RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

MATH 111H AND STATISTICS II HONORS

I. Basic Course Information

    A. Course Number and Title: MATH 111H Statistics II Honors

    B. New or Modified Course: Modified

    C. Date of Proposal: Semester: Spring   Year: 2020

    D. Effective Term: Fall 2020

    E. Sponsoring Department: Mathematics and Computer Science

    F. Semester Credit Hours: 3

    G. Weekly Contact Hours: 3   Lecture: 3
                                         Out of class student work per week: 6

    H. Prerequisites: MATH 110 Statistics I or AP Statistics Score of 4

    I. Laboratory Fees: None

    J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional Dean at time of approval: Department Chair: Lori Austin, Lori Austin, Lori.Austin@raritanval.edu ext. 8576; Divisional Dean: Sarah Imbriglio, Sarah.Imbriglio@raritanval.edu ext. 8241

II. Catalog Description

    Prerequisite: MATH 110 Statistics I or AP Statistics Score of 4. This course is a continuation of Statistics I. Topics include description and analysis of bivariate data, regression and correlation, inferences in regression, chi-square procedures, inferences in two means and proportions, simple experimental design, analysis of variance, and optional non-parametric tests.

III. Statement of Course Need

A. Rationale for this course: Students who come to RVCC with AP statistics credit yet need a two-semester sequence of statistics, would benefit from the Honors section of statistics II rather than the regular version, as these students tend to be high achieving students. A subpopulation that will benefit from this course are students admitted into the Honors College and those enrolled into the Honors Program.

B. If course has a lab component, justify the need for the lab.

C. Please describe the transferability of this course.
   1. This course generally transfers as a Mathematics general education course.
   2. This course generally transfers as a free elective for many programs.

IV. Place of Course in College Curriculum

A. This course serves as 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; for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

A.   Statistical Inference
   1.   Nature and Design of Hypothesis Tests – classical and modern
   2.   Interpretation of Results
   3.   Type I and Type II Errors
   4.   Power analysis
   5.   p-values

B.   Inferences About Two Population Means
   1.   Independent and dependent Samples
   2.   Tests for differences between Two Means
   3.   Tests for differences between Two Proportions
   4.   Tests for standard deviations
   5.   Chi-square procedures

C.   Inferences About More Than Two Population Means
   1.   The F-Distribution
   2.   The Logic behind Analysis of Variance
   3.   One-Way ANOVA
   4.   Blocking Designs (One Replication per cell, no interactions)
   5.   Two Factor Factorial Design (with Cell Replications and interactions)
   6.   Multiple Comparisons for Factorial Designs

D. Descriptive Measures for Bivariate Data
1. Scatter plots
2. Linear Equations with One Independent Variable
3. The Regression Equation
4. The Correlation Coefficient
5. The Coefficient of Determination
6. Multiple Regression Model
7. The Multiple Correlation Coefficient, Multicollinearity
8. Model Selection and Partial Correlations
9. Categorical Variable Regression, Coding

E. Inferences for Regression and Correlation
1. Standard Error of the Estimate
2. Inferences for Regression and Correlation Coefficients
3. Inferences for Regression Weights and Multiple Correlation Coefficient

F. Non-Parametric Tests (optional)

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

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

1. Use appropriate methods of statistics for various analyses. (GE- NJ 2)
2. Solve problems quantitatively and symbolically. (GE- NJ 2)

B. Course Learning Outcomes:

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

1. Conduct an appropriate hypothesis test using both classical and modern (p-value) procedures. (GE-NJ 2)
2. Interpret results from inferential statistics to interpret data for the purposes of decision-making for comparing two population means. (GE-NJ 2)
3. Interpret results from inferential statistics to interpret data for the purposes of decision-making for comparing one or two population proportions. (GE-NJ 2)
4. Interpret results from inferential statistics to interpret data for the purposes of decision-making in Chi-Square tests for independence or goodness-of fit. (GE-NJ 2)
5. Interpret results from inferential statistics to interpret data for the purposes of decision-making for a one-way ANOVA analysis. (GE-NJ 2)

6. Use linear regression techniques for purposes of analysis and prediction for slope or correlation. (GE-NJ 2)
7. Use Multiple Regression techniques for purposes of analysis and prediction. (GE-NJ 2)
8. Use Factorial and Blocking designs to analyze data involving multiple factors. (GE-NJ 2)
9. Conduct a simple statistical study (experimental or observational), including the sampling design, interpretation of computer results from their collected data, and inference from these results to a conclusion consistent with their design. (GE-NJ 2)
10. Explain and present (written and verbal) statistical results from own experimental design study. (GE-NJ 1)

C. **Assessment Instruments**

A. teacher written tests
B. computer/calculator lab projects
C. semester projects
D. final examination
E. in-class quizzes

VII. Grade Determinants

A. research paper (required)
B. case studies (required)
C. tests (required)
D. presentations (required)
E. homework (required)
F. 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. laboratory
E. student oral presentations
F. student collaboration
G. independent study
H. homework

VIII. Texts and Materials

A. Suggested textbook: *Introductory Statistics, Alternate Windows Version, (latest edition).* Neil A. Weiss. Pearson Addison-Wesley.

B. Supplementary textbook (optional): *Interpreting Basic Statistics,* 3rd ed. Zealure C. Holcomb. Pyrczak Publishing, 2002.
C. Computer-based sources: The instructor is free to choose the type of technology. Choices include but are not limited to:
  1. MINITAB
  2. TI-84 graphing calculator
  3. EXCEL
  4. SAS
  5. IBM SPSS

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

Because of the technology used in the course, classes should be held in a computer lab room where the instructor can access both MINITAB and the web. MINITAB software needs to be available in the Academic Support Center, the open labs, the library, and any other computer lab where students may be working.

X. Honors Option N/A