KINGSBOROUGH COMMUNITY COLLEGE
The City University of New York

CURRICULUM TRANSMITTAL COVER PAGE

Department: Department of Mathematics & Computer Science **Date:** 1/18/2022

Title Of Course/Degree/Concentration/Certificate: Elements of Statistics (MAT 2000)

Change(s) Initiated: (Please check)

- ☐ Closing of Degree
- ☐ Closing of Certificate
- ☐ New Certificate Proposal
- ☐ New Degree Proposal
- ☐ New Course
- ☐ New 82 Course (Pilot Course)
- ☐ Deletion of Course(s)
- ☐ Change in Degree or Certificate
- ☐ Change in Degree: Adding Concentration
- ☐ Change in Degree: Deleting Concentration
- ☐ Change in Prerequisite, Corequisite, and/or Pre/Co-requisite
- ☐ Change in Course Designation
- ☒ Change in Course Description
- ☒ Change in Course Title, Number, Credits and/or Hours
- ☐ Change in Academic Policy
- ☐ Pathways Submission:
  - ☐ Life and Physical Science
  - ☐ Math and Quantitative Reasoning
  - ☐ A. World Cultures and Global Issues
  - ☐ B. U.S. Experience in its Diversity
  - ☐ C. Creative Expression
  - ☐ D. Individual and Society
  - ☐ E. Scientific World
- ☐ Change in Program Learning Outcomes
- ☐ Other (please describe): ____________________

PLEASE ATTACH MATERIAL TO ILLUSTRATE AND EXPLAIN ALL CHANGES

DEPARTMENTAL ACTION

Action by Department and/or Departmental Committee, if required:

Date Approved:____________ **Signature, Committee Chairperson:**____________________

If submitted Curriculum Action affects another Department, signature of the affected Department(s) is required:

Date Approved:____________ **Signature, Department Chairperson:**____________________

Date Approved:____________ **Signature, Department Chairperson:**____________________

I have reviewed the attached material/proposal

Signature, Department Chairperson: Rina Yarmish

Revised/Augl.2018/AK

TO: Spring 2022 Curriculum Committee

FROM: Prof. Yarmish, Chair, Department of Mathematics & Computer Science

DATE: 1/18/2022

RE: Change in number of hours for MAT 2000

The Department of Mathematics & Computer Science is proposing a change in number of hours for MAT 2000.

FROM:

3 Credits, 3 hours

TO:

3 Credits, 4 hours (2 hours lecture, 2 hours lab)

Rationale for Change: The change in number of credits reflects curricular adjustments to allow for 2 lab hours and 2 lecture hours, as reflected in the course syllabus.

KINGSBOROUGH COMMUNITY COLLEGE
★ DREAMS BEGIN HERE ★

TO: Spring 2022 Curriculum Committee

FROM: Prof. Yarmish, Chair, Department of Mathematics & Computer Science

DATE: 1/18/2022

RE: Change in course description for MAT 2000

The Department of Mathematics & Computer Science is proposing a change in course description for MAT 2000.

FROM:

Concepts of statistics and probability, their application to today's world and the ethical use of data to analyze problems and questions. Topics include tabulation and graphing of distributions, central and dispersal tendencies, comparison techniques, correlations and predictive techniques. Instruction and practice in the use of statistical calculators.

Students who have completed MAT 19A0 or BA 2200/MAT 2200 or MAT 9100/BIO 9100 will <u>not</u> receive credit for this course.

TO:

Concepts of statistics and probability, their application to today's world and the ethical use of data to analyze problems and questions. Topics include tabulation and graphing of distributions, central and dispersal tendencies, comparison techniques, correlations and predictive techniques. Students will learn to use statistical software for solution of statistical problems; the class will incorporate computer laboratory activity.

Students who have completed MAT 19A0 or MAT 2010 or BA 2200/MAT 2200 or MAT 9100/BIO 9100 will <u>not</u> receive credit for this course.

Rationale for Change: The change reflects new course added.

CURRENT

KINGSBOROUGH COMMUNITY COLLEGE
The City University of New York

1. **DEPARTMENT, COURSE NUMBER AND TITLE:**
   Department of Mathematics and Computer Science, MAT 2000, Elements of Statistics

2. **GENERAL EDUCATION/CUNY COMMON CORE PATHWAYS CATEGORY:**
   Math and Quantitative Reasoning

3. **COURSE TRANSFERS:**
   This course transfers as an Introduction to Statistics class

4. **COLLEGE CATALOG DESCRIPTION OF COURSE:**
   Introduction to probability and statistics including: tabulation and graphing of distributions, central and dispersion tendencies, comparison techniques, correlations and predictive techniques. Recommended for students planning careers in economics, education, psychology, sociology, computer information systems, occupational therapy and physician assistant.
   Students who have completed MAT 19A0 or MAT 2200/MAT 2200 or MAT 9100/BIO 9100 will not receive credit for this course.

   3 Credits, 3 Hours

5. **EQUATED CREDITS:** (For Developmental Courses ONLY)
   N/A

6. **COURSE PREREQUISITES, COREQUISITES AND SELECTED POPULATIONS:**
   A. Prerequisite(s): MAT R300 or MAT 9B0
   B. Corequisite(s): None
   C. Pre/Co-requisite(s): None
   D. Open ONLY to selected students: None

7. **ENROLLMENT AND RATIONALE:**
   A. Projected enrollment: 235 students per year
   B. Suggested class limits: 30 students
   C. Frequency course is likely to be offered: Every semester, every module
   D. Role of course in Department's curriculum and College's mission: Introduces students to basic elements of statistics and probability.

8. **LIST COURSE(S), IF ANY, TO BE WITHDRAWN WHEN COURSE IS ADOPTED:**
   N/A

9. **IF COURSE IS AN INTERNSHIP, INDEPENDENT STUDY, OR THE LIKE, PROVIDE AN EXPLANATION AS TO HOW THE STUDENT WILL EARN THE CREDITS AWARDED:**
   N/A

10. **PROPOSED TEXTBOOK(S) AND/OR OTHER REQUIRED INSTRUCTIONAL MATERIAL(S):**
    Introductory Statistics, 10th Edition, Neil A. Weiss, ISBN: 978-0321989352
    Calculator

11. **IS THE COURSE REQUIRED FOR A MAJOR, CONCENTRATION OR CERTIFICATE:**
    No

12. **EXPLANATION OF WHAT STUDENTS WILL KNOW AND BE ABLE TO DO UPON COMPLETION OF COURSE:**
    Students will have the ability to understand the basic ideas of statistics and probability. They will have the ability to apply this knowledge to "real world" situations. They will be able to use the knowledge to be able to understand and evaluate and even prepare research projects.

13. **METHOD(S) OF TEACHING:**
    In person lectures or the course can be taught online both synchronously or asynchronously.

14. **ASSIGNMENTS TO STUDENTS:**
    Assignments will be predominantly drawn from the text book.

15. **METHOD OF EVALUATING LEARNING:**
    There will be two class exams and one final exam in two parts with 2 grades. Grade to be determined by the mean of the highest three grades on the exams.

16. **TOPICAL COURSE OUTLINE FOR THE 12 WEEK SEMESTER:**
    1. Descriptive Measures (93-155)

       Five Lessons

       a) Measures of center: mean, sample mean, median, mode.

       b) Measures of variation: standard deviation, sample standard deviation, Z scores, Chebychev rule.

    2. Probability Concepts (156-200)

       Seven Lessons

       a) Probability Basics

       b) Rules of Probability

       c) Contingency Tables

       d) Conditional Probability

       e) Independence and Multiplication Rule

    3. Discrete Random Variables (231-249)

       Four Lessons

       a) Mean of Random Variable

       b) Mathematical Expectation

       c) Binomial Distribution

       d) Bernoulli Trials

4. The Normal Distribution (262-306)

   Four Lessons

   a) Area under the Standard Normal Curve

   b) Working with Normally Distributed Variables

5. Sampling Distribution of the Sample Mean (307-330)

   Two Lessons

   a) Sampling Error

   b) Mean and Standard Deviation of the Sample Mean

   c) Sampling Distribution of the Sample Mean

6. Confidence Intervals for one Population Mean (331-364)

   Three Lessons

   a) Estimating a Population Mean

   b) Confidence Intervals for one population mean when the Population Standard Deviation is known

   c) Confidence Intervals for one population mean when the Population Standard Deviation is unknown

7. Hypothesis Tests for one Population Mean (367-407)

   Four Lessons

   a) Nature of Hypothesis Testing

   b) Hypothesis Tests for one Population Mean when the Population Standard Deviation is known

   c) Hypothesis Tests for one Population Mean when the Population Standard Deviation is unknown

   d) P-Values

The other meetings will be used for testing and review

17. **SELECTED BIBLIOGRAPHY AND SOURCE MATERIAL(S):**
Ovedovitz, Albert C. Business Statistics in Brief, South-Western College Publishing, 2001
Sullivan, Michael III, Informed Decisions using Data, Prentice Hall, 2004
Triola, Mario, Elementary Statistics, Addison Wesley, 2004

Updated: 09/2020
By: R. Forman

PROPOSED

Syllabus

1. Complete the requested course information in the table below. Indicate “**NONE**” where applicable. *For Assignment of New Course Number, contact **Academic Scheduling**.

Department:	Mathematics & Computer Science
Course Designation/Prefix:	MAT
***Course Number:**	2000
Course Title:	Elements of Statistics
Course Description: **(Note: Description should include language similar to Course Learning Outcomes.)**	Concepts of statistics and probability, their application to today’s world and the ethical use of data to analyze problems and questions. Topics include tabulation and graphing of distributions, central and dispersal tendencies, comparison techniques, correlations and predictive techniques. Students will learn to use statistical software for solution of statistical problems; the class will incorporate computer laboratory activity. Students who have completed MAT 19A0 or MAT 2010 or BA 2200/MAT 2200 or MAT 9100/BIO 9100 will not receive credit for this course.
Prerequisite(s):	MAT R300 or MAT 9B0
Corequisite(s):	None
Pre-/Co-requisite(s):	None
Open ONLY to Select students (Specify Population):	
Frequency course is to be offered (Select All that Apply)	☑ Fall ☑ Winter ☑ Spring ☑ Summer
Suggested Class Limit:	25
Indicate if a special space, such as a lab, and/or special equipment will be required:	Classroom with smartboard

2. Credits and Hours based on MSCHE Guidelines for *College Credits Assigned for Instructional Hours* -***Hours are based on hours per week in a typical 12-week semester** (Please check **ONE** box based on credits):

PROPOSED

1-credit:	☐ 1 hour lecture ☐ 2 hours lab/field/gym
2-credits:	☐ 2 hours lecture ☐ 1 hour lecture, 2 hours lab/field ☐ 4 hours lab/field
3-credits:	☐ 3 hours lecture ☑ 2 hours lecture, 2 hours lab/field ☐ 1 hour lecture, 4 hours lab/field ☐ 6 hours lab/field
4-credits:	☐ 4 hours lecture ☐ 3 hours lecture, 2 hours lab/field ☐ 2 hours lecture, 4 hours lab/field ☐ 1 hour lecture, 6 hours lab/field ☐ 8 hours lab/field

More than 4-credits: ☐ Number of credits: ____ (explain mix lecture/lab below)

___ Lecture ____Lab

Explanation:____

3. **Where** does this course fit? Select from the following:

☐ Degree Program(s)/Certificate(s)*	**List Degree Program(s)/Certificate(s):** 1. 2.
☑ General Education/Pathways	**Select ONE of the following:** ☐ Life and Physical Science (LPS) ☑ Math and Quantitative Reasoning (MQR) ☐ World Cultures and Global Issues (Group A) ☐ U.S. Experience in its Diversity (Group B) ☐ Creative Expression (Group C) ☐ Individual and Society (Group D) ☐ Scientific World (Group E)

☐ **82XX** Pilot/Experimental Course	**If proposed as a "real" course, where will this course fit?** Select from the following: **List Degree Program(s)/Certificate(s):** 1. 2. **Select ONE of the following:** ☐ Life and Physical Science (LPS) ☐ Math and Quantitative Reasoning (MQR) ☐ World Cultures and Global Issues (Group A) ☐ U.S. Experience in its Diversity (Group B) ☐ Creative Expression (Group C) ☐ Individual and Society (Group D) ☐ Scientific World (Group E)

***If Degree Program/Certificate is Selected:**

- Include an updated **Curricular** Map (Program Learning Outcomes) for each Degree Program/Certificate listed above.
- Include an updated Degree Map (semester-by-semester course sequence) for each Degree Program/Certificate listed above. For Degree Map template, contact Amanda Kalin, ext. 4611, Amanda.Kalin@kbcc.cuny.edu

The Following NYSED Guidelines must be adhered to for **ALL** Degree Programs:

45 credits of Liberal Arts (General Education) course work for an Associate of Arts Degree (AA)
30 credits of Liberal Arts (General Education) course work for an Associate of Science Degree (AS)
20 credits of Liberal Arts (General Education) course work for an Applied Associate of Science (AAS)

Additional Separate Submissions Required:

1. Curriculum Transmittal Cover Page indicating a "Change in Degree or Certificate"
2. Memo with rationale for inclusion of the course within the curriculum
3. "Current" Degree with all proposed deletions (strikeouts) and additions (bolded) clearly indicated
4. "Proposed" Degree, which displays the degree as it will appear in the *College Catalog*

For a copy of the most up-to-date Degree/Certificate requirements contact Amanda Kalin, ext. 4611, Amanda.Kalin@kbcc.cuny.edu

If General Education/Pathways is Selected:

- Please refer to NYSED Guidelines for courses that are considered Liberal Arts (General Education).
- Pilot/Experimental/82XX courses CANNOT be submitted for Pathways until they are submitted as a "**real**" course.

Additional Separate Submissions Required:

1. Curriculum Transmittal Cover Page indicating BOTH "New Course" and "Pathways"
2. CUNY Common Core Pathways Submission Form

4. **List the Course Learning Outcomes** – Course Learning Outcomes are measureable/demonstrable, containing "**action verbs**" (Blooms Taxonomy). If proposed to PATHWAYS, the Course Learning Outcomes should significantly align with the Pathways Learning Outcomes (refer to the Pathways Common Core Submission Form for Pathways Learning Outcomes). If proposed for a Degree program, the course should align with the Program Learning Outcomes (PLOs). **REMINDER** – Course Learning Outcomes are consistent for **ALL sections** of the same course and **MUST** be included on the syllabus.

Course Learning Outcomes
1. Interpret Data (Descriptive Measures / Probability Theory)
2.Communicate Quantitative Analysis (Normal Distribution)
3. Evaluate Solutions (Linear Systems / Regression Analysis)
4. Apply Mathematical Methods (Hypothesis Testing)

5. **Assessment of Course Learning Outcomes**: The Course Learning Outcomes are measurable/demonstrable through the below listed sample assignments/activities. Include percentage breakdown for grading. **REMINDER -** Assessment of Course Learning Outcomes are based on a **Common Syllabu**s – to allow for **any** qualified instructor to teach the course.

Course Learning Outcome	**Percentage of Grade**	**Measurement of Learning Outcome (Artifact/Assignment/Activity)**
1.Interpret Data	25	Homework / Test
2.Communicate Quantitative Analysis	25	Homework / Test
3. Evaluate Solutions	25	Homework / Test
4. Apply Mathematical Methods	25	Homework / Test

6. Proposed textbook(s) and/or other required instructional material(s), including open educational resources (OER)– Please include any supplemental/ materials/texts to allow for **any** qualified instructor to teach the course:

Textbook: Introductory Statistics , MyLab Revision , 10^{th} edition , by Weiss (Pearson Education)

7. **Attach a Common Syllabus** that includes the Topical Course Outline for the 12-week semester. This should be specific and explicit regarding the topics covered and should contain the detailed sample assignments/activities being used to measure the Course Learning Outcomes. **REMINDER** – be mindful to focus on the Course Learning Outcomes, Course Content, and Assessment.

New course material is highlighted below. Note, also the adjustment to lab component (designated by "L" when appropriate).

Class Hour (L – Lab)	Topics	Section (OpenAlgebra)	Section (Weiss book)
1	Variables and Data		2.1
2	Measures of Center		3.1
3 L	Measures of Variation		3.2
4 L	The Five-Number Summary; Boxplots		3.4
5	Descriptive Measures for Population; Use of Samples		3.5
6	Discrete Random Variables and Probability Distributions		5.1
7 L	The Mean and Standard Deviation of a Discrete Variable		5.2
8 L	The Binomial Distribution		5.3
9	Review		
10	Test		
11 L	Probability Basics		4.1
12 L	Events		4.2
13	Some Rules of Probability		4.3
14	Contingency Tables; Joint and Marginal Probabilities		4.4
15 L	Conditional Probability		4.5
16 L	The Multiplication Rule; Independence		4.6
17	Counting Rules		4.8

18 L	Review		
19	Test		
20 L	Introducing Normally Distributed Variables		6.1
21	Areas under the Standard Normal Curve		6.2
22	Working with Normally Distributed Populations		6.3
23 L	Normal Approximation to the Binomial Distribution		6.5
24 L	Sampling Error		7.1
25	The Mean and Standard Deviation of the Sample Mean		7.2
26 L	The Sampling Distribution of the Sample Mean		7.3
27 L	Review		
28	Test		
29	Estimating a Population Mean		8.1
30	Confidence Intervals for Mean: Standard Deviation Known		8.2
31 L	Confidence Intervals for Mean: Standard Deviation Unknown		8.3
32 L	The Nature of Hypothesis Testing		9.1
33	Critical-Value Approach to Hypothesis Testing		9.2
34	P-Value Approach to Hypothesis Testing		9.3
35 L	Hypothesis Tests for Mean: Standard Deviation Known		9.4
36 L	Hypothesis Tests for Mean: Standard Deviation Unknown		9.5
37	Review		
38	Test		
39 L	Confidence Intervals for One Population Proportion		12.1
40 L	Hypothesis Tests for One Population Proportion		12.2
41	Linear Equations with One Independent Variable		14.1
42	The Regression Equation		14.2
43 L	The Coefficient of Determination		14.3
44 L	Linear Correlation		14.4
45	Review		
46	Test		

47 L	Review for Final Exam		
48 L	Review for Final Exam		

8. Selected Bibliography and Source materials:

1) Bennett and Briggs, ***Using & Understanding Mathematics: A Quantitative Reasoning Approach***, 7th edition, Pearson, 2019

2) Black, ***Business Statistics: For Contemporary Decision Making***, 9th edition, Wiley, 2016

3) Blitzer, ***Introductory Algebra for College Students***, 8th edition, Pearson, 2021

4) Blitzer, ***Thinking Mathematically***, 6th edition, Pearson, 2015

5) Larson and Farber, ***Elementary Statistics: Picturing the World with Integrated Review***, 7th edition, Pearson, 2019

6) Majewicz, ***College Algebra: A Narrative Approach***, 3rd edition, Pearson, 2016

7) McClave and Sincich, ***Statistics***, 13th edition, Pearson, 2021

8) Sturm-Beiss and Yarmish, ***Essential College Pre-Algebra***, Kendall Hunt, 2015

9) Sturm-Beiss and Yarmish, Math Prep ***Elementary Algebra Exam***, Kendall Hunt, 2017

10) Sullivan, ***Statistics: Informed Decisions Using Data Plus Integrated Review***, 2nd edition, Pearson, 2017

11) Triola, ***Biostatistics for the Biological & Health Sciences***, 2nd edition, Pearson, 2018

12) Triola, ***Elementary Statistics with Integrated Review***, 13th edition, Pearson, 2018