IS 410 – Standard Course Outline

**COLLEGE OF BUSINESS ADMINISTRATION:**

**INFORMATION SYSTEMS DEPARTMENT**

I. General Information

- Course number: IS 410
- Title: Business Statistics II
- Units: 3
- Prerequisites: IS 310: Business Statistics I - or a upper division course in Probability and Statistics
- Course Coordinator: Khosrow Moshirvaziri
- SCO Prepared by: Khosrow Moshirvaziri, Faculty of CBA
- Date prepared/Revised: September 2012/October 2012

II. Catalog Description

A second course in business statistics with in-depth coverage of topics in sampling distributions, estimation, hypothesis testing, analysis of variance, linear regression and correlation analyses, multiple regression, non-linear regression modeling, non-parametric techniques, one-way and two-way analysis of variance, and time series forecasting, with use of appropriate software and spreadsheet modeling.

III. Curriculum Justification

An important aspect of being a manager is making decisions. The best decisions are those that are made based upon facts. Such decisions require the use of realistic current data that often exhibit variation. In this course, the underlying principle will be the use of advanced statistical analysis of data to make intelligent, data driven, fact-based business decisions. We will specifically work on learning the following:

- How to formulate and test hypotheses using collected data
- How to use regression analysis to understand relationships between random variables, and how to use those relationships to make predictions.
- How to use statistical software to perform calculations, and interpret the computer output.

This course provides a comprehensive understanding of the wide range of analytical tools and theory that can be used for modeling, analyzing, and ultimately designing best practices and processes in the context of Business Decision making.

Upon completion, the student will meet the following three specific CBA learning goals:
Learning Goal #1 – Critical Thinking (& Problem Solving Skills)
Learning Goal #2 – Ethics (Use and Interpretation of Data)
Learning Goal #6 – Quantitative and Technical Skills

IV. Course Objectives and General Learning Goals

- The primary objective of this course is on the study of simple and multiple linear regressions, and an introduction to non-linear regression models. The emphasis will be on concepts, methods, and interpretation of statistical analyses using appropriate software tools and spreadsheet analysis rather than calculations.
- To build upon the statistical foundation established in a first course in Business Statistics and to familiarize student with advanced topics in statistics which are relevant to students’ academic program in the College of Business Administration.
- To develop advanced statistical-analysis skills appropriate for entry-level employment in business fields.
- To expose students to a wide range of statistical applications utilizing these methods and models, and to integrate this material with their introduction to other areas in business and economics.
- To strengthen the student's analytic thinking and background in anticipation of the rest of the degree program in Business curriculum.

V. Student Learning Outcomes

A. **Quantitative and Technical skills.** Students will possess quantitative and technological skills enabling them to analyze, interpret business data, and to perform what-if analysis to improve operational performance.

B. **Critical Thinking.** Students will be able to demonstrate conceptual learning, critical thinking, and problem-solving.

C. **Technology Selection.** Students will be able to select proper technical approach and make use of appropriate technology for presenting an efficient solution.

D. **Additional Tasks.** Students will be proficient in the following tasks:

- Translate a verbal or graphical description of a decision problem into a valid decision model, by identifying variables, resources, and limitations.
- Organizing data and describing patterns and relations between variables verbally, numerically, graphically, and symbolically.
- Express a given decision model in a structured form for use with current software tools being used by the instructor.
- Determining whether enough data or information is given in resolving a problem situation.
- Making reasonable approximations of numerical results.
- Posing questions and making hypothesis about a given situation or a set of data or information.
• Recognize situations where quantitative analysis may provide useful insights and apply appropriate numerical and statistical techniques to reach conclusions.
• Questioning assumptions, detecting fallacies, and evaluating pitfalls associated with a decision.
• Assessing, comparing and selecting among multiple strategies for solving real-world problems and recognizing sources of error.

VI. Outline of Subject Matter

A. Topics on the practical skills necessary to design, implement, and analyze Regression and Spreadsheet modes.

B. Coverage of basic theory underlying what-if analysis in order to enable a critical understanding of regression output in operational environments and build the foundations necessary to quickly adapt to future advances in business decision making.

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<thead>
<tr>
<th>Week #</th>
<th>Tentative topics</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>Quick view of Statistical Concepts: Expectation, Variance, Discrete probability distributions and its applications</td>
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<td>2</td>
<td>Continuous Probability Distributions and its applications Estimation and Confidence Interval methods</td>
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<td>3</td>
<td>Hypothesis Testing for Means and Proportions</td>
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<td>4</td>
<td>Hypothesis Testing for One and Two Population Variances</td>
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<td>5</td>
<td>Least Square Method and Linear Regression model (Exam 1)</td>
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<td>6</td>
<td>Nonparametric Methods: Contingency Tables and Goodness of Fit Tests</td>
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<td>7</td>
<td>Covariance and Correlation analysis</td>
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<td>8</td>
<td>Analysis of Variance, Multiple Comparisons of Means, one-way</td>
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<td>9</td>
<td>Analysis of Variance, Multiple Comparisons of Means, two-way</td>
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<td>10</td>
<td>Regression Analysis: Linear models (Exam 2)</td>
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<td>11</td>
<td>Regression Analysis: Multiple Regression models</td>
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<td>12</td>
<td>Regression Analysis: Non-linear models</td>
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<td>13</td>
<td>Time Series Forecasting</td>
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<td>14</td>
<td>Statistical Quality Control Techniques</td>
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<td>15</td>
<td>Introduction to Simulation</td>
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<td>16</td>
<td>Final Project Presentations and Review (Exam 3)</td>
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VII. Methods of Instruction

The course will be offered though formal lectures and a number of hands-on demonstrations. Plenty opportunity will be provided for classroom discussion, group work, and student presentations. Students are expected to actively engage in participating their reasoning and logical thinking skills through exercises and discussions.

Teaching Method

• Lectures and hands-on demonstrations
• Assignments
• Term Project (individual or team work)

VIII. Extend and Nature of Technology Use

Students’ familiarity and moderate skills in spreadsheet manipulation (Microsoft Excel) will be assumed. Other modeling software packages and any additional Add-ins utilized will be covered. In addition to MS Excel, other software packages such as Simulation and Modeling tools and Risk Solver Platform (RSP) or equivalent may be used.

IX. Textbooks and Manuals

The following books are most popular textbooks used for teaching the subject matter. The instructor may select materials from combination of the list below along with practical cases and application areas.

X. Instructional Policies Requirements

Grading and Plagiarism, withdrawal, absences, and others: University policy will apply.

Grading will be based on performance on exams, assignments, projects, and class participation.

- Exam 1 (25%)
- Exam 2 (25%)
- Exam 3 (25%)
- Assignments (10%)
- Group Projects (10%)
- Active Participation (5%)

XI. Bibliography


XII. Additional Resources

Internet sites:

Software: Risk Solver Platform (RSP)  
http://www.solver.com/xlspremsolvsim.htm
http://www.solver.com/

ExtendSim LT – included with the text by David Krahl and Robin Clark  
http://www.extendsim.com/

The DecisionToolsSuite from Palisade Academic Software  
http://www.palisade.com/risk/