 199-203	MS p. 222 ex. 6-12
12	compound interest cont.	MS p. 199-203	MS p. 222 ex. 6-12
13	Exam 2		
14	basic probability	MS p. 279-281	MS p. 310 ex. 1-10
15	working with events	MS p. 282-286	MS p. 311 ex.14, 16-19
16	conditional probability	MS p. 286-289	MS p. 311 ex. 20-22,27-29
17	basic counting, tree diagrams	MS p. 293-295	MS p. 314 ex. 49-50
18	permutations	MS p. 296-298	MS p. 314 ex. 51-53, 55-56
19	combinations	MS p.298-300	MS p. 315 ex. 61-62,65-66
20	probability using permutations and combinations	MS p. 301-303	MS p. 315 ex. 67-72
21	expected value	MS p. 305-308	MS p. 316 ex. 73-78
22	Exam 3		
23	describing data	MS p. 247-253	MS p. 275 ex. 1-6
24	measures of central tendency	IS p. 7, MS p. 258-262	MS p. 276-277 ex. 7-10 (a,b only)
25	measures of variation	MS p. 263-266	MS p. 278 ex.16-17
26	normal distribution, z-scores	IS p. 311-313, 366-368	IS p. 389 hw. 60-67
27	scatter plots, correlation coefficient	IS p. 682-685, 690	IS p. 720 hw. 57, 59-61, 68-69(a,b,d only)
28	voting theory	MS p. 35-38	MS p. 54 1-2, 3-6(a,b,c only)
29	Review		
30	Final Exam		