

**SUFFOLK COUNTY COMMUNITY COLLEGE**  
**COLLEGE-WIDE COURSE SYLLABUS**  
**MAT104 (formerly MA24)**

**I. COURSE TITLE:**

Statistics II

**II. CATALOG DESCRIPTION:**

For students interested in social sciences, health sciences, business and industry. Expands on statistical concepts and methods treated in MAT103 and provides opportunity to apply statistical methods to an actual survey. Teaches how to select a sample, interview respondents and analyze data. Additional topics include non-parametric statistics, correlation and regression, analysis of variance and decision making. Prerequisite: C or better in MAT103.

A-E-G / 3 cr. hrs.

**III. COURSE GOALS:**

- A. Introduce students to more advanced statistical techniques.
- B. train students to conduct statistical studies
- C. Prepare students to analyze and present the results of those studies.

**IV. COURSE OBJECTIVES:**

Upon successful completion of this course, students will be able to:

- A. understand the significance of variation between samples as epitomized in the Central Limit Theorem;
- B. understand that statistical results involve degrees of uncertainty;
- C. demonstrate familiarity with the notion of design of experiments in the context of devising statistical studies involving the formulation of questions, the selection of random samples and the collection of sample data;
- D. conduct, either individually or as part of a group, a series of complete statistical studies, to analyze fully the data and to come to appropriate statistical conclusions based on the data. These studies should include some or all of the following:
  - 1. constructing confidence intervals to estimate population parameters such as the mean and the proportion based on random samples drawn from some population;
  - 2. testing a statistical hypothesis about a population mean, a population proportion, a difference of means and a difference of proportions based on random samples drawn from some populations;
  - 3. performing a regression/correlation analysis for a set of paired data;
  - 4. performing a chi-square analysis for a contingency table;
  - 5. performing a goodness-of-fit test;
  - 6. performing an analysis of variance test;
  - 7. applying a variety of non-parametric statistical tests; including the sign test, the rank-sum test, the runs test, and the use of the Spearman rank correlation coefficient;

- E. communicate by preparing formal written or oral reports on the results of statistical studies;
- F. understand that  $DATA = FIT + RESIDUAL$ ;
- G. distinguish between different types of samples; i.e., random, cluster, quota samples.

## V. Topics Outline with Timeline

| Topics   | Approximate Time (Including Examinations) |
|--|---|
| A. <u>Brief Review</u> :<br>1. descriptive statistics<br>2. probability distributions<br>3. sampling<br>4. applications <ul style="list-style-type: none"> <li>a. confidence intervals for means (large and small samples) and proportions</li> <li>b. hypothesis tests for means (large and small samples), proportions, differences of means</li> </ul>                        | 3 weeks                                   |
| B. <u>New Topics</u> :<br>(Note: while some students may have seen some of these topics, they appear to be new to the majority)<br>1. confidence intervals <ul style="list-style-type: none"> <li>a. differences of means</li> <li>b. differences of proportions</li> </ul> 2. hypothesis tests for differences of proportions<br>3. choosing random samples<br>4. paired t-test | 3-4 weeks                                 |
| 5. regression and correlation <ul style="list-style-type: none"> <li>a. calculating slope and intercept</li> <li>b. testing significance of slope</li> <li>c. calculating R</li> <li>d. testing the significance of the correlation coefficient</li> <li>e. mention of non-linear univariate and linear multivariate regression</li> </ul>                                       | 2-3 weeks                                 |
| 6. chi-square distribution <ul style="list-style-type: none"> <li>a. goodness-of-fit test</li> <li>b. contingency tables</li> </ul>  | 1 week                                    |
| 7. analysis of variance <ul style="list-style-type: none"> <li>a. testing equality of variances</li> <li>b. F-distribution</li> </ul>  | 2 weeks                                   |

|  |           |
|--|-----------|
| 8. non-parametric statistics <ol style="list-style-type: none"> <li>a. Spearman rank correlation</li> <li>b. sign test</li> <li>c. runs test</li> <li>d. Mann-Whitney, Wilcoxon or rank sum test</li> </ol>  | 1-2 weeks |
| C. <u>Statistics projects</u> : These might include: <ol style="list-style-type: none"> <li>1. a series of successively more demanding projects such as:           <ol style="list-style-type: none"> <li>a. measuring waiting times</li> <li>b. difference of means study</li> <li>c. linear regression study</li> <li>d. culminating in a large scale attitudinal survey</li> </ol> </li> <li>2. an exclusive focus on a large scale attitudinal survey throughout the semester</li> <li>3. a focus on a study of classic statistical experiments such as one based on the Surgeon General's Report on Smoking and Health</li> </ol> |           |

**VI. Evaluation of Student Performance:**

To be determined by the instructor

**VII. Programs that require this course:**

Business: Marketing/AAS

**VIII. Courses that require this course as a prerequisite:**

None

**IX. Supporting Information:**

Mathematics tutoring services, as well as video and computer aids, are provided for all students through the Math Learning Center (Ammerman Campus, Riverhead 235), the Center for Academic Excellence (Grant Campus, Health, Sports and Education Center 129), and the Academic Skills Center (Eastern Campus, Orient 213).