New York City College of Technology

Mathematics Department

COURSE CODE: MAT 1190

TITLE: Quantitative Reasoning

PREPARED BY**:** *Nadia Benakli and QR fellows*

REVISED BY: Nadia Benakli, Spring 2021

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 mathematics. PRE/CO ENG 1101 OR PRE ENG 1101CO/ML

REQUIRED TEXTBOOKS

1. Title: Math in Society

   Author: David Lipman

   Publisher: Independent

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

2. Title: Introductory Statictics

   Authors: Barbara Illowsky, Susan Dean, et al.

   Publisher: OpenStax

   Available at https://openstax.org/details/books/introductory-statistics

A scientific calculator is required.

Course Learning Outcomes	General Education	Required Core-

	Learning Outcomes	Mathematical & Quantitative Reasoning
Apply mathematical, logical, critical thinking, and statistical skills to solve problems in real-world contexts	Be able to understand and employ both quantitative and qualitative analysis to identify issues and evaluate evidence in order to make informed decisions and draw appropriate conclusions Be able to connect the acquired knowledge by applying mathematical skills for real world problems	Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems Apply mathematical methods to problems in other fields of study
Represent mathematical information symbolically, visually, numerically, and verbally	Be able to convert relevant information into various mathematical forms	Represent quantitative problems expressed in natural language in a suitable mathematical format
Estimate mathematical quantities as well as evaluate the accuracy of estimates, and adjust estimates when necessary	Be able to make and evaluate assumptions in estimation	Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation
Represent proportional relationships and solve problems that require an understanding of ratios, rates, proportions, and scaling	Be able to use reading, writing competencies, listening and inquiry skills to solve problems	Represent quantitative problems expressed in natural language in a suitable mathematical format
Represent and know how to read, collect and organize data in an assortment of appropriate written and graphical forms	Be able to use reading, writing competencies, and listening skills to solve problems	Represent quantitative problems expressed in natural language in a suitable mathematical format Produce well-reasoned written arguments using evidence to support conclusion Effectively communicate quantitative solutions to mathematical problems in written or oral form
Represent relationships	Be able to convert relevant	Represent quantitative

between quantities in multiple ways and solve problems that require an understanding of functions	information into various mathematical forms	problems expressed in natural language in a suitable mathematical format
Describe the behavior of common functions in words, graphically, algebraically and in tables	Be able to explain information presented in different mathematical forms	Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables

SCOPE OF ASSIGNMENTS and other course requirements*

- **Learning log**
- **Participation in group work and discussion**
- **Homework reading assignments**
- **Group projects and presentation**
- **Tests**
- **Attendance**

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.

COLLEGE POLICY ON ABSENCE/LATENESS

A student may be absent without penalty for 10% of the number of scheduled class meetings during the semester as follows:

Class Meets	Allowable Absence
1 time/week	2 classes
2 times/week	3 classes

The official Mathematics Department policy is that two latenesses (this includes arriving late or leaving early) is equivalent to one absence.

***depending on department policy these may be uniform and required of all instructors of the course or there may be guidelines or samples from which instructors may select or adapt**

References (MS = Math in Society; IS = Introductory Statistics)

Session	Topics	Pages	Homework

1	Percents	MS p. 1-3 (ex. 1-5)	MS p.18: 1-3, 6-8
2	Proportions, rates, unit conversions	MS p.6-8 (ex. 12-15)	MS p.20: 27-32
3	Proportions, rates, unit conversions (continued)	MS p.8-10 (ex. 16, 18, 19, 20)	MS p.20: 35-40
4	Geometry	MS p.9 (ex. 17) MS p.10-12 (ex. 21, 22,23)	MS p.22: 51,52,56,63
5	Problem solving, estimation	MS p.14-16 (ex. 26, 27, 28)	MS p.23: 61,62,64,65,68
6	Taxes	MS p.30-31 (ex. 1-4)	MS p.32: project 1
7	Exam I		
8	Linear growth	MS p.173-177 (ex. 1-3)	MS p.193: 1-4,16
9	Exponential growth	MS p.178-181 (ex. 5-7)	MS p.194: 9-12
10	Simple interest	MS p.197-198 (ex. 1-3)	MS p. 222: 1-3
11	Compound interest	MS p.199-203 (ex. 4-6)	MS p.222: 6-12
12	Compound interest cont.	MS p.199-203 (ex. 4-6)	MS p.222: 6-12
13	Exam 2		
14	Basic probability	MS p.279-281 (ex. 1-5)	MS p.310: 1-10
15	Working with events	MS p.282-286 (ex. 5-11)	MS p.311: 13-18, 3116-19
16	Conditional probability	MS p.286-289 (ex. 13,14,15)	MS p.311: 21, 27-30
17	Basic counting, tree diagrams	MS p.293-295 (ex.21-24)	MS p.314: 49-50
18	Permutations	MS p.296-298 (ex.25-30)	MS p.314: 51-53, 55-56
19	Combinations	MS p.298-300 (ex.31-	MS p.315: 61-62, 65-66

		33)	
20	Probability using permutations and combinations	MS p.301-303 (ex.34-38)	MS p.315: 67-72
21	Expected value	MS p.305-308 (ex. 42-44)	MS p.316: 73-76
22	Exam 3		
23	Describing data	MS p.247-253 (ex. 1,2,4,5,6,8)	MS p.275: 1-6
24	Measures of central tendency	MS p.258-262 (ex.14-19)	MS p.276-277: 7-10 (a,b only)
25	Measures of variation	MS p.263-266 (ex.23-24)	MS p.278: 15-16
26	Normal distribution, z-scores	IS p.311-313, 366-368	IS p.389: 60-67
27	Scatter plots, correlation coefficient	IS p.682-685, 690-691	IS p.720: 57, 59-61, 68-69 (a, b, d only)
28	Voting theory (ex. 1-4)	MS p.35-38	MS p.54: 1-2, 3-6 (a, b, c only)
29	Review		
30	Final exam		