BROWARD COLLEGE
COURSE OUTLINE

Last Review: 08/01/2010 **Next Review:** 08/01/2015

COURSE TITLE: STATISTICS

COMMON COURSE NUMBER: STA2023

EFFECTIVE TERM:

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(per 16 week term)

Lecture: 48 Lab:

Clinic: Other:

College Placement Testing Requirements

N/A

Prerequisite

STA1001 with a minimum grade of C
or

Corequisite

None

Pre/Corequisite

None

COURSE DESCRIPTION: A first course in statistical methods including such topics as collecting, grouping, and presenting data; measures of central tendency, position, and variation; theoretical distributions; probability; test of hypotheses; estimation of parameters; and regression and correlation. Use of statistical computer software and/or a scientific calculator (capable of performing 2-variable statistics) will be required. Recommendation of the Mathematics Department or at least a grade of C in the prerequisite course is required.

MEETS THE FOLLOWING GENERAL EDUCATION REQUIREMENTS

AA and Baccalaureate Degrees, meets Area(s):	AA/Bac-Area 5: Mathematics
AS Degree, meets Area(s):	AS-Area 5: Mathematics
AAS Degree, meets Area(s):	AAS-Area 4: Mathematics/Science AAS-Area 5: Program-Designated Courses

UNIT TITLES

1. Frequency Tables and Graphs
2. Descriptive Measures
3. Probability
4. Discrete Probability Distributions
5. Normal Distribution and Central Limit Theorem
6. Hypothesis Testing Concepts
7. Hypothesis Testing Applications
8. Estimation of Parameters
9. Linear Correlation and Regression

EVALUATION:

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Portfolio	

Short Essay	
Research Project	
Group Projects	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0
Discussion	
Multiple Choice Tests	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0
Presentations	
Service Learning Projects	
Pop Quizzes	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0
Take Home Tests	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0
Summaries and Critiques	
Reaction Papers	
Surveys	
Performance	
Short Answer Tests	
Class Room Debates and Colloquia	
Blog, Wikis, Webpages	
Other	

GENERAL EDUCATION Competencies and Skills:

1. Read with critical comprehension.	3.3 , 3.4 , 3.5 , 3.6 , 3.7 , 4.4 , 4.5 , 4.6 , 4.7 , 4.8 , 5.2 , 5.3 , 5.6 , 6.1 , 6.3 , 7.0 , 8.0 , 9.3 , 9.4 , 9.5
2. Write clearly and coherently.	5.5 , 6.1 , 6.2 , 6.8 , 7.0
3. Demonstrate literacy as appropriate within a given discipline.	
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts.	1.0 , 2.0 , 3.0 , 4.0 , 5.0 , 6.0 , 7.0 , 8.0 , 9.0
5. Differentiate between ethical and unethical behavior.	
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	3.7 , 5.2 , 5.3 , 5.6 , 7.0 , 8.3 , 8.4 , 8.5 , 8.6 , 9.2 , 9.3 , 9.4 , 9.5
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	
8. Speak and listen effectively.	

UNITS

Unit 1 **Frequency Tables and Graphs**

General Outcome

1.0 **Organize summarize, and illustrate data both in table and in graph form, as well as be able to interpret the meanings of such tables and graphs.**

Specific Learning Outcomes

1.1 **Construct and interpret frequency, relative and cumulative frequency distribution tables.**

1.2 **Construct and interpret stem-and-leaf distributions.**

1.3 **Construct and interpret histograms.**

1.4 **Construct and interpret frequency and relative frequency polygons.** OPTIONAL

1.5 **Construct and interpret ogives.** OPTIONAL

Unit 2 Descriptive Measures

General Outcome

2.0 **Calculate measures of location, central tendency and dispersion, and distinguish between population parameters and sample statistics**

Specific Learning Outcomes

2.1 **Calculate and interpret the mean, median, and mode of a set of numbers.**

2.2 **Calculate and interpret the weighted mean.**

2.3 **Calculate and interpret quartiles and percentiles.**

2.4 **Calculate and interpret box-and-whisker diagrams. OPTIONAL**

2.5 **Calculate and interpret the range, variance, and standard deviation of a set of numbers.**

2.6 **Calculate and interpret the mean, variance, and standard deviation for data from a frequency distribution. OPTIONAL**

2.7 **Determine and interpret the inter-relationships between the mean, median, and mode for skewed and symmetrical distributions.**

2.8 **Determine if a value is unusual (or range of usual values) based upon given or calculated mean and standard deviation.**

2.9 **Calculate and interpret z scores for a normal distribution.**

Unit 3 Probability

General Outcome

3.0 **Apply the definitions and rules of probability to solve problems involving discrete variables.**

Specific Learning Outcomes

3.1 **Apply the classical definition of probability.**

3.2 **Compute probabilities using the fundamental counting principle, permutations, and combinations.**

3.3 **Read applied problems and compute probabilities using the law of complementation.**

3.4 **Read applied problems and compute probabilities using the laws of addition.**

3.5 **Read applied problems and compute probabilities using the laws of multiplication.**

3.6 **Read applied problems and compute conditional probabilities.**

3.7 **Determine whether an event is unusual or not based upon the relevant probability.**

3.8 **Read applied problems and calculate the odds associated with given probabilities.** OPTIONAL

Unit 4 Discrete Probability Distributions

General Outcome

4.0 **Determine the probability distribution for a given experiment and random variable, and calculate its mean and standard deviation.**

Specific Learning Outcomes

4.1 **Differentiate between discrete and continuous random variables.**

4.2 **Decide whether a given distribution satisfies the requirements of a probability distribution.**

4.3 **Calculate the mean (expected value) and standard deviation for a given random variable.**

4.4 **Read applied problems and solve problems involving expected value.**

4.5 **Read applied problems and decide whether a given distribution is binomial.**

4.6 **Read applied problems and calculate the binomial probability using the table or technology.**

4.7 **Read applied problems and calculate the binomial probability using the binomial formula.**

4.8 **Read applied problems and calculate the mean and standard deviation of a binomial distribution.**

Unit 5 Normal Distribution and Central Limit Theorem

General Outcome

5.0 **Solve problems using normal distributions and apply the Central Limit Theorem for sample means.**

Specific Learning Outcomes

5.1 **Identify the properties of the standard and nonstandard normal distributions.**

5.2 **Read applied problems and calculate probabilities using the standard and nonstandard normal distributions.**

5.3 **Read applied problems and calculate values in the standard and nonstandard normal distributions when given specific probabilities.**

5.4 **Determine when the normal distribution can be used to approximate the binomial distribution, and compute the binomial probabilities using the normal approximation.** OPTIONAL

5.5 **Explain the meaning of the Central Limit Theorem and its properties associated with the distribution of sample means.**

5.6 **Read applied problems and calculate probabilities for the distributions of sample means using the Central Limit Theorem.**

Unit 6 Hypothesis Testing Concepts

General Outcome

6.0 **Demonstrate an understanding of the concepts and structure of hypothesis testing and by performing hypothesis tests in various situations.**

Specific Learning Outcomes

6.1 **Read applied problems and formulate the null and alternative hypotheses that would be used to test a claim.**

6.2 **Describe, analyze, and differentiate between Type I and Type II errors.**

6.3 **Read applied problems and decide when to use the t or z statistic, and be able to determine the correct values for these statistics for various hypothesis tests.**

6.4 **Determine the rejection region(s), and construct a sketch of the region(s).**

6.5 **Determine the p-value for a hypothesis test involving the z test statistic.**

6.6 **Calculate the sample z or t test statistic for given sample data.**

6.7 **Decide whether to reject or fail to reject the null hypothesis based upon comparison of the test statistic value and the rejection region, or comparison of the p-value and the level of significance.**

6.8 **Write the hypothesis test conclusion as a meaningful holistic answer to the original problem situation.**

Unit 7 Hypothesis Testing Applications

General Outcome

7.0 **Apply the hypothesis testing concepts to a wide variety of different situations.**

Specific Learning Outcomes

7.1 **Read applied problems and perform a hypothesis test relating to the mean of a population by using the z statistic.**

7.2 **Read applied problems and perform a hypothesis test relating to the mean of a population by using the t statistic.**

7.3 **Read applied problems and perform a hypothesis test relating to the difference of two mean when given two independent samples.**

7.4 **Read applied problems and perform a hypothesis test relating to the difference between mean using paired samples.**

7.5 **Read applied problems and perform a hypothesis test relating to a proportion using one large sample.**

7.6 **Read applied problems and perform a hypothesis test relating to the Chi-square test for the independence of two variables.**

7.7 **The use of a computer or calculator to perform any of the aforementioned hypothesis tests.** OPTIONAL

Unit 8 Estimation of Parameters

General Outcome

8.0 **Determine point and interval estimates for population parameters and to determine sample sizes for the estimation of parameters.**

Specific Learning Outcomes

8.1 **Read applied problems and determine point estimates for the population mean and population proportion.**

8.2 **Read applied problems and determine a point estimate for the population variance.** OPTIONAL

8.3 **Read applied problems and construct and interpret confidence intervals for the population mean and population proportion.**

8.4 **Read applied problems and construct and interpret confidence intervals for the population variance.** OPTIONAL

8.5 **Read applied problems and determine the sample sizes necessary to estimate population means and population proportions within a given error.**

8.6 **Read applied problems and construct the confidence intervals for the difference between mean and difference between proportions.** OPTIONAL

Unit 9 Linear Correlation and Regression

General Outcome

9.0 **Calculate the correlation coefficient, determine if there is a significant linear correlation, and find the line of best fit.**

Specific Learning Outcomes

9.1 **Explain the meaning of and calculate the sample linear correlation coefficient, .**

9.2 **Construct and interpret scatter diagrams.**

9.3 **Read applied problems and conduct a test to determine if there is a significant linear correlation between two variables.**

9.4 **Read applied problems and determine the equation of the regression line.**

9.5 **Determine the best predicted y value for a given x value using the strength of the linear correlation and then either the regression equation or as appropriate.**