STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE

MATH 341 – Statistics II

Prepared By: Mathematics Department
A. **TITLE:** STATISTICS II

B. **COURSE NUMBER:** MATH 341

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 weeks including exam week

F. **SEMESTER(S) OFFERED:** Fall/Spring

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:** Three lecture hours per week.

H. **CATALOG DESCRIPTION:** Includes confidence intervals and hypothesis testing for population proportions, variance and standard deviation; hypothesis testing two samples for differences between means; correlation and regression, including multiple regression; finding prediction intervals and hypothesis tests for the linear correlation coefficient; Chi-square tests and the F-distribution; non-parametric tests.

I. **PRE-REQUISITES/CO-COURSES:** Statistics (MATH 141) with a grade of C or better or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES):** Students shall be able to:

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>a. Interpret and draw inferences from mathematical models such as formulas, graphs, tables, and schematics;</td>
<td>Critical Thinking Communication</td>
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<tr>
<td>b. Represent mathematical information symbolically, visually, numerically, and verbally;</td>
<td>Critical Thinking Communication</td>
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<tr>
<td>c. Employ quantitative methods such as, arithmetic, algebra, geometry, or statistics to solve problems;</td>
<td>Critical Thinking</td>
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<tr>
<td>d. Estimate and check mathematical results for reasonable ness; and</td>
<td>Critical Thinking Inter-Intrapersonal Skills</td>
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<tr>
<td>e. Recognize the limits of mathematical and statistical methods</td>
<td>Critical Thinking Communication</td>
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L. **REFERENCES:** none

M. **EQUIPMENT:** Technology enhanced classroom.
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N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:** Methods include:
   - Exams
   - Homework/Quizzes
   - Projects

P. **DETAILED COURSE OUTLINE:** See attached.

Q. **LABORATORY OUTLINE:** N/A
MATH 341 – STATISTICS II

DETAILED OUTLINE

I. Confidence Intervals
   A. Confidence intervals for population proportions
   B. Confidence intervals for variance and standard deviation

II. Hypothesis Testing – One Sample
   A. Hypothesis testing for proportions
   B. Hypothesis testing for variance and standard deviation

III. Hypothesis Testing – Two samples
   A. Testing the difference between means (large independent samples) using a \( z \)-test
   B. Testing the difference between means (small independent samples) using a \( t \)-test
   C. Testing the difference between means (dependent samples) using a \( t \)-test
   D. Testing the difference between proportions using a \( z \)-test

IV. Correlation and Regression
   A. Finding the linear correlation coefficient
   B. Hypothesis testing the population correlation coefficient, \( \rho \)
   C. Multiple regression
   D. Finding prediction intervals

V. Chi-square Tests and the F-distribution
   A. The Chi-square goodness of fit test
   B. Using Chi-square distribution to test whether two variables are independent
   C. Using the two-sample F-test for variances
   D. One-way analysis of variance (ANOVA)
   E. Two-way analysis of variance (optional)
VI. Nonparametric Tests

A. Using the sign test for a population median

B. Using the paired-sample sign test

C. Using the Wilcoxon signed-rank and rank-sum tests to determine if two samples are selected from populations having the same distribution.

D. Using the Mann-Whitney test to determine if the means of two samples are equal (optional).

E. Using the Kruskal-Wallis Test to test whether three or more samples are from populations having the same distribution.

F. Using the Friedman test for dependent samples (optional).

G. Using the Spearman rank correlation coefficient to determine if the correlation between two variables is significant.

H. Using the runs test to test datasets for randomness.