RARITAN VALLEY COMMUNITY COLLEGE ACADEMIC COURSE OUTLINE

MATH 110 Statistics I

I. Basic Course Information

A. Course Number and Title: MATH 110 Statistics I

B. New or Modified Course: Modified

C. Date of Proposal: Semester: Fall Year: 2025

D. **Effective Term: Fall 2026**

E. Sponsoring Department: **Mathematics and Computer Science**

F. Semester Credit Hours**:** 3

G. Weekly Contact Hours**:** 3

Lecture**:** 3
Laboratory**:** 0
Out of class student work per week: 6

H. ☐ Prerequisite (s):
☐ Corequisite (s):
☒ Prerequisite (s) and Corequisite (s): Prerequisite of MATH 030 Intermediate Algebra, or MATH 030R Intermediate Algebra w/Review or corequisite of MATH 072 Statistics Workshop

I. Additional Fees**:** none

II. Catalog Description

Prerequisite and corequisite(s): Prerequisite of MATH 030 Intermediate Algebra, or MATH 030R Intermediate Algebra w/Review, or corequisite of MATH 072 Statistics Workshop. This is a first course in statistics that introduces the student to the methods and uses of statistical research. Topics include descriptive displays and analysis, classical probability, the normal distribution, the sampling distribution of the mean, inferences concerning means p-values.

III. Statement of Course Need

A. This course is the first course in a two-semester sequence that provides students with an introduction to statistical methods.

B. There is no lab component.

C. This course generally transfers as a mathematics general education requirement and a mathematics program elective dependent on the transfer institution.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course serves as a General Education course in Mathematics.
C. This course meets a program requirement for various A.S. and A.A. degree programs.
D. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

A. The Nature of Statistics

B. Organizing Data
   1. Sampling Techniques
   2. Grouping Data
   3. Histograms and other graphs
   4. Stem and Leaf Diagrams

C. Descriptive Measures for Univariate Data
   1. Summation Notation
   2. Measures of Central Tendency
   3. Measure of Dispersion
   4. Interpretation of Standard Deviation
   5. Grouped Data Formulas
   6. Quartiles and Box-and-Whisker Diagrams
   7. Parameters and Statistics

D. Probability
   1. Classical Probability

2. Rules of Probability
3. Mutually Exclusive Events
4. Conditional Probability
5. Independent Events

E. Discrete Random Variables
1. Probability Distributions
2. The Mean and Standard Deviation of Discrete Random Variables
3. Bernoulli Trials and Binomial Coefficients
4. The Binomial Distribution

F. The Normal Distribution
1. Continuous Random Variables
2. The Standard Normal Curve
3. Areas Under the Normal Curve
4. Normally Distributed Random Variables

G. The Sampling Distribution of the Mean
1. Random Sample and Sampling Error
2. The Mean and Standard Deviation of the Sample Mean
3. The Central Limit Theorem

H. Estimation
1. Point and Interval Estimation of a Parameter
2. Confidence intervals for Population Means
3. The t-Distribution
4. Sample Size Considerations

I. Hypothesis Testing
1. The Logic of Significance Tests – classical and p-value methods
2. Tests for Single Means

J. Optional Topics:
1. Descriptive Statistics Bivariate Data

VI. A. <u>Course Learning Outcomes</u>:

At the completion of the course, students will be able to:

1. Synthesize descriptive methods of statistics for the purpose of organizing and summarizing data. (GE-2)
2. Interpret the meaning of summary measures (mean, median, mode, standard deviation, variance, quartile, percentile, range, minimum, maximum, outlier, etc.) within the context of problem. (GE-2)
3. Calculate the probability of an event using both discrete and normal distribution methods. (GE-2)
4. Construct and interpret a confidence interval for a population mean. (GE-2)
5. Conduct a hypothesis test for a population mean using the p-value or critical-value approach (GE-2)

B. Assessment Instruments

1. tests (required)
2. quizzes
3. homework (required)
4. projects/case studies/presentations
5. cumulative final exam (required)

VII. Grade Determinants

A. tests (required)
B. quizzes
C. homework (required)
D. projects/case studies/presentations
E. cumulative final exam (required)

Given the goals and outcomes described above, LIST the primary formats, modes, and methods for teaching and learning that may be used in the course:

A. lecture/discussion
B. small-group work
C. computer-assisted instruction
D. student oral presentations
E. student collaboration
F. independent study

VIII. Texts and Materials

A. Suggested textbooks: *Statistics: Informed Decisions Using Data* by Sullivan
B. Computer-based sources: Instructor is free to choose the type of technology.

Choices include but are not limited to:

- Scientific calculator with statistical capabilities
- StatCrunch
- MINITAB
- EXCEL

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

Instructor access to internet for statistics software to be used during lecture.

X. Check One: ☐ Honors Course ☐ Honors Options ☒ N/A