COURSE OUTLINE OF RECORD

Number: MATH G080  
TITLE: Pre-Statistics

ORIGINATOR: Pete Bouzar  
EFF TERM: Fall 2018

FORMERLY KNOWN AS:  
DATE OF OUTLINE/REVIEW: 05-01-2018

CROSS LISTED COURSE:  
TOP NO: 1701.00

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:
1. Analyze data by producing appropriate descriptive statistics including measures of center, spread, and position, and interpreting the results in context.

2. Construct and analyze relevant algebraic models in one and two variables including linear regression models.

3. Construct and analyze graphs including bar graphs, pie charts, histograms, stem and leaf plots, boxplots, and scatter plots.

COURSE OBJECTIVES:

1. Perform order of operations and evaluate algebraic expressions with exponents, square roots, fractions, absolute value, percents, and scientific notation.

2. Solve linear equations, evaluate formulas, and solve a formula for a given variable.

3. Find equation of a line and use linear equations to solve various application problems.

4. Solve linear inequalities, including compound inequalities, and use interval notation.

5. Work with data to perform basic regression analysis including interpretations of slope and y-intercept when appropriate.

6. Understand various sampling methods, types of errors in sampling, types of data, and the design of experiments.

7. Summarize data by constructing tables, charts, and graphs such as pie charts, histograms, stem and leaf plots, boxplots, and scatter plots.

8. Numerically summarize data using measures of central tendency, dispersion, and position.

9. Understand and be able to use various probability rules, formulas, and models including the Binomial and Normal Probability models.

10. Compute probabilities of simple and compound events, and conditional probabilities using counting techniques.

11. Determine the probability distribution of random variables and compute the expected value and standard deviation.

12. Describe the sampling distribution of the sample mean and sample proportion and compute related probabilities.

13. Read, investigate, and effectively communicate both verbally and in written form trends in data and statistical application problems.

14. Use a graphing calculator to perform algebraic and statistical computations.

COURSE CONTENT:

LECTURE CONTENT:

A. Algebra

1. Simplify Expressions with Fractions, Percents, Exponents (integer and rational), Radicals, Absolute Value, and inequalities using Order of Operations

2. Evaluate Algebraic Expressions, Formulas, and Functions

3. Solve Formulas for Specified Variable

4. Solve Linear Equations and Inequalities

5. Solve Compound Inequalities

6. The Rectangular Coordinate System and Plotting Points

7. Slope, Intercept, and Finding Equations of Lines

8. Represent and Analyze Linear Functions Algebraically, Graphically, Verbally, and with a Table

9. Dimensional analysis as relevant for Statistics

B. Sampling

1. Types of Variables and Data

2. Sampling Methods Including Simple Random, Stratified, Cluster, Systematic, and
Convenience Sampling
3. Design of Observational Studies and Experiments
4. Types of Bias, Sampling, and Nonsampling Errors

C. Graphical Summaries of Data
1. Frequency Tables, Relative Frequency Tables, and Their Graphs
2. Pie Charts and Two-way Tables
3. Graphs of Quantitative Data including Histograms, Dotplots, Stemplots, Time-Series Plots, and Boxplots
4. Graphical Misrepresentation of Data

D. Numerical Summaries of Data
1. Measures of Center
2. Measures of Spread
3. Measures of Position

E. Summarizing Bivariate Data
1. Scatterplots and Their Characteristics
2. Correlation and its Interpretation
3. Equations of Least Squares Regression Line and its use for Prediction
4. Features and Limitations of the Regression Line including Interpretation of Slope and Intercept, and Residual Analysis

F. Probability Theory
1. Basic Concepts of Probability
2. The Addition Rule and Complements
3. Conditional Probability and the Multiplication Rule
4. Counting Principles, Permutations, and Combinations

G. Discrete Probability Distributions
1. Discrete Random Variables
2. Discrete Probability Distributions and their Mean and Standard Deviation
3. The Binomial Distribution

H. Continuous Probability Distributions
1. Continuous Random Variables
2. The Normal and Standard Normal Distributions
3. Applications of the Normal Distribution

I. Sampling Distributions
1. Commonly Used Parameters and Statistics
2. Sampling Distribution of Sample Means
3. Sampling Distribution of Sample Proportions
4. Probability Involving Sample Statistics

J. Analyze and Understand Application Problems
1. Understand the Difference Between Population versus Sample Statistics
2. Apply Statistical Techniques and Effectively Communicate Trends in the Data in Context
3. Identify Given Statistics and Write Their Interpretations
4. Analyze Published Articles and Apply Experimental Design Principles
5. Use Technology to Perform Statistical Computations and Representations of Data in Applications

LABORATORY CONTENT:

1. Algebra Topics including algebraic expressions, exponents, radicals, inequalities, and equation of lines.

2. Sampling methods

3. Graphical and Numerical Summaries of Data
4. Bivariate data analysis

5. Probability including discrete and continuous probability distributions

6. Sampling distributions and applications

7. Use of technology to perform statistical analysis

METHODS OF INSTRUCTION:

A. Lecture:
B. Lab:
C. Independent Study:

INSTRUCTIONAL TECHNIQUES:

1. Lecture/Discussion
2. Collaborative Group Learning
3. Article Handouts
4. Multimedia Presentations
5. Web Enhanced
6. Homework Assignments
7. Group or Individual Projects
8. Problem Solving and Technology Sessions

COURSE ASSIGNMENTS:

Reading Assignments

A. Textbook
B. Published Articles
C. Case Studies

Out-of-class Assignments

A. Textbook or Online Homework Assignments
B. Projects
C. Problem solving applications requiring critical thinking

Writing Assignments

A. Projects
B. Reports
C. Exam questions which require written explanation of a topic or a concept

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Essay Examinations
Objective Examinations
Report
Projects (ind/group)
Problem Solving Exercises
Oral Presentations
Skills Demonstration

**Demonstration of Critical Thinking:**

A minimum of 3 exams, the majority of which shall not be multiple choice or true/false. Students must show their written work and the work must be evaluated.

A comprehensive final exam to be given.

All exams are to be proctored, on campus exams.

**Required Writing, Problem Solving, Skills Demonstration:**

A minimum of 3 exams, the majority of which shall not be multiple choice or true/false. Students must show their written work and the work must be evaluated.

A comprehensive final exam to be given.

All exams are to be proctored, on campus exams.

**TEXTS, READINGS, AND RESOURCES:**

**TextBooks:**


**Other:**

1. It is expected that some amount of supplemental in-class materials will be necessary for this class.

**LIBRARY:**

*Adequate library resources include:* Print Materials

**Comments:**

**Attachments:**

[Attached Files]