MATH 1127 - Introduction to Statistics (version 201003L)

Course Title	Course Development	Learning Support
Introduction to Statistics	Standard	No

Course Description

Emphasizes the concepts and methods fundamental to utilizing and interpreting commonly used statistics. Topics include descriptive statistics, basic probability, discrete and continuous distributions, sampling distributions, hypothesis testing chi square tests, and linear regression.

Pre-requisites

Appropriate algebra placement test score.

Regstr. Co-requisites

Regstr. Co-requisites: None

True Co-requisites

True Co-requisites: None

Course Length

	Lecture Contact Time	Regular Lab Type	Reg. Lab Contact Time	Other Lab Type	Oth. Lab Contact Time	Total Contact Hrs
Contact Hours Per Week	**3 hrs**	**N/A**	**0 hrs**	**N/A**	**0 hrs**	**3 hrs**
Contact Min/Hrs Per Semester	**2250 min**		**0 min**		**0 min**	**45 hrs**

	Lecture Credit Hours	Lab Credit Hours	Total Credit hours	WLU
Semester Credit Hours	**3**	**0**	**3**	**101.25**

Competencies & Outcomes

Order	Description

1 **Data Classification and Collection**

Order	Description	Learning Domain	Level of Learning
1	Define populations, samples, parameters, and statistics.	Cognitive	Knowledge
2	Classify data as quantitative (discrete/continuous) or qualitative.	Cognitive	Knowledge
3	Distinguish types of samples including random and stratified.	Cognitive	Knowledge
4	Distinguish between observational studies and experiments.	Cognitive	Knowledge

2 **Descriptive Statistics and Graphs**

Order	Description	Learning Domain	Level of Learning
1	Create/interpret stem-leaf diagrams, histograms, and box plots.	Cognitive	Knowledge
2	Create relative and cumulative frequency distribution tables.	Cognitive	Application
3	Compute mean, median, mode, and standard deviation.	Cognitive	Application

4	Identify skew and symmetry; investigate the empirical rule.	Cognitive	Application
5	Compare relative position using z-scores, percentiles, quartiles.	Cognitive	Application

3 **Basic Probability**

Order	Description	Learning Domain	Level of Learning
1	Define events, compound events, and complementary events.	Cognitive	Knowledge
2	Compute probabilities for unions, intersections, and complements.	Cognitive	Application
3	Compute conditional probabilities.	Cognitive	Application

4 **Discrete and Continuous Distributions**

Order	Description	Learning Domain	Level of Learning
1	Demonstrate the difference between discrete and continuous random variables.	Cognitive	Application
2	Use probability distributions to compute expected value of a discrete random variable.	Cognitive	Application
3	Compute probabilities for binomial distributed random variables.	Cognitive	Application
4	Compute expected value and variance of a binomial distributed random variable.	Cognitive	Application
5	Compute probabilities for normally distributed random variables.	Cognitive	Application
6	Use the normal distribution to estimate probabilities for binomial distributed random variables.	Cognitive	Application

5 **Sampling Distributions and Estimation**

Order	Description	Learning Domain	Level of Learning
1	Use the Central Limit Theorem to compute probabilities for sample means.	Cognitive	Application
2	Determine confidence intervals for population proportions.	Cognitive	Application
3	Determine confidence intervals for population means (unknown).	Cognitive	Application
4	Determine the sample size required to obtain a desired margin of error.	Cognitive	Application

6 **Hypothesis Testing**

Order	Description	Learning Domain	Level of Learning
1	Interpret and determine the null and alternative hypothesis for testing a claim.	Cognitive	Application
2	Define Type I () error, Type II (ß) error, and the power of a test.	Cognitive	Knowledge
3	Test a hypothesis about a population proportion.	Cognitive	Analysis
4	Test a hypothesis about a population mean(unknown).	Cognitive	Analysis

7 **Linear Regression**

Order	Description	Learning Domain	Level of Learning
1	Use scatter plots to explore positive and negative association between two variable quantities.	Cognitive	Knowledge
2	Use the correlation coefficient to establish a linear relationship between two variables.	Cognitive	Analysis
3	Calculate a linear regression line that best represents the relationship between two variables.	Cognitive	Application
4	Use linear regression to make appropriate predictions.	Cognitive	Application

8 **Chi Square Tests**

Order	Description	Learning Domain	Level of Learning
1	Examine how well a data set fits a claimed distribution.	Cognitive	Analysis
2	Test a contingency table for row independence/association.	Cognitive	Analysis
3	Compare two or more population proportions and test for differences in populations.	Cognitive	Analysis