

**MGT 60100**  
**STATISTICS IN BUSINESS**  
**Fall 2007**

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Department of Management  
*Office:* 377 MCOB  
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## **I. COURSE DESCRIPTION**

Introduction to statistical techniques for decision-making. Topics covered include confidence intervals, hypothesis tests, and regression analysis. We will be using statistical software to assist in the data analysis. The emphasis of the course is on formal modeling and the use of data for **managerial decision making** and problem solving. Issues relating to the ethical use of data analytic techniques will also be discussed.

## **II. COURSE OBJECTIVES**

Upon completion of this course you should be able:

1. To use basic techniques of data analysis, and regression modeling;
2. To use software to analyze data for decision making;
3. To analyze a set of data, to reach a conclusion based on these analyses, and to make and defend a recommended course of action;
4. To be well-equipped to take courses in Marketing, Investments, Accounting, Finance, and Operations Management that require proficiency in statistical methods.

## **III. COURSE FORMAT**

Class time will be devoted to lecture and discussion. A part of your final grade is dependent on useful and meaningful class participation. You are encouraged to ask questions. A portion of the class time will also be devoted to familiarize you with the statistical features of Microsoft Excel. All class projects require the use of Excel.

#### **IV. GRADING AND OTHER REQUIREMENTS**

Cases:	20%
Participation/Professionalism:	10%
Problem Sets:	10%
Midterm:	30%
Final:	30%

The midterms and the final exam will be closed-book and closed-notes. All necessary tables will be included in the exams.

The projects will be used to test your ability to apply statistical tools learned in class to real life business situations.

#### **V. TEXTBOOK AND COURSE MATERIALS**

1. Anderson, Sweeney, and Williams, "Essentials of Modern Business Statistics", 3<sup>rd</sup> Edition
2. Lecture Notes will be handed out in class. Data sets and cases will be made available electronically.

#### **VI. EXAMS**

Midterm Exam: September 18, 2007 (Tuesday), 4:00 PM

Final Exam: October 12, 2007 (Friday), 4:00 PM

#### **VII. ACADEMIC HONOR CODE**

All students are expected to abide by the College Honor Code  
Further,

1. Students are expected to work on homework problems individually. The cases are group assignments.
2. Exam is closed-book closed notes, and to be taken on the dates mentioned.

## VIII. DELIVERABLES

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<b>Date Due</b>	<b>Assignment</b>
9/4	Homework 1: Sampling Distribution
9/11	Homework 2: Confidence Intervals
9/18	Homework 3: Hypothesis testing
<b>September 18, (Tuesday)</b>	<b>MIDTERM EXAM (4 PM, Jordan)</b>
9/25	Case 1 - Hoffman Appraisal Co. (Hypothesis Testing)
10/2	Case 2 - Investments Risk Analyses (Simple Regression)
10/9	Case 3 – Service Quality in Automotive Industry (Multiple Regression)
<b>October 12, (Friday)</b>	<b>FINAL EXAM (4 PM)</b>

Note: The above are tentative dates that assignments are due and are intended to give you an idea of the sequence and number of assignments required in this course. Actual due dates may vary and **will be indicated** on the assignment.

## IX. SCHEDULE

<b>Week</b>	<b>Content</b>
Week 1 (8/28, 8/30)	Sampling Distribution Text Chapter: 7
Week 2 (9/4, 9/6)	Confidence Intervals Text Chapter: 8
Week 3 (9/11, 9/13)	Hypothesis testing Text Chapter: 9
Week 4 (9/18, 9/20)	<b>MIDTERM EXAM on 9/18 (4:00 PM, Jordan)</b> Simple Linear Regression Text Chapter: 12
Week 5 (9/25, 9/27)	Simple Linear Regression Text Chapter: 12
Week 6 (10/2, 10/4)	Multiple Linear Regression Text Chapter: 13
Week 7 (10/9)	Multiple Linear Regression Text Chapter: 13
	<b>FINAL EXAM on 10/12 (4 PM)</b>

## **X. COURSE OUTLINE**

### **SAMPLING THEORY**

TOPIC: Sampling Distributions

- Fundamentals of sampling
- Normal and Standard Normal (Z) distributions
- Central Limit Theorem
- Applying sampling distribution theory

### **CONFIDENCE INTERVALS & HYPOTHESIS TESTING**

TOPIC: Estimation of confidence intervals for  $\mu$

- interval estimation of  $\mu$  using z
- interval estimation of  $\mu$  using t-distribution
- Sample size calculation

TOPIC: Hypothesis testing

- Uses of hypothesis tests for decision making
- Types of hypothesis tests
- Interpreting and computing the p-value
- Small sample and large sample hypothesis tests

### **SIMPLE AND MULTIPLE LINEAR REGRESSION ANALYSIS**

- Relationship between two(simple), three or more(multiple) variables
- Model estimation
- Model Inference
  - \* model assumptions
  - \* model validation: Global F-Test, R-square
- Model Checking
  - \* Error Distribution: Zero Mean, Normality, Independence
  - \* heteroscedascity(non-constant variance)
  - \* Multicollinearity
- Model Use
  - \* Description, Estimation and Prediction
- Model Building
  - \* Model comparisons: Adjusted  $R^2$ , MSE, p-values, assumptions
- Using Qualitative Independent Variables
- Caveats (Causality)