

## Southeast Missouri State University

Department of Accounting

Course No.: QM258

Title of Course: Business Statistics II

Revision: Fall 2012

New:   X  

- I. Catalog Description and Credit Hours of Course:  
Test of hypotheses, analysis of variance (ANOVA), simple linear regression, multiple linear regression and nonparametric testing. (3)
- II. Prerequisite(s): QM257 with a minimum grade of 'C'
- III. Purposes or Objective of the Course: to present the basic concepts and applications of hypothesis testing, simple and multiple linear regression, analysis of variance (ANOVA) and nonparametric tests in a non-theoretical format. The application of statistical techniques in the business areas is emphasized with examples considered both from manufacturing & service industries.

Harrison College of Business Assurance of Learning Goals:

- 1. Proficiency in oral/written communication
- 2. Knowledge of the fundamentals of accounting, finance, business law, MIS, marketing, management, and economics
- 3. Application of critical thinking skills to business problems and ethical dilemmas
- 4. Awareness and understanding of other cultures in a global and diverse environment
- 5. Effective use of technology

Upon completion of this course a student should be able to:

- A. Have the ability to make use of statistical techniques and make appropriate inferences in a wide variety of business contexts and also to make seamless transition to subsequent quantitative courses & ultimately to prepare students to use statistical thinking to improve business processes.
  - B. Have a thorough understanding of statistical hypothesis testing, simple and multiple linear regression, analysis of variance (ANOVA) for effective decision making in business.
  - C. Develop the ability to build statistical models with appropriate assumptions to draw inferences about population parameters and to explore the relationships among independent and dependent variables.
  - D. Use appropriate software to solve statistical problems involved with the improvement of business processes.
- IV. Student Learning Outcomes:  
Upon completion of this course students should be able to:
    - A. Perform tests of hypotheses on mean and proportion for two independent populations to facilitate improved decision making;
    - B. Develop and complete the calculations for a two-way ANOVA table for effective decision making;
    - C. Develop and interpret multiple linear regression models using appropriate software to explore relationships among independent and dependent variables in relevant business contexts.
  - V. Expectations of Students:

Students are expected to be fully participating members of this course, including discussions, individual & team projects & other class assignments. Students are also expected to behave in an academically honest manner to preserve the integrity of the classroom & the learning environment.

VI. Course Content or Outline:

A. Concepts of Risk Management	4hrs
1. Review of basic probability concepts	
2. Decision making under uncertainty and risk	
3. Purpose of redundancy in a system and its impact on risk	
4. Fault Tree Analysis	
B. Test of hypothesis – One sample based tests	5 hrs
1. The Null and Alternative hypotheses	
2. Tests of hypotheses for population mean and proportion ( $\sigma$ known case)	
3. Tests of hypotheses for population mean ( $\sigma$ unknown case)	
4. p-value approach	
C. Test of hypothesis – Two sample based tests	6 hrs
1. Comparison of two independent population means ( $\sigma$ known case)	
2. Comparison of two independent population means ( $\sigma$ unknown case)	
3. Comparison of two independent population proportions	
4. F-test for the ratio of two variances	
D. Analysis of Variance (ANOVA)	6 hrs
1. One-Way ANOVA (completely randomized)	
2. The Randomized Block Design	
3. Two way ANOVA (Factorial Design)	
E. Simple Linear Regression	6 hrs
1. The Least-Squares Method	
2. Computing the Y intercept, $b_0$ and the slope $b_1$	
3. Sum of squares, the Coefficient of Determination and the residual analysis	
4. Inferences about the slope	
5. Estimation of mean values and prediction of individual values	
F. Multiple Linear Regression	6 hrs
1. Regression coefficient interpretation	
2. Adjusted $r^2$ and overall F test	
3. Inference on population regression coefficients	
4. Usage of dummy variables	
G. Multiple Linear Regression Model Building	6hrs
1. The Quadratic Regression Model	
2. Using Square-Root and Log transformations	
3. Collinearity	
4. Stepwise Regression and the Best-Subsets approach for Model building	
H. Nonparametric Tests	6hrs
1. Chi-Square Test of Independence	
2. Wilcoxon Rank Sum Test	
3. Kruskal-Wallis Rank test	

VII. Textbook(s) and/or Other Required Materials or Equipment:

Textbook:

Berenson, M.L., Levine, D.M., & Krehbiel, T.C.. (2012). *Basic business statistics: Concepts and Applications*. (12<sup>th</sup> ed.). Prentice Hall.

VIII. Basis for Student Evaluation:

Categories and weights will be determined by the instructor and communicated to students on the class syllabus. The following is offered as a guideline:

- A. regularly scheduled exams (40%)
- B. final exam (20%)
- C. homework & projects (20%)
- D. quizzes, assigned readings, & class participation (20%)