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 4 hrs
   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:

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%)