Math 103 - STATISTICS

1. **Course Description**
   - This course introduces the use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square, and t-tests; and application of technology for statistical analysis, including the interpretation of the relevance of statistical findings. Students use appropriate statistical techniques to analyze and interpret applications based on data from a broad range of disciplines. UC CREDIT LIMITATION: Credit for BTEC 180/BTEC 180H, BUS 204/BUS 204H, MATH 103/MATH 103S, PSYC 104/PSYC 104H, or SOC 125. Some CSU campuses may also impose this credit limitation.

2. **Topics Covered**
   - Descriptive statistics;
   - Probability and sampling distributions;
   - Statistical inference;
   - Correlation and linear regression;
   - Analysis of variance,
   - Chi-square,
   - T-tests;
   - Application of technology for statistical analysis, including the interpretation of the relevance of statistical findings.

3. **What to expect?**
   - Time: The most common term lengths are listed below; others would be proportionate. Outside of class time is studying, completing homework, reviewing, etc.

Length of term	In-class time	Out-of-class time (typical)	Total hours/wk (typical)	Total Term hours (typical)
17 weeks	4 hrs/wk	8 hrs/wk	12	204
8 weeks	8.5 hrs/wk	17 hrs/wk	25.5	204
6 weeks	11.3 hrs/wk	22.7 hrs/wk	34	204

   - Technology: We may be using modern statistical technologies such as ArtOfStat Web Applets (FREE), or RStudio Cloud (FREE), Python on Google Colab (FREE), etc.

4. **Who should enroll?**
   - This course could be the last math class many students need for their major to graduate and/or transfer.

- ○ This course is recommended for students who have struggled with algebra but need a transfer level course.

5. <u>What prior knowledge students need to know to be successful?</u>
- ○ Numbers and the Number Line
    - i. Plot points and intervals on the number line
    - ii. Represent an inequality as an interval on the number line
    - iii. Find the distance between two points on the number line
    - iv. Round decimals
    - v. Order decimal numbers
    - vi. Convert between fractions, decimals, and percent
        1. $15\% = 0.15 = \frac{15}{100}$
- ○ Operations on Numbers
    - i. Perform signed number arithmetic
    - ii. Calculate powers of a number (using technology)
    - iii. Calculate the square root of a number (using technology)
    - iv. Use summation notation
    - v. Understand order of operations in expressions and formulas
        1. Parentheses/ Brackets, Exponents, Multiplication/Division, Addition/Subtraction
- ○ Sets
    - i. Understand Venn diagrams
    - ii. Use set notation
    - iii. Find the complement of a set
    - iv. Find the union and the intersection of two sets
- ○ Equations and Inequalities
    - i. Evaluate algebraic expressions
    - ii. Solve a linear equation in one variable
    - iii. Plot an ordered pair (x, y) in a rectangular coordinate system
    - iv. Understand slope as the change in y associated with a 1-unit change in x
        1. $Slope = \frac{y_2-y_1}{x_1-x_2}, Slope = \frac{Change\ in\ y}{Change\ in\ x}$
    - v. Given the equation of a line, draw the graph of the line
    - vi. Use the equation of a line to find the y-value associated with a given x-value
- ○ Reading Tables and Graphs and Approximating Areas
    - i. Extract information from tables and graphs
    - ii. Given the total area under a curve or a histogram, approximate the area of a shaded region