

BRONX COMMUNITY COLLEGE
of the City University of New York
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

SYLLABUS

MTH 20: PROBABILITY AND STATISTICS WITH ALGEBRA (3 credits / 7 hours)

Prerequisite: MTH 1 or placement into MTH 5 or a proficiency index indicating a light developmental need as defined by CUNY (proficiency index between 40 and 59)

Co-requisite: ENG 2 and/or RDL 2, if required

Textbooks: 1. Brase & Brase, Understanding Basic Statistics, 8th ed., Cengage Learning
ISBN: 9781337558075

2. A. McInerney, MTH 5 Lecture Notes available at

<https://fsw01.bcc.cuny.edu/mathdepartment/Courses/Math/MTH05/05text0916b-hyper.pdf>

Calculator: Scientific calculator (suggested: TI-36X Pro)

Course Description: This is a probability and statistics course with elementary algebra topics integrated to support the statistics. Probability and statistics topics include organization and presentation of data, measures of central tendency and variation, correlation and linear regression, elementary probability, the binomial and normal distributions, sampling distributions, the central limit theorem, confidence intervals, student's t-distribution, and hypothesis tests. Elementary algebra topics include fractions, percent, adding and subtracting polynomials, linear and quadratic equations, literal equations, solving word problems, inequalities, and functions.

Purpose: To reduce to one semester the sequence of courses leading to a credit-bearing math course for non-STEM majors. This course covers the curriculum of a 3 credit probability and statistics course (presently offered as MTH 23) with supplemental instruction in elementary algebra integrated on a “just in time” basis to support the probability and statistics. This course is equivalent to MTH 23 for grade replacement purposes. This course is not for STEM or Business Administration AS majors and is not a prerequisite for any higher level mathematics course. In particular, *this course does not satisfy the prerequisites for MTH 6.*

Student Learning Objectives: Upon completion of this course, students will be able to:

1. Perform operations with signed numbers using a calculator. Solve and graph linear equations. Solve literal equations and linear inequalities. Evaluate algebraic expressions and solve word problems. Evaluate functions and graph linear functions.
2. Sort, analyze and present numerical data using sample spaces, measures of central tendency, and measures of variation.
3. Recognize correlations between data sets using scatter diagrams; express linear correlations using least squares regression; determine the strength of the correlation via the correlation coefficient.
4. Predict experimental outcomes using basic techniques of probability (permutations, combinations, counting techniques, tree diagrams).
5. Recognize the features of a binomial experiment and apply the binomial probability distribution.
6. Recognize the features of a normal distribution and compute probabilities using the standard normal distribution.
7. Infer population parameters using sampling distributions and the Central Limit Theorem.
8. Limit the error of estimation by calculating confidence intervals.
9. Accept or reject a hypothesis by establishing a level of significance.

Pathways: This course may be used to satisfy Category B (Mathematical and Quantitative Reasoning) of the CUNY Pathways Required Core.

Grading Guidelines: Homework, quizzes, oral presentations, projects, etc. (1/3 of grade); midterm and in-class tests (1/3 of grade); final exam (1/3 of grade).

Academic Integrity: Academic dishonesty (such as plagiarism and cheating) is prohibited at Bronx Community College and is punishable by penalties, including failing grades, dismissal and expulsion. For additional information and the full policy on Academic Integrity, please consult the BCC College Catalog.

Accommodations/Disabilities: Bronx Community College respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of a disability, please contact the disAbility Services Office as soon as possible this semester. The disAbility Services specialists will meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations for this course. You can reach the disAbility Services Office at: disability.services@bcc.cuny.edu, Loew Hall, Room 211, (718) 289-5874.

Topics in Probability and Statistics with Algebra: Section numbers preceding topics refer to Brase & Brase (for probability and statistics) and McInerney (for elementary algebra).

(* indicates optional topics; leave some out as needed in order to do tests and review)

	PROBABILITY AND STATISTICS	ELEMENTARY ALGEBRA
Week 1	1.1 What is statistics?	1, 2, 3.1 Review: arithmetic of signed numbers, fractions, decimals, percent, rounding, and order of operations
	1.2 Random Samples	Calculators: Arithmetic and order of operations
Week 2	1.3 Introduction to Experimental Design	3.2, 3.3, 3.4 Evaluating algebraic expressions and translating algebraic expressions
	2.1 Frequency Distributions, Histograms, and Related Topics	Supplement: Area of a rectangle
Week 3	2.2 Bar Graphs, Circle Graphs, and Time-Series Graphs*	8.2 Radicals
	2.3 Stem-and-Leaf Displays*	Calculators: Descriptive statistics
Week 4	3.1 Measures of Central Tendency: Mode, Median, and Mean	
	3.2 Measures of Variation	6.2 Combining like terms, adding and subtracting polynomials
Week 5	3.3 Percentiles and Box-and-Whisker Plots*	4.1, 4.2, 4.3 Solving linear equations and applications to word problems
	4.1 Scatter Diagrams and Linear Correlation	5.1, 5.2 Co-ordinate system, graphs of linear equations, slope of a straight line, equation of a line
Week 6	4.2 Linear Regression and the Coefficient of Determination*	
	5.1 What is Probability?	
Week 7	5.2 Some Probability Rules—Compound Events	4.3 Solving literal equations
	Midterm Review	
Week 8	5.3 Trees and Counting Techniques*	6.3 Exponents and properties
	6.1 Introduction to Random Variables and Probability Distributions	3.3 Functions and their graphs
Week 9	6.2 Binomial Probabilities	
	6.3 Additional Properties of the Binomial Distribution	
Week 10	7.1 Graphs of Normal Probability Distribution	4.4 Inequalities and interval notation, graphing linear inequalities on a number line
	7.2 Standard Units and Areas Under the Standard Normal Distribution	Supplement: Area under the graph of a function, basic properties of area
Week 11	7.3 Areas Under any Normal Curve	
	7.4 Sampling Distributions	
Week 12	7.5 The Central Limit Theorem	
	7.6 Normal Approximation to the Binomial Distribution	
Week 13	8.1 Estimating μ when σ is Known	4.4 Solving linear inequalities
	8.2 Estimating μ when σ is Unknown	
Week 14	8.3 Estimating p in the Binomial Distribution*	9.3, 9.4, 9.5 Solving quadratic equations by basic factoring and quadratic formula, with applications to more advanced word problems
	9.1 Introduction to Statistical Tests	
Week 15	9.2 Testing the Mean μ	
	9.3 Testing a Proportion p^*	
Week 16	Final Review	