MATH 108
ELEMENTARY STATISTICS

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Required Text: *Elementary Statistics*, Fifth Edition by Ron Larson and Betsy Farber**. (A specific ISBN number for the course package materials will be posted in the near future.)**

Required Calculator: TI-83+ or TI-84+

Course Description
MATH 0108 ELEMENTARY STATISTICS (3) An introduction to basic concepts and techniques of statistics for students needing skills for research techniques in education, business, and the physical, life, and social sciences, or simply to understand the mass of statistical information in modern life. Topics include: graphical techniques such as histograms or box plots; measures of location and spread; scatter plots and correlation; sampling and sampling distributions; estimation and statistical inference (confidence intervals and/or hypothesis testing). Prerequisite: High School Algebra II.

Our goal is to become confident, competent problem solvers. Experience is truly the finest teacher on the road to attaining any goal. Our experiences in this class will consist of reading the course materials, solving selected problems, and actively participating in class. You will learn best by solving problems. Only then will you move toward understanding.

Topics
Week 1 1.1 - 1.2 An Overview of Statistics, Data Collection 1.3 Experimental Design

Week 2 2.1 Frequency Distributions and Their Graphs, 2.2 More Graphs and Displays
2.3 Measures of Central Tendency

Week 3 2.4 Measures of Variation, 2.5 Measures of Position

Week 4 Review and Exam 1

Week 5 4.2 Binomial Distributions

Week 6 5.1 Introduction to Normal Distributions 5.1 The Standard Normal Distribution

Week 7 5.2 Normal Distributions: Finding Probabilities 5.3 Normal Distributions: Finding Values

Week 8 5.4 The Central Limit Theorem

Week 9 Review and Exam 2

Week 10 6.1, 6.2 Confidence Intervals

Week 11 9.1, 9.2 Correlation, Regression

Week 12 Review and Quiz

Week 13 Project Presentations

Week 14 Project Presentations

Week 15 Final Exam

Grades:
Homework, Quizzes, Labs, & Class Participation: 20%
Exam 1: 20%
Exam 2: 20%
Project: 20%
Final Exam: 20%

Course Objectives
Descriptive stats: Students will develop the skills to interpret and evaluate statistical results. They will be able to judge the validity of an experimental set-up, and design experiments. The abuses of statistics are discussed together with common mistakes and misconceptions. Students will learn how to represent data both graphically and using descriptive statistics. While students will compute parameters such as mean, standard deviation, skewness etc., the main focus will be on the interpretation of these statistical measures. Students will be introduced to the concept of probability and probability distributions and their properties.
Inferential stats: Students will learn how to investigate a claim and come up with a conclusion. They gain an appreciation for the power of statistics and an understanding of its limitations. The concepts of confidence and significance are discussed. Recognizing the extensive use of software in the work place today, the focus is again on using proper methods and set-ups, and on the interpretation of results.

Instructional Objectives
The students will understand and be able to compute, create, and interpret:
1. types of samples and data
2. experiment design
3. graphical representation of data (histogram, box plots)
4. measures of center and their implications (mean, median, mode, midrange)
5. measures of variation and their interpretation (range, standard deviation, variance, min, max)
6. measures of position (percentiles, quartiles, z-score)
7. detection of outliers, unusual and extreme values
8. Chebychev's theorem and the empirical rule
9. probability and probability distributions, expected values
10. Law of large numbers
11. binomial, uniform, and normal distribution
12. how to use the normal distribution to find probabilities given a data point and a data point given a probability
13. Central limit theorem
14. how to compute confidence intervals for mean, proportion, standard deviation, meaning of confidence level, computation of margin of error, choosing the correct distribution, determining sample size
15. Correlation and regression - how to choose an appropriate mode, how to interpret the r-value