The City University of New York

Common Core (Pathways)

CUNYfirst

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM1096458313001	**Version No.** 9.001	**Created by** Arroyo Peralta, Johanna
Created on 2022-10-26T11:29:47	**Last Updated on** 2022-10-26T11:40:43	**Status Updated on** 2022-11-19T13:01:03
Current Status Approved	**Course Selected: Subject** MAT (MAT - Mathematics) **Catalog Nbr** 120SI	

Course Revision & College

Form Submission Initial Submission

College Hostos CC

Course Data

Course ID 152993	**Subject** MAT (MAT - Mathematics)	**Catalog Nbr** 120SI
Catalog Status Approved	**Contact Hours** 6	**No. of Credits** 3

CourseTitle Introduction to Probability and Statistics

Course Description The student will identify, define, and compute the measures of central tendency and dispersion; develop frequency distributions and related histograms; determine the level of correlation; and draw inferences from regression lines. The student will also solve problems involving sample spaces, counting techniques, and mathematical expectation; determine the probability of normally distributed events through use of tables; conduct hypothesis testing; and determine confidence intervals. Additional supplementary basic algebra and critical thinking skills topics are: operations with real numbers, algebraic expressions, solving and graphing linear equations and inequalities, proportion and percent word problems, basic skills in manipulating exponential, and radical expressions. MAT120SI and MAT120 are equivalent courses.

Department Mathematics

Pre-Requisites/Co-Requisites Pre/Co-Requisite: Placement via the CUNY's Proficiency Index for Elementary Algebra

Course Syllabus [Attachment Filename(s)]

MAT_120_SI_Pathways_Syllabus.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

☑ **Math & Quantitative Reasoning**	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
	Scientific World

Learning Outcomes: Questions	Learning Outcomes: Responses
* 1. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.	SLO #1: Interpret and draw appropriate inferences from quantitative representations of data in numerical, chart, or tabular form. This includes summarizing data by constructing frequency distributions, histograms, stem and leaf plots, box plots, pie charts, or Pareto charts. ? Test #1: Students will identify different types of data such as qualitative and quantitative as well as four different levels of measurement. Students will summarize data into a frequency distribution table and represent the table into several different forms of graphs such as histograms, frequency polygons, and stem-and-leaf plots. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1.
* 2. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.	SLO #2: Use numerical and statistical methods as well as techniques from probabilities to reason statistically; i.e., to draw accurate conclusions and correctly interpret patterns of data sets. This includes measures of center, spread, or variation, combining probabilities, estimation procedures, hypothesis testing, correlation, regression, and analysis of variance. ? Test #1: Students will compute the measure of central tendency and the measure of variation. Students will be able to apply the mean and variance to the empirical rule. ? Test #2: Students will construct probability distribution as well as the uniform distribution. ? Test #3: Students will construct a confidence interval for the mean and the proportion. Students will test the mean and the proportion using hypothesis testing. Students will calculate the correlation coefficient. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.

Common Core (Pathways)

* 3. Represent quantitative problems expressed in natural language in a suitable mathematical format.	SLO #3: Represent quantitative problems expressed in natural language in a suitable statistical format and techniques. ? Test #1: Students will plan the basic statistical study from a given situation described in natural language. ? Test #1 and 2: Students will translate word problems involving modeling with appropriate statistical functions. ? Unit Test #3: Students will convert word problems into appropriate statistical tests such as confidence intervals or hypothesis testing. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.
* 4. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.	SLO #4: Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form. This involves understanding and using the basic language and tools of statistics such as fundamental definitions with some very basic principles to attain statistical literacy. ? Test #1: Students will express solutions to problems using appropriate written, graphical, or functional methods. ? Test #2: Students will solve application problems involving probability distribution function, expected value, and binomial probability distribution problems. ? Test #3: Students will communicate solutions to the normal distribution, the standard normal distribution, the inverse normal distribution, the uniform distribution, and the binomial distribution problems in an accurate and appropriate form. Students will state solutions to estimation problems using the confidence interval and hypothesis testing. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.
* 5. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.	SLO #5: Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation. This includes estimation procedures, hypothesis tests, and testing the goodness of fit of linear models to represent data sets. ? Test #3: Students will use appropriate estimation or hypothesis testing techniques to evaluate solutions to problems. Students will evaluate problems involving the goodness-of-fit test to test if the sample date fits a distribution from a certain population. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #3.

Common Core (Pathways)

* 6. Apply mathematical methods to problems in other fields of study.	SLO #6: Apply statistical methods to model and analyze problems in other fields of study including economics, social sciences, education, political science, health, etc. ? Test #1 and 2: Students will use data sets from business and nursing applications to summarize, organize, analyze, and summarize data to describe data. Students will use data sets from social science, education, and political science applications to summarize, organize, and analyze, to make decisions. ? Test #3: Students will apply appropriate distributions to solve applications in social sciences, education, and health science. Students will apply proper hysteresis testing to solve applications in social science and economics. ? Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

Chair (Approver) Comments

Comments The committee voted to approve this course.

DEPARTMENT OF MATHEMATICS

MAT120 SI: Introduction to Probability and Statistics

Credit Hours: 3.0
Equated Hours: 6.0
Class Hours: 6.0

Prerequisites: Placement via the CUNY's Proficiency Index

Required Textbook: Introductory Statistics (free open-source textbook), Openstax.
Free download available:
https://guides.hostos.cuny.edu/mat119-120

Course Description
The student will identify, define, and compute the measures of central tendency and dispersion; develop frequency distributions and related histograms; determine the level of correlation; and draw inferences from regression lines. The student will also solve problems involving sample spaces, counting techniques, and mathematical expectations; determine the probability of normally distributed events through the use of tables; conduct hypothesis testing; and determine confidence intervals. Additional supplementary basic algebra and critical thinking skills topics are: operations with real numbers, algebraic expressions, solving and graphing linear equations and inequalities, proportion and percent word problems, and basic skills in manipulating exponential, and radical expressions. MAT120SI and MAT120 are equivalent courses.

PATHWAY LEARNING OUTCOMES ASSESSMENT TOOLS:

Students will receive instruction on each Mathematical definition and concept described under the SLOs and will practice through class activities and homework assignments.

SLO #1: Interpret and draw appropriate inferences from quantitative representations of data in numerical, chart, or tabular form. This includes summarizing data by constructing frequency distributions, histograms, stem and leaf plots, box plots, pie charts, or Pareto charts.
- Test #1: Students will identify different types of data such as qualitative and quantitative as well as four different levels of measurement.
  Students will summarize data into a frequency distribution table and represent the table into several different forms of graphs such as histograms, frequency polygons, and stem-and-leaf plots.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1.

SLO #2: Use numerical and statistical methods as well as techniques from probabilities to reason statistically; i.e., to draw accurate conclusions and correctly interpret patterns of data sets. This includes measures of center, spread, or variation, combining probabilities, estimation procedures, hypothesis testing, correlation, regression, and analysis of variance.
- Test #1: Students will compute the measure of central tendency and the measure of variation. Students will be able to apply the mean and variance to the empirical rule.
- Test #2: Students will construct probability distribution as well as the uniform distribution.

- Test #3: Students will construct a confidence interval for the mean and the proportion. Students will test the mean and the proportion using hypothesis testing. Students will calculate the correlation coefficient.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.

SLO #3: Represent quantitative problems expressed in natural language in a suitable statistical format and techniques.
- Test #1: Students will plan the basic statistical study from a given situation described in natural language.
- Test #1 and 2: Students will translate word problems involving modeling with appropriate statistical functions.
- Unit Test #3: Students will convert word problems into appropriate statistical tests such as confidence intervals or hypothesis testing.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.

SLO #4: Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form. This involves understanding and using the basic language and tools of statistics such as fundamental definitions with some very basic principles to attain statistical literacy.
- Test #1: Students will express solutions to problems using appropriate written, graphical, or functional methods.
- Test #2: Students will solve application problems involving probability distribution function, expected value, and binomial probability distribution problems.
- Test #3: Students will communicate solutions to the normal distribution, the standard normal distribution, the inverse normal distribution, the uniform distribution, and the binomial distribution problems in an accurate and appropriate form.
  Students will state solutions to estimation problems using the confidence interval and hypothesis testing.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.

SLO #5: Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation. This includes estimation procedures, hypothesis tests, and testing the goodness of fit of linear models to represent data sets.
- Test #3: Students will use appropriate estimation or hypothesis testing techniques to evaluate solutions to problems. Students will evaluate problems involving the goodness-of-fit test to test if the sample date fits a distribution from a certain population.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #3.

SLO #6: Apply statistical methods to model and analyze problems in other fields of study including economics, social sciences, education, political science, health, etc.
- Test #1 and 2: Students will use data sets from business and nursing applications to summarize, organize, analyze, and summarize data to describe data. Students will use data sets from social science, education, and political science applications to summarize, organize, and analyze, to make decisions.

- Test #3: Students will apply appropriate distributions to solve applications in social sciences, education, and health science.
  Students will apply proper hysteresis testing to solve applications in social science and economics.
- Departmental Final Exam: Students may be asked to answer similar questions to the one(s) on Test #1, Test #2, and Test #3.

Student Learning Outcomes
1. Interpret and draw appropriate inferences from quantitative representations of data in numerical, chart, or tabular form. This includes summarizing data by constructing frequency distributions, histograms, stem and leaf plots, box plots, pie charts, or Pareto charts.
2. Use numerical and statistical methods as well as techniques from probabilities to reason statistically; i.e., to draw accurate conclusions and correctly interpret patterns of data sets. This includes measures of center, spread, or variation, combining probabilities, estimation procedures, hypothesis testing, correlation, regression, and analysis of variance.
3. Represent quantitative problems expressed in natural language in a suitable statistical format and techniques.
4. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form. This involves understanding and using the basic language and tools of statistics such as fundamental definitions with some very basic principles to attain statistical literacy.
5. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation. This includes estimation procedures, hypothesis tests, and testing the goodness of fit of linear models to represent data sets.
6. Apply statistical methods to model and analyze problems in other fields of study including economics, social sciences, education, political science, health, etc.

Grade: A, A-, B+, B, B-, C+, C, D, I, F

Course Outline

LESSONS	TOPICS	SECTION	PTRBCS	HOMEWORK
	Topic: Algebra			
1	Addition, Subtraction, Multiplication and Division of Integers			
2	Like Terms, Addition and Subtraction of polynomials			
3	Exponent rule and Multiplication and division of polynomial			
4	Exponent rule and Multiplication and division of polynomial			
5	Solving linear equation with one variable and Solving formula for a given variable			

6	Solving linear equation with one variable and Solving formula for a given variable			
7	Graphing Linear Equations, Fining the slope and y-intercept			
8	Graphing Linear Equations, Fining the slope and y-intercept			
9	Roots and Radicals			
10	Roots and Radicals			
11	Factoring			
12	Factoring			
13	Review for Algebra test			
14	Algebra Test			
	Topic: Probability and Statistics			
15	**Introduction to the Practice of Statistics**	1.1	2. - 14	7, 15, 23, 31,45,51
	Simple Random Sampling	1.3	22 - 29	7, 11
16	Other effective Sampling Methods	1. 4	30 - 37	13, 25, 27
	Bias in Sampling	1.5	38 - 44	17, 19
17	Organizing Qualitative Data	2.1	63 - 77	3, 5, 11, 13, 21
18	Organizing Quantitative Data: The Popular Displays	2.2	77 - 99	7, 9, 11, 13, 33, 35, 39, 41, 47
19	Organizing Quantitative Data: The Popular Displays	2.2	77 - 99	7, 9, 11, 13, 33, 35, 39, 41, 47
20	Measures of Center Tendency: Mean, Median, and Mode	3.1	117 - 130	17, 21, 27, 29, 33, 47,
21	Measures of Dispersion: Range, Standard Deviation, Variance, Empirical Rule, and Chebyshev's Theorem	3.2	130 - 146	5, 7, 11, 23, 31
22	Measures of Central Tendency and Dispersion from grouped Data	3.3	147 - 153	1, 3, 5
23	Measures of Position and Outliers: Z-score, Percentiles, Quartile, and Outliers.	3.4	153 - 162	7, 21, 19, 25
	The Five-Number Summary and Boxplots	3.5	163 - 170	3, 5, 7, 11
24	**REVIEW TEST 1**			
25	**Test # 1 CHAPTER 2 and 3 (1hour and 15 min Exam)**			
26	Scatter plot Diagrams and Correlation	4.1	178 - 194	9, 13, 17, 19
27	Least-Squares Regression: Find the Least-squares regression Line	4.2	194 - 207	7, 9, 11, 13
28	The Coefficient of Determination	4.3	208 - 214	5, 7, 11
29	Probability Rules	5.1	233 - 246	7, 11, 19, 29, 31, 35
30	The addition rule and Complements	5.2	247 - 253	13, 19, 31, 41, 43, 45
31	Independence and the Multiplication Rule	5.3	253 - 264	13, 17, 19, 27, 23
32	Conditional Probability and the General Multiplication Rule	5.4	264 - 274	13, 17, 19, 21, 29
33	Counting Techniques	5. 5	274 - 285	31, 33, 51, 55, 59, 61

34	Discrete Random Variables: Probability Distribution: Mean, Standard Deviation, and Variance	6.1	298 - 309	9, 11, 13, 19, 27, 33
35	The Binomial Probability Distribution: Find probability using binomial distribution, mean, standard deviation, and variance	6.2	309 - 323	29, 35, 41, 43, 53
36	**Departmental Midterm Test 2 Review**			
37	**DEPARTMENTAL MIDTERM - TEST 2 -- Chapter 2 - 6**			
38	Properties of the Normal Distribution	7.1	329 - 337	17, 31, 35
39	Applications of the Normal Distribution	7.2	338 - 349	7, 9, 11, 13, 15, 17, 19, 39, 47, 49
40	The Normal Approximation to the Binomial Probability Distribution	7.4	356 - 360	21, 23
41	Distribution of the Sample Mean: The Central Limit Theorem	8.1	366 - 379	9, 15, 19, 25
42	Distribution of the Sample Proportion	8.2	379 - 385	7, 17, 33
43	Estimating a Population Proportion	9.1	390 - 403	11, 13, 15, 17, 21, 25, 27, 33
44	Estimating a Population Mean	9.2	405 - 419	27, 15, 17, 19, 29, 31, 45, 47
45	The Language of Hypothesis Testing	10.1	428 - 436	11, 13, 15, 17, 21, 25, 37
46	Hypothesis Tests for a Population Proportion	10.2	436 - 448	7, 9, 13, 19, 21, 23, 27, 37
47	Hypothesis Tests for a Population Mean	10.3	449 - 458	1, 3, 5, 7, 9, 13, 17, 21, 23, 27, 31,
48	**REVIEW FOR TEST 3**			
49	**TEST 3 -- CHAPTER 7, 8, 9 AND 10**			
50	Inference About Two Population Proportions	11.1	468 - 482	3, 19, 23, 33
51	Inference About Two Means: Dependent Samples and	11.2	483 - 493	7, 11
	Inference About Two Means: Independent Samples	11.3	493 -505	13, 15
52	Goodness-of-Fit Test and Test for Independence	12.1	516 - 527	11, 21
	The Homogeneity of Proportions	12.2	527 - 542	7, 15
53	Testing the Significance of the Least-Squares Regression Model	12.3	542 - 556	17, 19
	Confidence and Perdition Intervals	12.4	557 - 562	7, 9
54	FINAL EXAM REVIEW			
55	FINAL EXAM REVIEW			
56	FINAL EXAM REVIEW			
57	**DEPARTAMENTAL FINAL EXAM --- ALL CHAPTER 2 - 12 (2 HOURS AND 30 MINUTES)**			