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

**MASTER SYLLABUS**

**MATH 362– Data Analysis**

**Created by: Kevin McAdoo**

**Updated by:**

**Canino School of Engineering Technology**

**Mathematics**

**Spring 2020**

**A.**     **TITLE**: Data Analysis


**B.**     **COURSE NUMBER:**  Math 362


**C.**     **CREDIT HOURS**: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

   **# Credit Hours: 4**
   **# Lecture Hours: 4 per week**
   **# Lab Hours: 0 per week**
     **Other: 0 per week**

   **Course Length: 14 weeks**

**D.**     **WRITING INTENSIVE COURSE**:  Yes ☐   No ☒


**E.**     **GER CATEGORY:  None:** ☒   **Yes:** ☐
   *If course satisfies more than one***:**


**F.**     **SEMESTER(S) OFFERED: Fall** ☐   **Spring** ☒  **Fall & Spring** ☐


**G.**      **COURSE DESCRIPTION:**

This course is an introduction to data analysis. Software will be used to analyze and interpret data throughout the course. Included topics are multiple regression, data modeling, along with an introduction to different distributions such as Gamma and Beta distributions.


**H.**     **PRE-REQUISITES:  None** ☐   **Yes** ☒  **If yes, list below:**

Math 141 Statistics, Math 361 Linear Algebra


   **CO-REQUISITES: None** ☒   **Yes** ☐  **If yes, list below:**

# I.    STUDENT LEARNING OUTCOMES:  (*see key below*)

By the end of this course, the student will be able to:

| *Course Student Learning Outcome [SLO]* | *Program Student Learning Outcome [PSLO]* | *GER* [If Applicable] | *ISLO & SUBSETS* | |
|---|---|---|---|---|
| Analyze data and interpret results using a variety of methods, such as multiple regression | | | 3-Found Skills | QTR |
| Use software to analyze data and create graphics, such as a scatter plot matrix | | | 3-Found Skills | QTR |
| Compute mean and variance for various distributions such as Gamma and Beta distributions | | | 3-Found Skills | QTR |
| Identify which distribution is best to use for a given data set | | | 3-Found Skills | QTR |
| Write a technical paper to show the results and make a conclusion for the data | | | 3-Found Skills | QTR |

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

**J.** **APPLIED LEARNING COMPONENT:** Yes ☒ No

If YES, select one or more of the following categories:

☒ Classroom/Lab          ☐ Civic Engagement
☐ Internship              ☐ Creative Works/Senior Project
☐ Clinical Placement      ☐ Research
☐ Practicum             ☐ Entrepreneurship
☐ Service Learning        (program, class, project)
☐ Community Service


**K.** **TEXTS:**


**L.** **REFERENCES:**


**M.** **EQUIPMENT: None** ☐ **Needed:** Computer Lab


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


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

**Homework**
**Quizzes**
**Tests**
**Projects**

**P.** **DETAILED COURSE OUTLINE:**

**I. Introduction to Statistical Programming**
    **A. Excel**
    **B. SPSS**
    **C. R**

**II. Binomial Distribution**
    **A. How Binomial data works**
    **B. Distribution Formula, mean formula, and variance formula**
    **C. Real world data that is Binomial – and using software to calculate statistics**

**II. Normal/Gaussian Distribution**
    **A. How the data is distributed and why it is Gaussian**
    **B. Distribution Formula, mean formula, and variance formula**
    **C. Real world data that is Gaussian – and using software to calculate statistics**

**II. Poisson Distribution**
    **A. What data relates to Poisson**
    **B. Distribution Formula, mean formula, and variance formula**

    **C. Real world data that is Poisson – and using software to calculate statistics**

**II. Gamma Distribution**
    **A. Data that is Gamma – (log distribution)**
    **B. Distribution Formula, mean formula, and variance formula**
    **C. Real world data that is Gamma – and using software to calculate statistics**

**III. Modeling**
    **A. Regression – single and multiple**
    **B. How to pick a distribution based on data**
    **C. Modeling with real world data**

**VI. Real World Applications**
    **A. Use multiple regression to make decisions on a data set**
    **B. Create a model based on multiple regression**
    **C. Given a data set, select a distribution and then model the data.**
    **D. Conclusions on the effectiveness of models that have been running for a long time**


**Q.**     <u>**LABORATORY OUTLINE:**</u>  **None** ☒  **Yes** ☐