Master Course Syllabus

Course Discipline and Number: MATH 200   **Year: 2024-2025**

Course Title: Statistics   **Credit Hours: 3**

I. Course Description: This course is a study of the application of statistical procedures to the analysis of experimental data. Topics covered include methods for presentation of data; measures of center, dispersion and position; sampling techniques; elementary probability; hypothesis testing and confidence intervals for both one and two population; and linear correlation and regression. Use of the binomial, normal, student's T and chi-square distributions are also covered. Technology such as a graphing calculator or Excel is required. MATH 200 satisfies the SUNY Gen Ed Mathematics category. Prerequisites: Prior completion of MATH 098 or a C or better in MATH 120 or concurrent enrollment in MATH 029 if required by placement; prior completion of, or concurrent enrollment in, ENGL 100. 3 Cr. (3 Lec.) Fall and spring semesters.

II. Additional Course Information:

1. MATH 200 is required in the following A.S. programs: Accounting, Business Administration, Human Services, Communication and Media Art, Computer Science, Environmental Studies, International Business and Sport Management. The course is a requirement option for Biology A.S. It is also required in the Applied Science and Technology A.A.S.
2. MATH 200 uses OER (open educational resources) and a fee for these materials will be applied to the student's bill.
3. This course includes online homework assignments in a free software and students are required to obtain an account in the designated platform.

III. Student Learning Outcomes
Upon successful completion of this course, students will be able to:

1.   Interpret graphs and other forms of data organization.
2.   Calculate and compare various forms of measure, i.e., measures of center, dispersion and positon.
3.   Use technology to calculate and interpret probability values from the binomial and normal distribution.
4.   Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

IV. Tompkins Cortland Institutional Learning Outcomes; Program Learning Outcomes; SUNY General Education Outcomes

Tompkins Cortland ILOs

Complete this section for "service" courses only (e.g. courses that are required of all students; courses that are not program specific but satisfy liberal arts requirements; or commonly used in multiple academic programs to meet non-program-specific requirements). Check only Institutional Learning Outcomes (ILOs) that are meaningfully developed and assessed in this course. For each ILO chosen, include the SLO to which it aligns.

Students will:

☐ Communicate effectively, in oral and written forms, taking into consideration audience and purpose.

☒ Apply principles and methods of scientific inquiry and quantitative reasoning appropriate to their discipline.

SLOs:
1. Interpret graphs and other forms of data organization.
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.

☒ Use information, critical thinking, and the creative process to solve problems and reach conclusions.

SLOs:
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

☒ Use technology appropriate to their discipline.

SLOs:
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.

☐ Describe the ways in which social, economic, or environmental sustainability depends on their own and the collective contributions of a diversity of ideas and people.

Program Learning Outcomes

Complete this section for program-specific courses (e.g. those that share the same 4 letter designation as the academic program or satisfy requirements in related programs).   List the academic program(s) here and note which Student Learning Outcomes align to specific Programmatic Learning Outcomes. Please see the MCS Instructions for more details.

Specify the Academic Program
Liberal Arts and Science – Math / Science A.S.

PLO #1: Examine and critique mathematical / scientific data:

SLOs:
1. Interpret graphs and other forms of data organization.
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

PLO #3: Explain effectively mathematical and/or scientific models and processes:

SLOs:
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.

3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

PLO #4: Use appropriate technology to perform calculations, experiments, solve problems and create presentations:

SLOs:
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

SUNY General Education Outcomes

If this course **assesses** a SUNY GEN ED Outcome, check all that apply and indicate which course outcome(s) address each checked item:

☒ CRITICAL THINKING - Students will:
  a. identify, analyze, and evaluate arguments as they occur in their own or others' work; and
  b. develop well-reasoned arguments.

 SLOs:
1. Interpret graphs and other forms of data organization.
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

☐ INFORMATION MANAGEMENT - Students will:
  a. perform the basic operations of personal computer use;
  b. understand and use basic research techniques; and
  c. locate, evaluate and synthesize information from a variety of sources.

☒ GENERAL EDUCATION CATEGORY - Area(s):
For courses that are approved to meet one (or more) of the ten SUNY General Education categories, indicate which category the course fulfills, and which outcome(s) are aligned with the SUNY outcomes for that category:

MATH 200 satisfies the Mathematics (#1) category

 PLO: Students will demonstrate the ability to interpret and draw inferences from mathematical models such as formulas, graphs, tables, or schematics.

 SLOs:
1. Interpret graphs and other forms of data organization.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.
4. Write an interpretation and/or conclusion based on the outcomes from hypothesis testing and confidence intervals.

 Students will demonstrate the ability to represent mathematical information symbolically, visually, numerically or verbally as appropriate.

 SLO:

2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
Students will demonstrate the ability to employ quantitative methods such as arithmetic, algebra, geometry, or statistics to solve problems.

   SLOs:
1. Interpret graphs and other forms of data organization.
2. Calculate and compare various forms of measure, i.e., measures of central tendency, dispersion and positon.
3. Use technology to calculate and interpret probability values from the binomial and normal distribution.

☐ This course does not address any of the above Tompkins Cortland ILOs, PLOs, or SUNY General Education Outcomes.

V. Essential Topics/Themes

1.   Terminology and Data collection
2.   Summarizing Data in Tables and Graphs
3.   Measures of Center,Dispersion and Position
4.   Linear Correlation and Regression
5.   Probability
6.   Discrete Probability and the Binomial Probability Distribution
7.   Normal Probability Distribution
8.   Sampling Distribution for Samples Means and Sample Proportions
9.   Estimation for 1 and 2 populations
10. Hypothesis Testing for 1 and 2 populations
11. Chi Square Goodness of Fit Hypothesis Test

VI. Methods of Assessment/Evaluation

Method	% Course Grade
1. Tests	20-25%
2. Midterm	25-30%
3. Projects	15-20%
4. Homework	10-15%
5. Final Exam or Final Project	25-30%

VII. Texts –☒ Required   ☐ Recommended   ☐ Used for more than one course (list courses)

No textbook purchase required: OER fee included in student bill

1.   Open Educational Resource (OER) Text: *Statistics Using Technology*. Kathryn Kozak, Edited by Nancy Putnam for MATH 200.

Editions listed are current as of date of syllabus. More recent editions may be used.

VIII. Bibliography of Supplemental Materials

1.	<u>Fundamentals of Statistics.</u> Sullivan, Michael. any edition, Pearson Education Inc.
2.	<u>Elementary Statistics.</u> Triola, Mario F. 9th Edition, Boston, MA, Pearson Education Inc., 2004.
3.	<u>Elementary Statistics Picturing the World</u>. 3rd edition, Upper Saddle River, NJ, Pearson Education Inc., 2006.

Editions listed are current as of date of syllabus. More recent editions may be used.

IX. Other Learning Resources

Audiovisual: None specified
Electronic: Lumen OHM   YouTube Videos of TI-83/TI-84 calculator usage
Other: Graphing calculator, or spreadsheets such as Excel, Google Sheets.

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for academic adjustments. All course materials are available in alternate formats upon request.*

Academic Integrity: *Every student at Tompkins Cortland Community College is expected to act in an academically honest fashion in all aspects of his or her academic work: in writing papers and reports, in taking examinations, in performing laboratory experiments and reporting the results, in clinical and cooperative learning experiences, and in attending to paperwork such as registration forms.*
Any written work submitted by a student must be his or her own. If the student uses the words or ideas of someone else, he or she must cite the source by such means as a footnote. Our guiding principle is that any honest evaluation of a student's performance must be based on that student's work. Any action taken by a student that would result in misrepresentation of someone else's work or actions as the student's own — such as cheating on a test, submitting for credit a paper written by another person, or forging an advisor's signature — is intellectually dishonest and deserving of censure.
Several degree programs offer student learning opportunities (such as internships, field work, and clinical experiences) outside the standard classroom setting. As part of the learning process, students must understand and engage in conduct that adheres to principles guiding employment within the professional workplace. These behaviors include, but are not limited to, academic integrity, accountability, reliability, respect, use of appropriate language and dress, civility, professional ethics, honesty, and trustworthiness. Disciplinary action may be initiated for inappropriate conduct occurring while participating in any course-related project or event.