Authorizing Signature:
Date:

LEHIGH CARBON COMMUNITY COLLEGE

COURSE OUTLINE

for

MAT 150 - INTRODUCTION TO PROBABILITY AND STATISTICS

Division/Department:	Mathematics
Submitted by:	Dr. Barbara Kistler, on behalf of the Mathematics Division
Course Origination Date:	1975
Review Date:	July, 2014
Credit Hours:	3
Lecture Hours:	3
Laboratory Hours:	0
Other:	0
Prerequisite(s):	COMPASS (Algebra 66) and two years high school Algebra or MAT 105 (at least a "C")
Corequisite(s):	None

Course Description

For students in programs where measurements and predictions are made. Topics include the following: tabulation of data, measures of central tendency and dispersion, sampling, types of distributions, probability, hypothesis testing and elementary aspects of correlation. A graphing calculator is required.

Course Competencies

Upon completion of this course, a student should be able to:

1. Analyze problems that employ the nature of data and statistics.
2. Summarize, describe, explore and compare data.
3. Apply elementary concepts of probability and counting techniques.
4. Create and interpret probability distributions.
5. Use the normal distribution to find probabilities for discrete and continuous variables.
6. Estimate the value of a parameter by using a confidence interval.

7. Test a hypothesis involving large and small samples for a continuous variable.

8. Develop and analyze a least squares linear regression line and a correlation coefficient.

Course Content

I. Data Collection
   A. Practice of statistics
   B. Observational Studies vs Designed Experiments
   C. Experimental Design
   D. Collecting Sample Data

II. Organizing and Summarizing Data
   A. Organizing Qualitative Data
   B. Organizing Quantitative Data
   C. Graphical Misrepresentations of Data

III. Numerically Summarizing Data
   A. Measures of Central Tendency
   B. Measures of Dispersion
   C. Measures of Central Tendency and Dispersion from Grouped Data
   D. Measures of Position and Outliers
   E. The Five-Number Summary and Boxplots

IV. Describing the Relation between Two Variables
   A. Scatter Diagrams and Correlation
   B. Least-squares Regression
   C. The Coefficient of Determination

V. Probability
   A. Probability Rules
   B. The Addition Rule and Complements
   C. Independence and the Multiplication Rule
   D. Conditional Probability and the General Multiplication Rule
   E. Counting Techniques

VI. Discrete Probability Distributions
   A. Discrete Random Variables
   B. The Binomial Probability Distribution

VII. The Normal Distribution
   A. Properties of the Normal Distribution
   B. Applications of the Normal Distribution
   C. Assessing Normality

VIII. Sampling Distributions
   A. Distribution of the Sample Mean
   B. Distribution of the Sample Proportion

IX. Estimating the Value of a Parameter
   A. Estimating a Population Proportion
   B. Estimating a Population Mean
   C. Choosing a Sample Size

X. Hypothesis Tests Regarding a Parameter
   A. The Language of Hypothesis Testing
   B. Hypothesis Tests for a Population Proportion
   C. Hypothesis Tests for a Population Mean

XI. Inferences on Two Samples
   A. Inferences About Two Population Proportions
   B. Inferences About Two Means: Dependent Samples
   C. Inferences About Two Means: Independent Samples

Grading Procedures

This course is to be taught using active learning strategies. Lectures with questions and answers must be augmented with in-class problem solving, cooperative learning, projects and case studies using real data. The online resource MyLabsPlus is required for all students to augment the textbook explanations, give online homework and quizzes, provide a gradebook and repository for class documents and an e-book. The TI-83/84 graphing calculator will be used to do calculations. Computer spreadsheets may also be used for assignments or case studies. Instructors are encouraged to develop problem sets using textbook problems for each chapter in addition to the online assignments. A pacing guide is available. Student progress can be assessed in a variety of ways using quizzes, exams, completed online exercises, case studies, handouts, problem sets, pre-reads, guided notes, evaluations of videos, outlines, group or individual projects, and a cumulative final exam.

Textbook

Sullivan, Michael III. *Fundamentals of Statistics: Informed Decisions Using Data (4th Edition), Pearson Education, Inc., 2014*

MyLabsPlus (required)

Graphing Calculator (TI-83/84 preferred)

Bibliography

Triola, M.F. *Elementary Statistics Using the TI-83/84 Plus Calculator (3rd Edition)*, Pearson Education, Inc., 2011

DeVeaux, R.D., Velleman, P.F., and Bock, D.E., *Intro Stats (3rd Edition)*, Pearson Education Inc., 2009

Triola, M.F., *Essentials of Statistics, 3rd Edition*, Pearson Education, Inc., 2008

Brase and Brase, *Understanding Basic Statistics, 5th Edition*, Brooks Cole, Cengage Learning, 2010

Johnson, R.and Kuby, P., *STAT,* Brooks Cole, Cengage Learning, 2010

Collegewide Student Learning Competencies for MAT 150

Collegewide Student Learning Competencies	Check if addressed by this course	Describe tools used for measurement
1. Think critically	X	Tests, quizzes, submitted assignments
2. Communicate effectively	X	Tests, quizzes, submitted assignments
3. Apply quantitative reasoning	X	Tests, quizzes, submitted assignments
4. Participate cooperatively within a team		
5. Use current technology effectively	X	Tests, quizzes, submitted assignments
6. Apply information literacy skills		
7. Analyze human diversity		
8. Apply scientific reasoning		
9. Evaluate ethical aspects of decision making		

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Lehigh Carbon Community College

Course Number and Title: MAT 150, Introduction to Probability and Statistics Date: July, 2014

Course-Specific Student Learning Competencies

Outcome	Means for Addressing Outcome	Means for Measuring Outcome
1. Analyze problems that employ the nature of data and statistics.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
2. Summarize, describe, explore and compare data.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
3. Apply elementary concepts of probability and counting techniques.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
4. Create and interpret probability distributions.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
5. Use the normal distribution to find probabilities for discrete and continuous variables.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
6. Estimating the value of a parameter by using a confidence interval.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
7. Test a hypothesis involving large and small samples for a continuous variable.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.
8. Develop a least squares linear regression line and a correlation coefficient.	Lecture, discussion, group projects, and/or out-of-class homework assignments.	Exams, quizzes, assignments and/or projects.

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