
LAKELAND COMMUNITY COLLEGE – COURSE OUTLINE FORM

*** APPROVED VERSION, EFFECTIVE Fall/ 16

ORIGINATION DATE:	2/20/12	APPROVAL DATE:	11/18/15
LAST MODIFICATION DATE:	12/2/15	EFFECTIVE TERM/YEAR:	FALL/ 16

PRINTED: 8/30/2016**COURSE ID:** MATH1330
COURSE TITLE: Statistics for the Health Sciences

	LECTURE	LAB	CLINICAL	TOTAL	OBR MIN	OBR MAX
CREDITS:	3.00		0.00	3.00	3.00	3.00
CONTACT HOURS:	3.00		0.00	3.00		

PREREQUISITE:

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

COURSE DESCRIPTION:

This course introduces the fundamental topics in statistics as they relate to the health science field. Topics include experimental design, graphical and numerical descriptive statistics, fundamentals of probability, the binomial and normal distributions, sensitivity analysis, hypothesis testing, analysis of variance, regression analysis, chi-square analysis, and nonparametric tests.

RATIONALE FOR COURSE:

This course is designed for health science students who seek a college-level mathematics course.

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 show how those techniques are used in real life applications.
4. Develop students' ability to use statistical methods to test hypotheses.
5. Utilize appropriate technology to determine solutions to real life statistical applications.
6. Strengthen students' abilities to apply statistical concepts to determine the reasonableness of results.
7. Use nonparametric tests to access hypotheses of nominal and ordinal level data.

COURSE OBJECTIVES:**Upon completion of the course, the student should be able to**

1. Differentiate between a population and a sample.

2. Differentiate between a sample and a parameter.
3. Identify discrete and continuous data.
4. Identify categorical and quantitative data.
5. Rank data according to its level.
6. Construct a frequency distribution from a set of data.
7. Construct graphs from a frequency distribution including histograms, frequency polygons, scatterplots and bar graphs.
8. Identify the skewness and kurtosis of a frequency distribution.
9. Compute the mean, median and mode for a set of data.
10. Determine which measure of central tendency is most appropriate for a set of data.
11. Compute the range and the standard deviation for a set of data.
12. Apply the standard deviation to the Empirical Rule and to quantify the skewness for a set of data.
13. Use the Fundamental Rules to compute probabilities.
14. Interpret contingency tables.
15. Solve applications involving the binomial distribution.
16. Solve applications involving the normal distribution.
17. Compute confidence intervals for a mean and for a proportion.
18. Determine the minimum sample size for a given standard deviation and margin of error.
19. Conduct a hypothesis test for a proportion.
20. Conduct a hypothesis test for a proportion for two independent samples.
21. Conduct a hypothesis test for the mean for two dependent samples.
22. Perform One-Way Analysis of Variance for sets of data.
23. Compute and interpret the correlation coefficient for a set of paired data.
24. Determine the linear regression model for a set of paired data and use the model to compute estimates.
25. Determine a logistic regression model for a set of paired data.
26. Compute a Chi-Square Test of independence for a contingency table.
27. Compute the Fisher's Exact Test for a 2 by 2 table of data.
28. Test the hypothesis that three or more independent samples come from populations with the same distribution using the Kruskal-Wallis Test.
29. Compute and interpret McNemar Test for matched pairs.

30. Compare two independent samples using the Wilcoxon Rank Test nonparametric test.
31. Compute odds ratios and assess relative risk.
32. Perform and interpret the results of tests of sensitivity and specificity.

COURSE OUTLINE:

- I. Data and Experimental Design
 - A. Types of data
 - B. Statistics and parameters
 - C. Levels of data
- II. Graphical Descriptive Statistics
 - A. Frequency distributions
 - B. Graphs from frequency distributions
 1. histogram
 2. bar chart
 3. frequency polygon
 3. time sequence graph
 4. scatterplot
 - C. Characteristics of frequency distributions
 1. skewness
 2. kurtosis
- III. Numerical Descriptive Statistics
 - A. Measures of central tendency and their properties
 - B. Measures of variation and their properties
 - C. Applications of numerical descriptive statistics
 1. The Empirical Rule
 2. skewness coefficient
- IV. Introduction to Probability
 - A. Fundamental rules of probability
 - B. Contingency tables
 - C. Binomial distribution
 - D. Normal distribution
- V. Introduction to Inferential Statistics
 - A. Confidence intervals
 1. confidence interval for a proportion
 2. confidence interval for a population mean
 - B. Sample size determination
- VI. Fundamentals of Hypothesis Testing
 - A. Writing hypotheses
 - B. Test type and level of significance
 - C. Critical values
 - D. Type I and type II errors
 - F. Sample tests of the mean and proportion
- VII. Hypothesis Testing
 - A. Test for a proportion
 - B. Test for the difference of two proportions
 - C. Test for the difference of two means
- IX. Analysis of Variance
 - A. One-Way ANOVA
- X. Modeling Data
 - A. Correlation coefficient and linear significance
 - B. Linear regression and estimation

- XI. Chi-Square Analysis
 - A. Chi-Square Test for independence
 - B. Fisher's Exact Test

- XII. Contingency Tables
 - A. Odds ratio and relative risk
 - B. Sensitivity and specificity test

- XIII. Nonparametric Tests
 - A. Kruskal-Wallis Test
 - B. McNemar Test
 - C. Wilcoxon Rank Test

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

	Methods of Assessment								
	1	2	3	4	5	6	7	8	9
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									
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	1	2							
8a. Implements a selected option or position									
8b. Reflects on a selected option or position									
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	1	2							
12b. Uses the appropriate form(s) of expression	1	2							
13. Engages in an exchange of ideas									
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									
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									

Methods of Assessment Codes:		
1. Test/Examination	4. Collaborative Writing	7. Portfolio
2. Homework/Written Assignment	5. Presentation	8. Demonstration of Skills
3. Research Project	6. Lab Project	9. Other (Specify in Grading Procedures)