

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



MASTER SYLLABUS

MATH 141 - STATISTICS

**Created by: Jiayuan Lin and Patrick Casselman
Updated by: Patrick Casselman**

**CANINO SCHOOL OF ENGINEERING TECHNOLOGY
MATHEMATICS DEPARTMENT
Fall 2018**

A. **TITLE:** Statistics

B. % **COURSE NUMBER:** MATH 141

C. % **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** N/A

E. **GER CATEGORY:** 1

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

G. **COURSE DESCRIPTION:** This course is an introduction to the standard methods of descriptive statistics, probability, and inferential statistics. Topics include: organization and presentation of data, descriptive measures of data, linear correlation and regression analysis, probability, binomial and normal probability distributions, *t*-distributions, estimation of parameters, and hypothesis testing. The Chi-square distribution and Chi-square applications are covered if time permits.

H. % **PRE-REQUISITES/CO-REQUISITES:**

a. Pre-requisite(s): College Algebra (MATH 121), (MATH 123) Survey of Mathematics (MATH 111), or

Mathematics for Elementary Teachers II (MATH 116) with a grade of C or better, or 3 years of high school mathematics with a grade of 75 or above on the third New York State Regents mathematics examination, or permission of instructor.

b. Co-requisite(s): N/A

c. Pre- or co-requisite(s): N/A

I. % **STUDENT LEARNING OUTCOMES:**

<u>Course Student Learning Outcome [SLO]</u>	<u>PSLO</u>	<u>GER</u>	<u>ISLO</u>
a. Use methods of descriptive statistics to create visual displays	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>
b. Compute common statistical measures, including mean, median, mode, variance, and standard deviation	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>
c. Use linear regression to find the equation of the regression line to predict y-values	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>
d. Solve probability problems using addition and multiplication rules	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>
e. Solve probability problems using binomial distribution	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>

f. Solve probability problems using normal distribution Create confidence intervals to estimate the population mean using normal and t-distributions	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>
h. Perform a hypothesis test for the population mean	N/A	1	3. <i>Quantitative Lit./Reasoning [QTR]</i>

KEY	Institutional Student Learning Outcomes [ISLO 1 – 5]
ISLO #	ISLO & Subsets
1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS]</i>
3	Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	Industry, Professional, Discipline Specific Knowledge and Skills

J. **APPLIED LEARNING COMPONENT:** Yes _____ No x

K. % **TEXTS:** ELEMENTARY STATISTICS: PICTURING THE WORLD by Larson/Farber, 6th Ed. (2015).

L. % **REFERENCES:** N/A

M. % **EQUIPMENT:** Smart Classroom (computer projection and access to the internet).
A graphing calculator is required for this course.

N. % **GRADING METHOD:** A-F

O. % **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Homework
- Quizzes
- Tests
- Participation

P. DETAILED COURSE OUTLINE:

I. Organizing and Presenting Sets of Data

- A. Sampling
- B. Grouped and ungrouped data
- C. Histograms, bar charts, etc.

II. Analysis of Data - The Common Statistical Measures

- A. Standard statistical measures including, mean, median, mode, variance, coefficient of variation, standard deviation, range, quartiles and percentiles.
- B. Requirements of the Normal Set (Empirical Rule)

III. Regression and Correlation of Paired data

- A. Types of correlation (strong, weak, positive, negative)
- B. Correlation coefficient
- C. Linear Regression

IV. Elementary Probability

- A. Addition and Multiplication Rules
- B. Conditional Probability and Independence
- C. Requirements of a Probability Distribution

V. Probability Distributions - Binomial and Normal

- A. The Binomial Distribution
- B. The Normal Distribution
- C. Distribution of sample means and the Central Limit Theorem

VI. Estimation of Parameters

- A. Confidence intervals for the mean.
- B. Sample Size.
- C. Confidence interval for paired differences.
- D. Confidence interval for proportion, large and small samples.
- E. Confidence interval for difference of proportion (optional).

VII. Hypothesis Testing

- A. The components and methods of hypothesis testing.
- B. Type I and Type II errors.
- C. Hypothesis test for the mean.
- D. Hypothesis test for the difference of two means.
- E. Hypothesis test for a proportion, large and small samples.
- F. Hypothesis test for difference of proportions (optional).

VIII. Additional Topics at Instructor's Discretion

- A. Chi-Square test for a table of data.
- B. Chi-Square test for a row of data, (goodness of fit).
- C. Testing and Estimating the Standard Deviation (F distributions)
- D. Analysis of the Variance, (ANOVA test).

Q. LABORATORY OUTLINE: N/A