COURSE DESCRIPTION

Prerequisite: None.

This is an accelerated course that prepares students for transfer-level Statistics. Topics include ratios, rates, and proportional reasoning, arithmetic reasoning using fractions, decimals and percents, evaluating expressions, analyzing algebraic forms to understand statistical measures, functions, use of linear and exponential functions to model bivariate data, use of logarithms, logarithmic scales and semi-log plots, graphical and numerical descriptive statistics for quantitative and categorical data. This course is designed for students who do not plan to major in math, science, computer science, or engineering. 90 hours lecture and 54 hours laboratory. (Non-degree credit course.)

SHORT DESCRIPTION FOR CLASS SCHEDULE

Concepts from arithmetic and algebra are introduced to understand the basics of college-level statistics. New approach designed for students who do NOT plan to major in math, science, or engineering.

ADVISORY ENTRY SKILLS

Before entering the course, students will be able to:

1. Command of basic arithmetic functions that include addition, subtraction, multiplication and division of whole numbers without the assistance of a calculator or other electronic devices.

STUDENT LEARNING OUTCOMES

Upon successful completion of the course, students should be able to:
Formulate questions that can be addressed with data, then organize, display, and analyze relevant data to address these questions and communicate results.

- Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts

Apply the basic principles of study design to develop and analyze the validity of simple experiments and sampling plans related to a given situation and goal.

- Critical Thinking - Construct sound arguments and evaluate arguments of others

Construct, use, and interpret mathematical models, specifically linear and exponential functions, to represent relationships in quantitative data.

- Critical Thinking - Analyze and solve complex problems across a range of academic and everyday contexts

Demonstrate numerical and algebraic reasoning skills to support statistical analysis.

Set goals and devise strategies for success in college.

- Application of Knowledge - Set goals and devise strategies for personal and professional development and well being

COURSE CONTENT

TOPICS

1. Graphs of distributions of categorical data: bar charts and pie charts.
   - Graphs of univariate distributions of quantitative data: histograms, stem-and-leaf plots, boxplots; graphs of linear, exponential, and logarithmic functions
2. Contingency tables: marginal and conditional distributions
3. Measures of center and associated measures of spread: mean, variance, standard deviation; median, quartiles, percentiles
4. Computing with and interpreting fractions, decimals, percents, signed numbers as they relate to statistical formulas and concepts
5. Graphing fractions, decimals, and signed numbers on a number line
6. Evaluating expressions using the order of operations
7. Graphs and models for bivariate distributions of quantitative variables, including least-squares regression using linear and exponential models, transforming exponential into linear models using logarithms and logarithmic scales, along with correlation coefficient (r) and as measures
of strength and spread in linear regression.
8. Data production
9. Developing effective learning skills

METHODS OF INSTRUCTION
Methods of instruction used to achieve student learning outcomes may include, but are not limited to:

- Class lectures, discussions, and demonstrations to introduce concepts, such as mathematical models (e.g. linear, exponential) and relationships, as well as providing "just in time" instruction on topics such as demonstrating numerical and algebraic reasoning skills to support statistical analysis.
- Use of computer-based tools to effectively find sources of data, and to analyze data and construct graphs
- Provision and employment of a variety of media (audio, visual, and tactile) to address multiple learning styles and to reinforce material
- Collaborative learning methods will be employed to promote statistical exploration and to enhance problem solving skills

METHODS OF EVALUATION
Students will be evaluated for progress in and/or mastery of learning outcomes by methods of evaluation which may include, but are not limited to:

- Evaluation of written homework assignments and/or computerized homework assignments for correct application of statistical concepts as well as the correct usage of graphs and vocabulary
- Evaluation of quizzes, tests, and a final exam for conceptual understanding and correct technique in the application of statistical, algebraic, and arithmetic principles (e.g., interpretation and construction of charts and graphs; evaluation of algebraic expressions, and use of percents and fractions).
- Assessment of classroom explorative and collaborative activities for content knowledge and conceptual understanding.

ASSIGNMENTS

Reading Assignments

- Read and analyze textual material from a variety of sources, including newspapers or journals covering data collection, data analysis, study designs, and interpretations of data.
Writing Assignments

- Students will write summaries that describe various data sets, show organizations of data, and communicate the results of data analysis.

Other Outside-of-Class Assignments

- Students will be given homework assignments that address arithmetic/algebraic concepts necessary for statistical computations, e.g., fractions, decimals, percentages, order of operations, and solving equations. Projects will be assigned that require students to formulate questions that can be addressed with data, and then collect, organize, display, and analyze the data to address their questions. Projects will show whether students can apply the basic principles of study design and construct, use, and interpret mathematical models to represent relationships in quantitative data.

COURSE MATERIALS

All materials used in this course will be periodically reviewed to ensure that they are appropriate for college level instruction. Possible texts include:


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