College of San Mateo
Official Course Outline

1. **COURSE ID:** BUS. 208 **TITLE:** Quantitative Business Analysis
   Units: 3.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; 96.0-108.0 Homework hours; 144.0-162.0 Total Student Learning hours
   Method of Grading: Grade Option (Letter Grade or Pass/No Pass)
   Prerequisite: BUS. 123, or MATH 200
   Recommended Preparation:
   BUS. 118, and Eligibility for ENGL 100, or Eligibility for ENGL 105

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   This is an introductory course on data analysis using spreadsheet software to support management decision including: simple and multiple regression models, forecasting, business simulation models, decision, analysis, and optimization models for resource allocation. Students will become comfortable working with larger datasets and articulating their analysis to a non-technical audience.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Students will learn effective operational and strategic decision making using concepts, methods and quantitative tools from the fields of decision making modeling and data analysis.
   2. Students will develop quantitative models for structured and unstructured decision problems by identifying controllable factors, uncontrollable factors, performance measures and relationships.
   3. Students will develop and analyze financial and other types of planning models and perform sensitivity analysis to identify critical factors.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Make effective operational and strategic decisions using concepts, methods, and quantitative tools from the fields of decision making modeling and data analysis.
   2. Develop quantitative models for structured and unstructured decision problems by identifying controllable factors, uncontrollable factors, performance measures and relationships.
   3. Develop and analyze financial and other types of planning models and perform sensitivity analysis to identify critical factors.

6. **COURSE CONTENT:**
   Lecture Content:
   1. Introduction to Spreadsheet Modeling
      A. Basic Spreadsheet Modeling: Concepts and Best Practices
      B. Cost Projections
      C. Breakeven Analysis
      D. Ordering with Quantity Discounts and Demand Uncertainty
      E. Estimating the Relationship between Price and Demand
      F. Decisions Involving the Time Value of Money
   2. Describing the Distribution of a Variable
      A. Basic Concepts
      B. Summarizing Categorical Variables
      C. Summarizing Numeric Variables
      D. Time Series Data
      E. Outliers and Missing Values
      F. Excel Tables for Filtering, Sorting, and Summarizing
   3. Finding Relationships among Variables
      A. Relationships among Categorical Variables
      B. Relationships among Categorical Variables and a Numeric Variable

C. Relationships among Numeric Variables
D. Pivot Tables
4. Decision Making under Uncertainty
A. Elements of Decision Analysis
B. EMV and Decision Trees
C. One-Stage Decision Problems
D. The PrecisionTree Add-In
E. Multistage Decision Problems
F. The Role of Risk Aversion
5. Regression Analysis: Estimating Relationships
A. Scatterplots: Graphing Relationships
B. Correlations: Indicators of Linear Relationships
C. Simple Linear Regression
D. Multiple Regression
E. Modeling Possibilities
F. Validation of the Fit
6. Regression Analysis: Statistical Inference
A. The Statistical Model
B. Inferences about the Regression Coefficients
C. Multicollinearity
D. Include/Exclude Decisions
E. Stepwise Regression
F. Outliers
G. Violations of Regression Assumptions
H. Prediction
7. Time Series Analysis and Forecasting
A. Forecasting Methods: An Overview
B. Testing for Randomness
C. Regression-Based Trend Models
D. The Random Walk Model
E. Moving Averages Forecasts
F. Exponential Smoothing Forecasts
G. Seasonal Models
8. Introduction to Optimization Modeling
A. A Two-Variable Product Mix Model
B. Sensitivity Analysis
C. Properties of Linear Models
D. Infeasibility and Unboundedness
E. A Larger Product Mix Model
F. A Multiperiod Production Model
G. A Comparison of Algebraic and Spreadsheet Models
H. A Decision Support System
9. Optimization Models
A. Employee Scheduling Models
B. Blending Models
C. Logistics Models
D. Aggregate Planning Models
E. Financial Models
F. Integer Optimization Models
G. Nonlinear Optimization Models
10. Introduction to Simulation Modeling
A. Probability Distributions for Input Variables
B. Simulation and the Flaw of Averages
C. Simulation with Built-in Excel Tools
D. Simulation with @RISK
E. The Effects of Input Distributions on Results
11. Simulation Models
A. Operations Models
B. Financial Models
C. Marketing Models

D. Simulating Games of Chance

12. Statistical Process Control
    A. Deming's 14 Points
    B. Introduction to Control Charts
    C. Control Charts for Variables
    D. Control Charts for Attributes
    E. Process Capability

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
   Typical methods of instruction may include:
   A. Lecture
   B. Activity
   C. Discussion

8. **REPRESENTATIVE ASSIGNMENTS**
   Representative assignments in this course may include, but are not limited to the following:
   Writing Assignments:
   Discussion posts, including peer evaluation, of key statistical concepts and statistical statements in business.
   Case studies where data sets are mined, interpreted, and visualized.
   Problem solving exercises.

   Reading Assignments:
   One chapter of college level statistics textbook per week.

   Weekly chapter study guide including key concepts, videos, and additional support documents (approximately one hour per week).

9. **REPRESENTATIVE METHODS OF EVALUATION**
   Representative methods of evaluation may include:
   A. Class Participation
   B. Class Performance
   C. Class Work
   D. Exams/Tests
   E. Homework
   F. Projects
   G. Quizzes

10. **REPRESENTATIVE TEXT(S):**
    Possible textbooks include:
    A. Winston, W. *Business Analytics: Data Analysis & Decision Making*, 7th ed. Cengage, 2020

Origination Date: November 2023
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Effective Term: Fall 2024
Course Originator: Sujata Verma