Syllabus for
MAT 232-Elementary Statistics
3 Credit Hours
Summer 2018

I. COURSE DESCRIPTION

Designed for students of social and health sciences, education, and business. Includes both descriptive and inferential methods and treats the fundamental concepts exemplified by frequency distributions, measures of central tendency, and variability; the interpretation of results; hypothesis testing; regression; analysis of variance; and chi-square. (Does not count towards major or minor in mathematics.) (Business emphasis sections are available for business majors.) Prerequisites: MAT 105 (with a grade of C or higher), 106, 201, NUR 230, SAT math score of at least 520, or ACT math score of at least 22.
Course fee $30.

II. COURSE GOALS

The purpose of this course is to enable the student to be able to do the following:

A. Understand the concept of the whole person—an integrated individual who is intellectually alert and spiritually alive by engaging in a quest for knowledge of his or her relationship to God, other people, and the universe and intelligently fill the many roles encountered in everyday life, such as that of the consumer.

B. Become statistically literate and make statistical decisions in his or her own field of practice, thus enabling him or her to go into everyone's world with healing for the totality of human need.

C. Understand the groundwork and basic tools of statistical analysis, which includes proficiency with graphing calculators and computer software, for pursuing research purposes or for more concentrated study in his or her chosen discipline.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives
As a result of successfully completing this course, the student will be able to do the following:

1. Summarize raw data using graphical methods.
2. Summarize raw data by descriptive statistical methods.
3. Quote the Central Limit Theorem.
4. Apply rules for determining the probabilities of events.
5. Construct and interpret confidence intervals for estimating population values.
6. Make predictions.
7. Complete a test of hypothesis using appropriate formulas and techniques in the following categories:
    a. Value of population proportion
    b. Value of population mean
    c. Difference between means
    d. Analysis of variance
    e. Correlation
    f. Value of population standard deviation

B. Unit Objectives

As a result of successfully completing this unit, the student will be able to do the following:

1. Unit I: The student studies approaches to statistics, random sampling, mode, median, mean, variance, standard deviation, percentiles, percentile ranks, z scores, discrete and continuous variables, histograms, and frequency polygons.
   a. Give examples of descriptive and inferential statistics.
   b. Given a data set, represent it using appropriate graphical tools.
   c. Name and define the measures of central tendency and dispersion.
   d. Given a data set, compute the mode, median, mean, variance, standard deviation, percentile ranks, and z scores.
   e. Calculate the probabilities of simple and compound events.
2. Unit II: The student studies the binomial distribution, the normal distribution, sampling distributions of sums and means, the normal approximation to the binomial, and the sampling distribution of proportions.
   a. State properties of the binomial and normal distributions.
   b. Calculate probabilities using the binomial and normal distributions.
   c. Find areas of sectors under the normal curve.
   d. Find percentiles and percentile ranks in normal distributions and sampling distributions of means, sums, and proportions.
   e. State the Central Limit Theorem.
   f. Compute the probabilities of events occurring in experiments involving discrete sample spaces.
   g. Compute the probabilities of events occurring in binomial experiments using a normal approximation.
3. Unit III: The student studies the hypothesis testing procedure, unbiased point estimation of the population mean, variance, standard deviation, and proportion, and interval estimation.
   a. Find unbiased point estimates for a population mean, variance, standard, and proportion.
   b. Find confidence intervals for population means and proportions.
   c. Calculate the probability of a type-one error occurring for tests involving hypotheses regarding population proportions and means.
   d. Perform tests of hypotheses involving population proportions.
   e. Perform tests of hypotheses involving population means when population standard deviation is known (z tests).
   f. Perform tests of hypotheses involving population means when population standard deviation is unknown (t tests).
   g. Translate real-world theories into hypotheses and test them by appropriate means.
4. Unit IV: The student studies analysis of variance, regression analysis, correlation analysis, and the chi square tests for the value of a population standard deviation.
   a. Perform tests of hypotheses involving the differences among a group of population means (ANOVA).
   b. Draw a scattergram given two scores for each subject in a group and sketch a regression curve.
   c. Develop the equation of the best-fit straight line to a raw score scattergram (prediction formula) and use it to make predictions.
   d. Compute and interpret the correlation coefficient between two variables.

C. Objectives for Students in Teacher Preparation Programs

The Teacher Preparation Program meets the competency-based requirements established

by the Oklahoma Commission on Teacher Preparation. This course meets the following competency: Subject Competency (SC) 8.

SC 8: Is proficient in the use of a variety of instructional strategies to include, but is not limited to, cooperative learning, use of concrete material, use of technology (i.e., calculators and computers), and writing strategies to stimulate and facilitate student learning.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Materials

1. Textbooks
2. Triola, Mario M. *Elementary Statistics.* 13th ed. Reading, MA: Addison-Wesley Longman, 2018. ISBN-13: 9780134462455*MyMathLab* (with eBook). *MyMathLab* is automatically included in the prepackaged deal. Students who choose to buy a used book must buy the code separately.
3. Other
   A calculator with statistical functions is required. The recommended calculators for this course are the Texas Instruments TI-83/84 plus.

B. Optional Materials

1. Textbooks
   None
2. Other
   None

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a ($15) late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
   a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
   b. Failing to meet group assignment or project requirements while claiming to have done so;
   c. Failing to cite sources used in a paper;
   d. Creating results for experiments, observations, interviews, or projects that were not done;
   e. Receiving or giving unauthorized help on assignments.
   By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the

work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students' majors.
   a. submitting an artifact is a zero for that assignment.
   b. by submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Department Policies and Procedures

1. Computer Resources - Each Student who uses the computer is given access to the appropriate computer resources. These limited resources and privileges are given to allow students to perform course assignments. Abuse of these privileges will result in their curtailment. Students should note that the contents of computer directories are subject to review by instructors and the computer administrative staff.
2. Late Exams - Each instructor has his or her own late-exam policy, so an instructor may decide that an exam missed because of an unexcused absence cannot be made up.
3. Unexcused Absences - Any student whose unexcused absences total 33% or more of the total number of class sessions will receive an F for the course grade.
4. Incompletes – As stated in the University catalog, incompletes are granted only for "good cause," such as extended hospitalization, long-term illness, or a death in the family. Students must petition for an incomplete using the form available in the Computing and Mathematics Department. Very few incompletes are granted.

C. Course Policies and Procedures

1. Evaluation Procedures
   a. The grade for this course is based on the total number of points accumulated in each of five categories, weighted as follows:

Homework	300 points
Tests	450 points
Discussions	50 points
WPA Assignment	50 points
Final Exam	200 points
Total	1,050 points

b.Grading scale:
A=90%
B=80%
C=70%
D=60%
F=59% and below

The student who wants to know his or her grade in the course should keep a record at all times of all points earned.

2. Whole Person Assessment Requirements
   a. A WPA artifact is required for this course. For specific requirements, check the WPA handbook at http://wpahandbook.oru.edu. Artifacts not submitted electronically or incorrectly submitted receive a zero for that assignment. (Submission requirements are for students who have had Whole Person Assessment training.)
   b. The WPA assignment counts as 5%of the student's grade.
3. Other Policies and/or Procedures
   a. The only way to learn mathematics is to do mathematics. Therefore, the student must do homework regularly. The individual homework assignments are done utilizing *MyMathLab*, a product of Pearson. The starting and ending dates for each assignment are listed in the online assignment page and the calendar. Failure to complete homework on time may result in a zero for that assignment, which may eventually affect the midterm or final grade. Homework is a minimal course requirement.
   b. Homework is assigned to provide students with the opportunity to learn the material. Therefore, students are encouraged to obtain assistance from anyone if they are having difficulty. The idea is to learn as much statistics as possible from one another. However, *MyMathLab* provides tutorials, practice tests and quizzes, video lectures, online help, and other resources that encourage independent learning. Of course, students are expected to work independently on tests.

VI. COURSE CALENDAR

Lesson	Section	Topic
1		Orientation, Syllabus
	1-1	Stat and Critical Thinking
2	1-2	Types of Data
3	1-3	Collecting Sample Data
4	2-1	Frequency Distributions
5	2-2	Histograms
6	2-3	Statistical Graphics/Critical Thinking-Bad Graphs
7	2-4	Scatterplots, Correlation, and Regression
8	3-1	Measures of Center
9	3-2	Measures of Variation
10-11	3-3	Measures of Relative Standing and Boxplots
12		Review for Test 1
13		Test 1 Chapters 1, 2, 3
14	4.1	Basic Concepts of Probability
15	4.2	Addition Rule, Multiplication Rule
16	5.1	Probability Distributions
17-19	5.2	Binomial Probability Distributions
-	-	-
20	6.1	The Standard Normal Distribution
21	6.2	Applications of Normal Distributions
22	6.4	The Central Limit Theorem
23	6.6	Normal as Approximation to Binomial
24		Review for Test II
25		TestII Chapters 4-6
26	7.1	Estimating a Population Proportion
27	7.2	Estimating a Population Mean
28-29	8.1	Basics of Hypothesis Testing
30	8.2	Testing a Claim about a Proportion
31	8.3	Testing a Claim about a Mean
32		Review for Test III
33		Test III Chapters 7-8
34	10-2, 10-3	Correlation & Regression
35-36		Review for Final Exam
		Final Exam

Please note: The individual homework assignments are done utilizing *MyMathLab,* a product of Pearson.

Course Inventory for ORU's Student Learning Outcomes
MAT 232-Elementary Statistics
Summer 2018

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit				X
1C	Evangelistic capability				X
1D	Ethical behavior				X
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy		X		
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation				X
2E	Intellectual creativity		X		
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills		X		
4B	Interpersonal skills			X	
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship		X		
4E	Leadership capacity				X