

LAGUARDIA COMMUNITY COLLEGE—CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING, AND COMPUTER SCIENCE
FOR ALL SECTIONS INCLUDING IN-PERSON, HYBRID, OR ONLINE

MAT 119 –STATISTICS AND ELEMENTARY ALGEBRA
5 Lecture Hours, 2 Lab Hours, 3 Credits
Prerequisite: MAT 095 or placement into MAT 096

Instructor Name: _____
Office Hours: _____
Tutoring Hours: _____

CATALOG DESCRIPTION

This is a statistics course with algebra support using the Statway curriculum. The focus is on statistics (data collection, numerical and graphical representation of data, linear correlation and regression, discrete and continuous probability distributions, estimation, and hypothesis testing); relevant algebra topics such as fractions, percent, linear equations in one and two variables and functional relationships are integrated, resulting in a collaborative, problem-based class.

PURPOSES AND GOALS

This course covers the curriculum of a 3-credit elementary statistics course with sufficient developmental mathematics to insure success. Two lab hours and two additional classroom/lecture hours are required for this. The purpose of this course is to reduce into one semester the sequence of courses leading to a credit-bearing Math course. In addition, the students will be exposed to productive persistence to deepen learning and understanding the topics of the course. One important feature of this teaching model is group work. The assumption is that when students work in groups there is more peer accountability and more memorable learning experiences.

INSTRUCTION OBJECTIVES

1. Enable students to create social ties with peers and instructors using the "Productive Persistence" and "Starting Strong" packages, sets of evidence-based activities developed and tested to increase student success and retention.
2. Introduce students to the fundamental questions that arise in a statistical study.
3. Familiarize students with the design of statistical studies, introducing them to the issues of population identification, sample selection and bias.
4. Provide students with qualitative and quantitative descriptions of data distributions in graphical and numerical formats.
5. Provide students with the skills needed to construct graphs from linear and nonlinear equations and, conversely, determine equations from graphs of straight lines.
6. Introduce students to bivariate data to identify correlations, causations and regressions; in order to make predictions.
7. Introduce students to the basic concepts of probability, the law of large numbers, probability rules, and two-way tables.
8. Familiarize students with the binomial, normal, and Student t-distributions, and the Central Limit Theorem.
9. Provide students with the method of estimating a population mean and enable them to conduct hypothesis testing.

PERFORMANCE OBJECTIVES

1. Demonstrate the ability to work effectively in groups, discussions, and class activities.

2. Compare and contrast observational and experimental statistical studies and describe the conclusions that can be drawn from each.
3. Conduct statistical studies, calculate descriptive statistics, and identify hypotheses.
4. Create, compute, and interpret graphical and numerical summaries of data distributions.
5. Appreciate the interplay of algebra and geometry in the graphical representation of linear and non-linear systems.
6. Compute, analyze and describe the results of linear correlation, causation and regression presented in output data from a statistical package.
7. Compute probabilities using relative frequencies, proportions and basic rules.
8. Compute probabilities and confidence intervals in order to estimate population parameters from sample data.
9. Appropriately use normal or Student t-distributions to estimate the population mean; and formulate and conduct hypothesis tests.

DESCRIPTION OF THE COURSE:

This course is different from other in-class, online, or hybrid mathematics courses you have taken. In this course, you will be working in groups, **Collaboration** sessions. The content of the course is divided into Units and Supplement Units (see end of syllabus for a detailed list of topics for each unit). Almost every unit has a **Collaboration** session, and you have assignments that you should do on your own. These individual assignments are called **Preparations** and **Exercises**. All units have an **Exercise** section; only some have a **Preparation**.

Course Structure:

- 6 Modules; ~25 units and ~20 supplement units
- Units contain the following *nodes*:
 - Collaboration session content
 - Exercise (assignment)
- Supplement units have just one node. The content is structured in the same way as the Exercises; that is, the lesson content provides practice and does not count toward the grade, and the Practice Problems are a series of questions that generate the student's grade.
- A supplement unit should be done *after* its unit counterpart.
- *Some* units contain additional Productive Persistence activities
- Each Collaboration session (SW college) has an associated Instructor Guide

These components are described in detail here:

Preparations:

- These assignments should be done *before* the associated Collaboration session. The content of Preparation assignments helps prepare you for the mathematics and the contexts you will encounter in your group when doing a collaboration.
- You will do these assignments on your own.
- These assignments are fully-auto graded.
- A Preparation assignment is 25% of the unit grade.
- Use the question Hints and Solutions when working through an assignment.

Collaborations:

- You will do these components with your group.
- For an In-person class, you will do collaborations during your lab hours so that all students have access to computers.
- A Collaboration session is 50% of the unit grade.

Exercises:

- These assignments should be done *after* the associated Collaboration session.
- You will do these assignments on your own.
- These assignments are graded automatically.
- An Exercise assignment is 25% of the unit grade.
- Use the question Hints and Solutions when working through an assignment.

Supplement Lessons:

- Supplemental lessons focus on basic math skills such as percentages, simplifying expressions, and linear models.
- They are usually set in a real-world context using a diverse set of topics such as climate change, political hot topics, and social issues.

The “second chance” opportunity

If a student fails MAT119 the usual remedy is to retake the course. However the second chance option allows such a student to instead, take MAT120. In order to qualify for the second chance program a student must:

1. Receive a failing grade in MAT119. And,
2. Before the end of the semester, complete the following list of 5 lessons achieving at least 80% in each lesson.
 - Unit 1.1-S: Understanding Percentages (50 minutes)
 - Unit 1.2-S: Percentages and conversions (50 minutes)
 - Unit 1.3-S: Evaluating and Simplifying Expressions (45 minutes)
 - Unit 10.1: Linear models
 - Unit 10.2: Linear models

REQUIRED MATERIALS:

Carnegie Math Pathways’ Portal: The course content is organized by units in the online platform portal.carnegiemathpathways.org where the interactive individual online activities and online collaborations in zoom are available for group interaction. In this Pathways Portal, students have access to all Unit topics and interactive preparations and exercises. Instructions on how to create an account and access the course will be provided by your instructor.

Blackboard (Bb): Communication, instructions of activities, course syllabus, grades, discussions, quizzes, midterm exam, midterm essay, final exam, and other activities are posted in Blackboard.

Standard Scientific Calculator: A basic calculator that can add, subtract, multiply, and divide plus basic functions like exponents and square roots. Check with your instructor the types of calculators allowed in class.

Desmos and other tools: For statistics calculations and visualizations that are too complicated for a standard scientific calculator the coordinators of this course suggest using Desmos (<https://www.desmos.com/>) for its ease of use and shareability. Links to desmos tools are used throughout the content provided in the platform.

Mobile phones, even when used as calculators, are not allowed to be used during quizzes or exams.

GRADING POLICY AND ATTENDANCE

1. Students are expected to attend all class online meetings, as collaboration work is an integral part of the course.
2. Students are responsible for all materials and assignments covered in class.
3. All absences are required to be explained and documented to the instructor.
4. A failing grade is assigned to any student with 6 or more unexcused absences—approximately equivalent to 12 hours of class.
5. An absence is marked when the student misses more than half of a class session.
6. A student is considered late if she or he misses more than 20 minutes of class time.
7. Three late marks are equivalent to one absence.
8. Students should consult the college catalog to find out the terms and conditions under which WU, incomplete, or F grades may be given by an instructor.

EXPECTATIONS FOR STUDENTS ENROLLED IN STATWAY:

1. The nature of the Statway program requires students to work in groups for a significant amount of the class time.
2. The learning process depends heavily on taking opportunities to work, discuss, and cooperate with others to solve problems.
3. Students should expect a significant amount of reading and writing compared to other math classes.
4. Students are expected to spend at least one hour every day outside of class for activities like course text readings, practice exercises, homework, and working with a tutor.

ACADEMIC INTEGRITY: This class will be conducted in compliance with LaGuardia Community College's academic integrity policy. For more information check the Academic Standing Committee website. Look under Academic Integrity and Academic Appeals.

<https://www.laguardia.edu/asc/>

EVALUATION: The purpose of a grading system is to give you and readers of your transcript an accurate record of your activities in this course. The role of the MEC Department is to provide a fair, valid, and reliable structure for assessing your achievement. MAT119 is an intensive course and all work you complete in class, at home, and in the online platform counts towards your final grade.

GRADING POLICY:

Online Units		30%	<p>Unit Completion: Each Unit grade is calculated as:</p> <ul style="list-style-type: none"> ● Collaboration 50% ● Exercise 50% <p>If there is a Preparation of the Unit, this will account for 25% of the exercise grade.</p> <p>Supplement Unit Completion: These are completed for after their corresponding Unit.</p>
Quizzes & Computer Labs		25%	<p>Five instructor quizzes.</p> <p>Computer labs: exercises to be completed using spreadsheet software.</p>
Departmental Midterm Assessment	Midterm	15%	For all sections, no matter if they are in-person, hybrid, or online, the midterm and final exams will be held in-person .
	Midterm Essay	5%	Mid-semester <i>Inquiry & Problem-Solving</i> Essay.
Departmental Final Exam	Final	25%	For all sections, no matter if they are in-person, hybrid, or online, the midterm and final exams will be held in-person .
TOTAL		100%	

MAT119 is an intensive course and all work you complete in class, at home, and in the online platform counts towards your final grade.

A passing grade is a total score of 60% or higher.

COURSE OUTLINE

The course content is divided into 6 units. The table below is included to help you plan your term and be aware of the checks and exams due dates in advance. The “Number of Hours” is an estimate of the class time needed to cover the corresponding lesson. “Lesson” and “Title” correspond to the Statway workbook and e-text readings.

Keep in mind that this class requires a lot of reading and writing. Your instructor will provide you with additional support, tools, and resources to acquire and deliberately practice developmental math skills while learning statistics.

	Unit	Topic	Activity		Math Background Worksheet
Week 1	1.1	Introduction to Data & Statistics	Preparation	Week 1	Quantitative Reasoning
			Working Tog.		Multiples and Factors
			Exercise		Prime Factorization, GCF, and LCM
	1.1-S	Percentages	Exercise		
	1.2	Statistical Analysis Process (SAS)	Preparation		
			Collaboration		
Exercise					
1.2-S	Percentages and conversion	Exercise			
Week 2	1.3	Research Questions	Growth Mindset	Week 2	Fraction Basics
			Collaboration		Fractions Multiplying and Dividing
			Exercise		
	1.3-S	Evaluating and simplifying expressions	Exercise		
	1.4	Random sampling, Data Collection, and Conclusions	Collaboration		Units and Measurements
			Exercise		Estimation
1.5	Sampling, bias, random assignment	Collaboration	Large Numbers and Powers of Ten		
		Exercise			
Computer Lab 1					
Module 1 Quiz					
Week 3	2.1	Data Visualization	Preparation	Week 3	Real Line
			Collaboration		Order of Operations: + and -
			Exercise		Order of Operations: * and /
	2.2	Measures of center, shape, spread	Collaboration		Order of Operations Multi-Step
			Exercise		
	2.2-S	Measure of center	Exercise		
2.3	Measures of center, shape, spread	Collaboration			
		Exercise			
2.3-S	Boxplots & outliers	Exercise			
Computer Lab 2					
Week 4	2.4	Measures of center, shape, spread	Preparation	Week 4	Place Value
			Collaboration		Rounding
			Exercise		
	2.4-S	Review lesson	Exercise		
Module 2 Quiz					
5.1	Probability basics (large numbers, relative frequency)	Preparation			
		Collaboration			
		Exercise			
5.1-S	Probability and long-term behavior	Exercise			
Midterm Essay Introduction					

Week 5	5.2	Probability basics (types of probabilities and rules)	Collaboration	Week 5	Algebra Basics
			Exercise		Translating Words into Notation
	5.3	Probability: Two-way tables	Exercise		Practice with Functions
	5.3-S	Two-way tables, proportion, probability, simulation	Exercise		
	5.4	Probability Distributions: Discrete	Collaboration		
			Exercise		
	5.4-S	Discrete probability distributions	Exercise		
Computer Lab 3 & Module 5 Quiz					

	Unit	Topic	Activity		Math Background Worksheet	
Week 6	5.5	Binomial Distributions	Collaboration	Week 6	Geometry Perimeter, Area Volume	
			Exercise			
	Midterm Review					
	Midterm Exam					
Computer Lab 4						
Week 7	5.6	Probability Distributions: Continuous	Collaboration	Week 7		
			Exercise			
	5.6-S	More probability distributions	Exercise			
	5.7	Normal Distributions	Collaboration			
			Exercise			
	5.7-S	Normal distributions and Z-scores	Exercise			
Computer Lab 5						
Week 8	5.8	Standard Normal Distribution	Collaboration	Week 8		
			Exercise			
	5.8-S	Normal distribution applications	Exercise			
	Module 5 Quiz					
	8.1	Sampling distribution for sample means	Preparation			
			Collaboration			
			Exercise			
	8.1A-S	Normal distribution	Exercise			
Computer Lab 6						
	8.1B-S	Central Limit Theorem for sample means	Exercise			
Week 9	8.2	Confidence intervals for population mean	Preparation	Week 9		
			Collaboration			
			Exercise			
	8.2-S	T-Distributions and interval estimates for means	Exercise			
	8.4	Hypothesis testing for population means	Collaboration			
			Exercise			
	8.4-S	Inference on quantitative data	Exercise			
	8.5	Hypothesis testing for population means	Collaboration			
			Exercise			
Module 8 Quiz					Linear Equations (Part I)	
Week 10	3.1	Scatterplots	Preparation	Week 10	Rates	
			Collaboration		Plotting Points	
			Exercise			
	3.1-S	Scatterplots	Exercise			
	3.2	Correlation	Collaboration			
			Exercise			

	Computer Lab 7				
W e e k 11	3.3	Least Squares Regression	Collaboration	W e e k 11	
			Exercise		
	3.4	Residuals	Collaboration		
			Exercise		
3.4-S	Line of best fit	Exercise			
	Computer Lab 8				
W e e k 12	3.5-S	Correlation Inference and P-Values	Exercise	W e e k 12	
	3.6-S	Correlation inference	Exercise		
	Module 3 Quiz				
	Final Exam Review				

