***Contra Costa College***

***Course Outline***

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **Department & Number:** | MATH 164 | | **Course Title:** | Introduction to Probability and Statistics | | Pre-requisite: | MATH 120 or MATH 125 | | Corequisite: | None | | Advisory: | None | | Entry Skill: | None | | |  |  | | --- | --- | | **Lecture Hours:** | 72.00 | | **Lab Hours:** | 0.00 | | **Composition Hours:** | 0.00 | | **Activity Hours:** | 0.00 | | **Lecture Hours By Arrangement:** | 0.00 | | **Lab Hours By Arrangement:** | 0.00 | | **Units:** | 4.00 - 4.00 | |

**Course/Catalog Description:**  
This course introduces the theory of probability and study of descriptive statistics and statistical inference. Included will be a general study of measure of central tendency and dispersion probability models, random variables, probability distributions, and hypothesis testing. This is designed to serve as an introductory course in statistics for the student in business, psychology, life sciences, and social sciences.

**Course Objectives:**  
At the completion of the course the student will be able to:

1. Distinguish among different scales of measurement and their implications;
2. Interpret data displayed in tables and graphically;
3. Apply concepts of sample space and probability
4. Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
5. Calculate measures of central tendency and variation for a given data set;
6. Calculate the mean and variance of a discrete distribution
7. Calculate probabilities using normal and student’s t-distributions
8. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem;
9. Construct and interpret confidence intervals
10. Determine and interpret levels of statistical significance including p-values
11. Interpret the output of a technology-based statistical analysis
12. Identify the basic concept of hypothesis testing including Type I and II errors
13. Formulate hypothesis tests involving samples from one and two populations;
14. Select the appropriate technique for testing a hypothesis and interpret the result
15. Use linear regression and ANOVA analysis for estimation and inference, and interpret the associated statistics;
16. Use appropriate statistical techniques to analyze and interpret applications based on data from disciplines including business, social sciences, psychology, life science, health science, and education

**Student Learning Outcomes**

1. Students will demonstrate understanding of graphical representations of data
2. Students will be able to calculate and demonstrate understanding of descriptive measures of data
3. Students will be able to apply the rules of probability and use probability distributions to compute and interpret basic probabilities
4. Students will demonstrate expertise in constructing confidence intervals and testing hypotheses

**Course Content**

**Course Content (Lecture):**

Summarizing data graphically and numerically.

Descriptive statistics:  measures of central tendency, variation, relative position, and levels/scales of measurement.

Sample spaces and probability.

Random variables and expected value.

Sampling and sampling distributions.

Discrete distributions - binomial

Continuous distributions - normal

The Central Limit Theorem

Estimation and confidence intervals

Hypothesis testing and inference, including t-tests for one and two populations, and Chi-square test

Correlation and linear regression and analysis of variance (ANOVA)

Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education.

Statistical analysis using technology such as SPSS, EXCEL, Minitab, or graphing calculators.

**Methods Of Instruction:**

1. Demonstration/Modeling

**Other Method:**  
Homework assignments

**Instructional Materials**

**Note:** To be UC/CSU transferable, the text must be dated within the last 7 years OR a statement of justification for a text beyond the last 7 years must be included

**Textbooks**  
Title: Fundamentals of Statistics   
Author: Michael Sullivan, III   
Publisher: Pearson-Prentice Hall   
Edition: 4th Edition   
Date: 2013

**Outside of Class Weekly Assignments**

Title 5, section 55002.5 establishes that a range of 48 -54hours of lecture, study, or lab work is required for one unit of credit. For each hour of lecture, students should be required to spend an additional two hours of study outside of class to earn one unit of credit.

* State Mandates that sample assignments must be included on the Course Outline of Record

|  |  |
| --- | --- |
| **Outside of Class Weekly Assignments** | **Hours Per Week** |
| Weekly Reading *(Include detailed assignment below, if applicable)* | 3 |
| Students are responsible for reading the sections of the textbook corresponding to the week’s lectures. The number of sections covered per week may vary between 2 and 4. For the adopted text listed above, this translates to approximately 20 – 40 pages of reading per week. | |
|  |  |
|  |  |
| Weekly Math *(Include detailed assignment below, if applicable)* | 5 |
| Students are assigned homework exercises by chapter, and are expected to complete the exercises as the material is covered in lecture. A typical assignment includes at least 10 – 15 problems per section of the text; this translates to a minimum of between 20 – 60 homework exercises per week. Note: 5 – 10 hours per week represents the minimum amount of time a student will spend on homework exercises | |
|  |  |
|  |  |

**Student Evaluation**

Computation or non-computational problem solving skills

Objective examinations

**Grading Policy**  
**Letter Grade**  
90% - 100% = A  
80% - 89% = B  
70% - 79% = C  
60% - 69% = D  
Below 59% = F

**Prepared by** Terrill Mead  
**Date** 1/1/0001

Generated on: 5/19/2015 8:29:15 AM