

**BOROUGH OF MANHATTAN COMMUNITY COLLEGE
THE CITY UNIVERSITY OF NEW YORK**

Department of Mathematics

INTRODUCTION TO STATISTICS WITH ALGEBRA

Class hours: 6

MAT 150.5

Credits: 4

Semester:

Instructor Information (Email, Phone #, Office #):

Office Hour:

A. Course Description:

Statistics with algebra is a statistics course (4 credits and 60 hours) with an additional 30 hours focusing on elementary algebraic concepts useful in statistics. After covering the selected algebraic concepts, the course covers the study of basic statistics. It includes measures of central tendency, measures of dispersion, graphs, probability, the binomial distribution, the normal distribution, sampling distributions, the chi-square distribution, t-tests, estimation and hypothesis testing, correlation, and regression.

MAT 150.5 is equivalent to MAT 150. (Students who passed MAT 150 cannot register for MAT 150.5. Students who passed MAT 150.5 cannot register for MAT 150).

B. Prerequisites/Co-requisites

This course is recommended for non-STEM majors. It does not satisfy the prerequisites for MAT 056.

To qualify students must be exempt from MAT 008 or pass MAT 008.

Table 1

Course Student Learning Outcomes	Measurements
<p>1. Students will study basic concepts of descriptive statistics, including graphical representations of data and measures of central tendency, position, and dispersion.</p> <p>Students will:</p> <ul style="list-style-type: none"> Know the difference between a population and a sample. Classify data by type. Design a sampling plan for a statistical study. Construct frequency distributions from data sets. Construct histograms, polygons and ogives from frequency distributions. Construct pie and Pareto charts. Interpret basic charts and graphs 	<p>1. Quizzes, tests, homework and/or projects</p>

<p>Define the vocabulary, terminology and symbols used in statistics. Calculate and <i>interpret</i> key statistics and parameters such as</p> <ul style="list-style-type: none"> • the mean, the mode, the median, • the standard deviation • quartiles and percentiles • standard (z) scores 	
<p>2. Students will study basic concepts of probability leading to the study of the binomial and normal probability distributions and the Central Limit Theorem.</p> <p>Students will:</p> <ul style="list-style-type: none"> Identify the sample space of a probability experiment. Find classical and experimental probabilities and explain how the two are related using the Law of Large Numbers. Use the Multiplication and Addition Rules for finding probabilities. Find permutations and combinations. Construct and graph discrete probability distributions. Find the mean and standard deviation for discrete probability distributions and for binomial probabilities. Find binomial probabilities using the formula and a table and/or technology. Understand the properties of the normal distribution. Use the standard normal table and/or technology to find probabilities. Use the standard normal table and/or technology to find data values. Understand and use the Central Limit Theorem. 	<p>2. Quizzes, tests, homework and/or projects</p>
<p>3. Students will be able to construct simple statistical studies and hypothesis tests using Normal distributions as well as with other distributions such as the t and the chi-squared distribution.</p> <p>Students will:</p> <ul style="list-style-type: none"> Construct confidence intervals for means (large samples). Construct confidence intervals for means (small samples). Construct confidence intervals for population proportions. Perform hypothesis tests for means (large samples). Perform hypothesis tests for means (small samples). Interpret the results of hypothesis tests and confidence intervals. Find the linear correlation coefficient, using software if possible 	<p>3. Quizzes, tests, homework and/or projects</p>

Test the linear correlation coefficient for significance. Find the equation of a regression line, using software if possible Predict y values using regression equations. Interpret a positive, negative or close to zero correlation Perform Chi Square Goodness-of-Fit tests	
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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.

Table 2

	General Education Learning Outcomes	Measurements
<input type="checkbox"/>	Communication Skills- Students will be able to write, read, listen and speak critically and effectively.	
<input checked="" type="checkbox"/>	Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Quizzes, tests, homework and/or projects
<input type="checkbox"/>	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	
<input type="checkbox"/>	Social and Behavioral Sciences- Students will be able to apply the concepts and methods of the social sciences.	
<input type="checkbox"/>	Arts & Humanities- 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"/>	Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
<input type="checkbox"/>	Values- Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

C. Required Text and Supplementary Material

Your instructor will select one of the two textbooks below. Some instructors may require the purchase of an e-book with an online homework system.

1. Essentials of Statistics, Seventh Edition, By Mario E. Triola, 2022, ISBN: 9780137954612, Pearson Education, Inc.
2. Elementary Statistics: Picturing the World, Eighth Edition, By Ron Larson and Betsy Farber, 2022, ISBN: 9780137954735, Pearson Education, Inc.

Specific information will be provided on the first day of class. **Students should not purchase any textbook before consulting with the course instructor.**

Official MAT150.5 Open Educational Resources (OER) Website

<http://helpyourmath.com/150.5>

Free Homework System (Recommended)

<http://helpyourmath.com/150.5/homeworksystem>

D. Other Resources

The resources available in the Math Lab (Room S535) include tutors, videotaped lessons, technology (statistics computer programs, graphing calculators and internet access) and additional worksheets.

E. Use of Technology

A scientific calculator is required. The new textbook comes with a free internet account that provides online tutorials, extra practice problems and video recorded lessons. Some MAT 150 sections listed in the Schedule of Classes as taught with technology require students to use computers and/or graphing calculators.

F. Evaluation and Requirements of Students

At the beginning of the semester, the instructor will advise the student on how the final grade will be determined (based on class work, examinations, quizzes, writing assignments and the final examination).

Each summative assessment will have two parts: algebra and statistics. **In order to satisfy the algebra requirement, students must earn a 70% or higher throughout the semester on the designated questions.** Students will receive a second try on algebra if needed during finals week. Given below is the suggested grade distribution.

Class Participation	10%
Homework, project, and quizzes	20%
Tests	25%
Midterm	20%
Final Exam	25%

G. Outline of Topics

Table 3

Topic		Time	Lesson Title	Required Math Background
Data Collection and Organizing and Summarizing Data	Week 1	1	1.1 An Overview of Statistics	
		2	1.2 Data Classification	How to Find Percent
		2	1.3 Data Collection and Experimental Design	Percent of Change
		2	2.1 Frequency Distributions and their Graphs	
			2.2 More Graphs	
Numerically Summarizing Data	Week 2	3	2.3 Measures of Central Tendency	Introduction to Mean, Median and Mode; Solving Linear Equations; Solving Literal Equations
		4	2.4 Measures of variation or dispersion	Radicals
	Week 3	2	2.5 Measures of Position	
		2	2.5 The Five-Number Summary and Boxplots	
		2	Review for Test 1	
Describing the Relation between Two Variables	Week 4	2	Test 1 on chapters 1 and 2.	
		4	9.1 Correlation	Slope of a Line; Graphing Linear Equations; Absolute Value
	Week 5	4	9.2 Linear Regression	Point-Slope Formula of a Line; Intercepts of a Linear Equation
		2	9.3 Measures of Regression and Prediction Intervals	

Probability	Week 6	2	3.1 Basic Concepts of Probability and Counting	
		4	3.3 The Addition Rule and Complements	Adding and Subtracting Variables in Fractions
		3	3.2 Conditional Probability and the Multiplication Rule	Exponents higher than degree 2
		2	3.4 Additional Topics in Probability and Counting	
		2	Review for Midterm Exam	
Discrete Probability Distributions	Week 7	2	Midterm on chapters 1,2,3,9.	
	Week 8	2	4.1 Probability Distributions	Inequalities, solving linear inequalities
The Normal Probability Distribution	Week 9	3	4.2 Binomial Distributions	
		2	5.1 Introduction to Normal Distributions and the standard Normal Distribution.	
		3	5.2 Normal Distribution: Finding Probabilities. 5.3 Normal Distribution: Finding Values	
Sampling Distributions and Estimating the Value of a Parameter	Week 10	3	5.4 Sampling Distributions and the Central Limit Theorem	
		3	6.1 Confidence Intervals for the Mean (σ Known)	
	Week 11	3	6.2 Confidence Intervals for the Mean (σ unknown)	
		2	6.3 Confidence Interval for Population Proportions.	
Hypothesis Tests Regarding a	Week 12	2	Review for Test 2	
		2	Test 2 on chapters 4 - 6.	
		3	7.1 Introduction to Hypothesis Testing.	
		3	7.2 Hypothesis Testing for the Mean (z test: σ known	

		3	7.3 Hypothesis Testing for the Mean (t test: σ unknown)	
	Week 13	2	7.4 Hypothesis Testing for Proportions.	
	Week 14	2	9.3 Testing the Significance of the Least-Squares Regression Model	
		3	Review for Final Examination	
	Week 15	2	Final Examination	

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 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).

Gender-Inclusivity

BMCC community members have the right to use and be referred to according to their preferred name, title, and/or personal pronouns. Everyone also has the right to use all spaces according to their self-identification, including restrooms and locker rooms. To learn more about how to change your preferred name and affirm your gender identity at CUNY (including requesting a new ID card and/or email address), go here: <https://www.bmcc.cuny.edu/student-affairs/lgbtq/> Anyone who has experienced harassment related to gender or sexual identification, who needs assistance, or who wishes to file a complaint, can contact the Office of Compliance and Diversity: <https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity/>.

FREE BMCC STUDENT SUPPORT SERVICES

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.

Advocacy and Resource Center (ARC) <https://www.bmcc.cuny.edu/student-affairs/arc/> room S230, 212-220-8195, arc@bmcc.cuny.edu. 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, contact the Advocacy and Resource Center (formerly Single Stop) for assistance. Please contact us at arc@bmcc.cuny.edu, call 212-220-8195, or come by the office at room S230. You may also contact the Office of Student Affairs, S350, 212-220-8130, studentaffairs@bmcc.cuny.edu, for assistance.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140, counselingcenter@bmcc.cuny.edu. 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 <https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity>, 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, Students who need academic accommodations in connection with a disability must initiate the request with BMCC's Office of Accessibility (OA). Students need to register with the Office of Accessibility in order to officially disclose their disability status to the College and to determine eligibility for appropriate reasonable accommodations (including any prior IEPs or 504s). Please contact the OA at the start of the semester (or as soon as possible) to coordinate any accommodation request/s: www.bmcc.cuny.edu/accessibility, Room N360 (accessible entrance: 77 Harrison Street), 212-220-8180, accessibility@bmcc.cuny.edu.