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

MASTER SYLLABUS

DATA 230– Applied Data Science – R programming

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SCHOOL OF SCIENCE, HEALTH AND CRIMINAL JUSTICE
CENTER FOR CRIMINAL JUSTICE, INTELLIGENCE AND CYBERSECURITY
SPRING 2023

A. **TITLE**: Applied Data Science – R programming

B. **COURSE NUMBER:** DATA 230

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE**: No

E. **GER CATEGORY:** None

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

G. **COURSE DESCRIPTION:** This course provides the fundamentals of applied data science – R morning. It helps students understand and learn some concepts necessary to start and work as data scientists. It covers the definitions, and main concepts, of data science.

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

Prerequisite: None
Co-requisite: None
Pre- or co-requisite(s): None

I. **STUDENT LEARNING OUTCOMES:**

Course Student Learning_ Outcome [SLO]	*ISLO*
Explain simple linear regression (SLR), SLR assumptions, Correlation and coefficient of determination, Interpreting SLR models,	5
Explain multiple regression, Multiple regression assumptions and diagnostics, Coefficient of multiple determination, Multicollinearity,	5
Describe interaction terms, Categorical predictor variables, Quadratic models	5
Describe logistic regression (LR), Estimating LR parameters, LR models with multiple predictors	5
Identify logarithmic transformations, Ladder of powers and Box-Cox transformation	5
Describe stepwise regression, Forward selection, Backward selection, Stepwise selection	5
Identify principal component analysis (PCA), Calculating principal components for two variables, Extending PCA to more variables, Determining the number of components, Interpreting principal components	5
Explain time series, Time series patterns and stationarity, Moving average and exponential smoothing forecasting, Forecasting using regression	5

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 X** **No _**

K. TEXTS:
ZyBooks

L. REFERENCES:
Various internet sources (ZyBooks, YouTube, CISA, others)

M. EQUIPMENT: None

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:
- Participation Assignments
- Challenge Assignments
- Quizzes
- Exams

P. DETAILED COURSE OUTLINE:
1. Linear Regression
2. Multiple Linear Regression
3. Multiple Linear Regression
4. Logistic Regression
5. Transformations
6. Stepwise Regression
7. Principal Component Analysis
8. Time Series

Q. LAB NA