
LAKELAND COMMUNITY COLLEGE - COURSE OUTLINE FORM

Course Title changed to "Statistics (A)" effective spring 2024

ORIGINATION DATE:	8/2/99	APPROVAL DATE:	9/28/21
LAST MODIFICATION DATE:	4/14/21	EFFECTIVE TERM/YEAR:	SPRING/ 24

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COURSE ID: MATH1550
COURSE TITLE: Statistics(A)

	LECTURE	LAB	CLINICAL	TOTAL	OBR MIN	OBR MAX
CREDITS:	4.00	0.00	0.00	4.00	4.00	4.00
CONTACT HOURS:	4.00	0.00	0.00	4.00		

PREREQUISITE:

A grade of "SC" or better in MATH 0850 or placement test

COURSE DESCRIPTION:

This course covers introductory topics in statistics, including statistical methods used to gather, analyze, and present data; fundamentals of probability and probability distributions; inferential statistics through estimation and hypothesis testing; correlation and regression; tests for independence; and analysis of variance.

RATIONALE FOR COURSE:

This course introduces elementary topics in statistics. It is required for many baccalaureate programs in business, management, biology, psychology, political science, education, health sciences, and agriculture.

GENERAL COURSE GOALS:

The course will

1. Develop students' ability to gather data and represent the data using graphical and numerical descriptive techniques.
2. Develop students' ability to summarize, analyze, and interpret data.
3. Introduce, develop, and apply probability techniques and demonstrate how these techniques are used in real-life applications.
4. Develop students' ability to form a hypothesis and use statistical methods to test that hypothesis.
5. Develop students' ability to apply the Central Limit Theorem to real-life applications.
6. Further develop the use of technology as a tool for determining solutions to real-life applications.
7. Strengthen students' abilities to critically apply statistical concepts to solve problems and to determine the reasonableness of results.

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to

1. Identify data as to its level and type.
2. Describe the four fundamental types of experimental design.
3. Construct a frequency distribution, given a set of data.
4. Construct histograms, dot plots, frequency polygons, ogives, and stemplots.
5. Compute the measures of centrality and identify their properties.
6. Compute the measures of dispersion and identify their properties and applications.
7. Solve application problems involving combinatorics.
8. Compute probabilities using the addition and multiplications rules.
9. Define sample space and distinguish discrete and continuous random variables.
10. Compute probabilities using discrete probability distribution models.
11. Identify properties and compute probabilities using the normal distribution.
12. Use the Central Limit Theorem to solve sampling distribution applications.
13. Compute confidence intervals of the mean given large and small samples.
14. Complete a hypothesis test on the mean.
15. Perform Chi-square tests for Goodness of Fir and Independence.
16. Compute the correlation coefficient and the regression function for paired data.
17. Write hypotheses for and interpret the result of Analysis of Varieance.

COURSE OUTLINE:

- I. Data and Experimental Design
 - A. Levels of data
 - B. Types of sampling techniques
- II. Describing data
 - A. Frequency distributions
 - B. Graphical descriptions of data
 1. Histogram
 2. Frequency Polygon
 3. Ogive
 - C. Numerical descriptions of data
 1. Measures of centrality
 2. Measures of dispersion
 3. Measures of position
- III. Probability
 - A. Fundamental rules and sample spaces
 - B. Addition and multiplication rules
 - C. Conditional probability
- IV. Probability Distributions
 - A. Discrete distributions
 1. properties and computation
mean and standard deviation

- B. Continuous Models
 - C. Expectation and Variance of a probability distribution model
 - D. Central Limit Theorem and sampling distributions
- V. Estimation
- A. Confidence intervals of large samples ($n > 30$)
 - B. Confidence intervals of small samples via the student's t-distribution
 - C. Sample size determination
- VI. Hypothesis Testing
- A. Fundamentals of hypothesis testing
 - B. Hypothesis test for a proportion
 - C. Completing a hypothesis test of the mean with large samples
 - D. Hypothesis tests of two means
 - 1. independent samples
 - 2. dependent samples
- VII. Regression and Correlation
- A. Constructing scatterplots
 - B. Computing and interpreting the correlation coefficient
 - C. Testing the significance of the correlation coefficient
 - D. Computing the least squares regression on a set of data
 - E. Computing estimates and residuals
 - F. Modeling non-linear data
- VIII. Chi-square Analysis
- A. Goodness of fit
 - B. Tests for independence
- IX. Analysis of Variance

INSTRUCTIONAL PROCEDURES THAT MAY BE UTILIZED:

Lecture and discussion
Videos
CD-ROM activities
Internet activities
Computer-based activities
Group or individual activities
Research projects

GRADING PROCEDURES:

It is recommended that the instructors have at least five evaluative items on which to determine the student's course grade. In general, tests are given covering lecture and homework assignments.

COURSE EVALUATION PROCEDURES:

Student Evaluations
Department Review

LAKELAND LEARNING OUTCOMES

LEARNS ACTIVELY 1. Takes responsibility for his/her own learning. 2. Uses effective learning strategies. 3. Reflects on effectiveness of his/her own learning strategies.	I	R	D
			D
THINKS CRITICALLY 4. Identifies an issue or idea. 5. Explores perspectives relevant to an issue or idea. 6a. Identifies options or positions. 6b. Critiques options or positions. 7. Selects an option or position. 8a. Implements a selected option or position. 8b. Reflects on a selected option or position.	I	R	D
			D
COMMUNICATES CLEARLY 9a. Uses correct spoken English. 9b. Uses correct written English. 10. Conveys a clear purpose. 11. Presents ideas logically. 12a. Comprehends the appropriate form(s) of expression. 12b. Uses the appropriate form(s) of expression. 13. Engages in an exchange of ideas.	I	R	D
			D
			D
			D
USES INFORMATION EFFECTIVELY 14. Develops an effective search strategy. 15a. Uses technology to access information. 15b. Uses technology to manage information. 16. Uses selection criteria to choose appropriate information. 17. Uses information responsibly.	I	R	D
			D
INTERACTS IN DIVERSE ENVIRONMENTS 18a. Demonstrates knowledge of diverse ideas. 18b. Demonstrates knowledge of diverse values. 19. Describes ways in which issues are embedded in relevant contexts. 20a. Collaborates with others. 20b. Collaborates with others in a variety of situations. 21. Acts with respect for others.	I	R	D

Definitions:

Introduces (I)

Students first learn about key ideas, concepts, or skills related to the performance indicator. This usually happens at a general or very basic level, such as learning one idea or concept related to the broader outcome.

Reinforces (R)

Students are given the opportunity to synthesize key ideas of skills related to the performance indicator at increasingly proficient levels.

Demonstrates (D)

Students should demonstrate mastery of the performance indicator with the level of independence expected of a student attaining an associate's degree.