COURSE OUTLINE OF RECORD

Number: MATH A103   **TITLE:** Statistics for Elementary Teachers

ORIGINATOR: Tab Livingston   **EFF TERM:** Fall 2015

FORMERLY KNOWN AS: **DATE OF OUTLINE/REVIEW:** 03-04-2016

CROSS LISTED COURSE: **TOP NO:** 1701.00

                                                                CID:

SEMESTER UNITS: 3.0

HRS LEC: 54.0   **HRS LAB:** 18.0   **HRS OTHER:** 0.0

CONTACT HRS TOTAL: 72.0

STUDY/NON-CONTACT HRS RECOMMENDED: 90.0

CATALOG DESCRIPTION:

Designed for prospective teachers, this course is an activity-based exploration of statistics aligned with the California State Mathematics Standards for K-12. Topics include data representation and analysis, randomization and sampling, measures of central tendency and variability, hypothesizing and statistical inference. May be taken for grades or on a pass-no pass basis. Transfer Credit: CSU.

JUSTIFICATION FOR COURSE:

The California Department of Education Standards for K-12 Mathematics require that probability and statistics be integrated into all levels of the K-12 curriculum. This course is part of a two-year program that will transfer to the Integrated Teacher Education Program (ITEP) at CSULB, an elementary teacher credential track.

PREREQUISITES:

- MATH A030: Intermediate Algebra with a minimum grade of C or better
  or
- Appropriate OCC Math Placement Score.

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:
    Mathematics

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00

CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]

GRADING POLICY: Pass/No Pass [X]   Standard Letter [X]   Not Graded [ ]

OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]

TRANSFER STATUS: CSU Transferable[X]   UC/CSU Transferable[ ]   Not Transferable[ ]

BASIC SKILLS STATUS: Yes [ ] No [X]   **LEVELS BELOW TRANSFER:** Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [ ] NUMBER REPEATS:

REQUIRED FOR DEGREE OR CERTIFICATE: No [X] Yes [ ]

GE AND TRANSFER REQUIREMENTS MET:

 IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

           2A: Mathematic

 CSU GE Area B: Scientific Inquiry and Quantitative Reasoning

B4 - Mathematics/Quantitative Thinking
OCC AA Gen Ed
AREA A2: LANGUAGE AND RATIONALITY - Communication and Analytical Thinking
OCC AS Gen Ed
AREA A2 – ENGLISH COMMUNICATION - Communication and Analytical Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Illustrate statistical ideas through graphs, manipulatives, and verbal and written explanations.
2. Apply valid statistical methods to appropriate applications.
3. Work cooperatively, explore, discover, make conjectures and formulate conclusions concerning activity based statistics.

COURSE OBJECTIVES:
1. Identify categorical, binary and continuous data types.
2. Demonstrate proper data collection designs.
3. Analyze data collection designs in order to draw meaningful conclusions from a study.
4. Display single variable data in appropriate graphs.
5. Compare and contrast different data sets.
6. Differentiate between population and sample, and parameter and statistic.
7. Analyze sampling methods for bias.
8. Implement a simple random sampling.
9. Relate properties of randomness to sample size.
10. Calculate mean, median, mode and apply appropriately.
11. Calculate standard deviation and apply appropriately.
12. Use least squares regression as a technique for modeling the relationship between two variables.
13. Analyze appropriate use of a hypothesis test.

COURSE CONTENT:
    LECTURE CONTENT:

      A. Data and variables
          1. In class experiments performed to discover different classifications of data
             a. categorical data
             b. binary data
             c. continuous data
          2. Discovery of the distribution of a variable
          3. Visually display a distribution
             a. bar graph
             b. stemplot
             c. histogram
          4. Verbal description of key features of data
      B. Data Collection
          1. Data collection designs for meaningful conclusions
          2. Popular vs. sample
          3. Parameter vs. statistic
          4. Bias in sampling methods
      C. Measures of Center
          1. Mean, median and mode for summarizing center of a data distribution
          2. Properties of these summary statistics
          3. Misunderstandings of these measures

D. Measure of Spread
1. Five number summary
2. Standard deviation using technology
3. Normal distribution
4. Empirical rule
E. Comparing distributions
1. Side-by-side stemplots
2. Modified box plot
3. Calculation of z-scores to compare distributions of different variables
F. Correlation
1. Graphical display of association
2. Correlation coefficient
3. Least squares linear regression using technology
4. Regression lines to make predictions
5. Distinction between association and causation
G. Introduction to probability
1. Experiments to determine number of possible outcomes
2. Predictions
3. Basic laws of probability
4. Combinations and permutations
H. Hypothesis testing and scientific method
1. Appropriate choice of null hypothesis
2. Level of significance
3. Interpretation
I. Basic logic and set theory
1. Common fallacies
2. Set notation and operations

LABORATORY CONTENT:

See course content

METHODS OF INSTRUCTION:

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

INSTRUCTIONAL TECHNIQUES:

1. Interactive learning

a. Discovery through guided experiments and activities

b. Analysis through interaction with other students, with instructor, and with technology

2. Lecture

3. Demonstration

COURSE ASSIGNMENTS:
Out-of-class Assignments

Written answers are required on test questions, documentation of experiments and detailed conclusions which require analysis and critical thinking. 4 hour.

Writing Assignments

Written answers are required on test questions, documentation of experiments and detailed conclusions which require analysis and critical thinking. 1 hour

Reading Assignments

From assigned text 1 hour.

METHODS OF STUDENT EVALUATION:
Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Projects (ind/group)
Problem Solving Exercises

Demonstration of Critical Thinking:

Grades will be determined by student performance on homework, test, team experiments and creation of a portfolio of experiments.

Required Writing, Problem Solving, Skills Demonstration:

Written answers are required on test questions, documentation of experiments and detailed conclusions which require analysis and critical thinking.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

1. Long, Calvin T. and DeTemple, Duane W. *Mathematical Reasoning for Elementary Teachers*, 6th ed. New York: Addison Wesley, 2011

Other:

1.   Other appropriate textbook as chosen by faculty.

LIBRARY:

Adequate library resources include: Print Materials
Non-Print Materials
Online Materials
Services

Comments:

Attachments:

Attached Files