

**University of Missouri – St Louis
College of Business Administration**

**5300 Business Statistics
Spring 2017
5:30 – 6:45 Wednesday
003 Express Scripts Hall**

Professor: Keith Womer

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Office Hours: You are welcome at any time but, to be sure I am available, please make an appointment

1. INTRODUCTION

Welcome to BA 5300, Business Statistics. I hope you find the course interesting and useful.

1.1 Procedure

I plan to operate this class as a flipped classroom where presentation of much of the material will be online. To this end please use the code ZH6K8C to join <https://www.khanacademy.org/welcome> with Keith Womer as the coach. There you will find many of the online presentations. Class time will be used primarily to work on applications of the topics to problems from the book and from situations that come up in your work life or my own. We will also use class time to provide support for work on your term project.

1.2 Textbook

The textbook Statistics for Business & Economics, 12th Revised Edition David R. Anderson; Dennis J. Sweeney; Thomas A. Williams; Jeffrey D. Camm; James J. Cochran, South-Western. While not all of the chapters of the book are explicitly

assigned, you will need to use it like a reference book to understand key aspects of topics in some of the chapters. You are expected to read the material in the main text before you come to class. This will enhance your understanding of the material discussed in class.

2. AIMS AND OBJECTIVES

Course Description and Objectives:

5300 Business Statistics (3)

The role of statistical evidence in the formation of inference and in the selection of strategies in solving business problems is developed. Probability and probability distributions are studied as a basis of statistical inference. An introduction to multivariate analysis is provided, which includes analysis of variance and regression methods. Computers are used for extensive analyses of case data.

3. COURSE EXPECTATIONS

3.1 Home Work Assignments

Home work will be assigned frequently but I do not expect to collect or grade it. I will call on students to present their solutions to cases that are assigned. These will often require a session at the computer plus some thinking and writing.

Problem solution is important for achieving a working knowledge of the course material. You will find that working these problems will be crucial for success in quizzes and examinations. If you have trouble with an assignment please ask about it in class.

3.2 Quizzes and examinations

You will have the opportunity to take four quizzes and two examinations. They will require the use of computers and EXCEL. They will be completed in class and they will be designed so that time should not be a problem in their completion. If the schedule of tests clashes with any of your pre-planned activities that cannot be missed, please provide a written explanation and turn it in by the end of the first full week of classes.

3.3 Term Project:

The term project is intended to allow you to demonstrate mastery of statistical techniques for analysis and forecasting in business. The report should include:

- A well thought out hypothesis about the nature of the relationships involved.
- The rationale for the data that is collected.
- A data collection plan.
- Careful analysis of the data.
- Estimation of the relations involved and tests of their significance.
- Careful analysis of the errors to verify the assumptions of the model.
- A forecast or a prediction and a clear indication of its accuracy.
- A clear write up of the results and their significance. The paper must also include complete citations for sources of the ideas and the data.

Please note that I expect you to adhere to the deadlines for various phases of the term project and that a late penalty will be assessed for missed deadlines. See Instructions for the term project below.

4. Grading

Grades will be based on several components:

Examinations (2) 20 points each;

Quizzes (2) 10 points each;

Term project and report 40 points, allocated as in the course schedule below.

Grade breaks for the final weighted scores usually occur near 80% for A-/B+, 70% for B-/C+ and 60% for C-/F, depending on the apparent difficulty of the exams.

5. Accommodations

Students requiring special accommodations should meet with me so that we can discuss how to meet your needs this semester. Prior to our meeting be sure you have met with someone in the campus offices that supports student with disabilities (MSC 144).

6. Honesty Policy

Honesty is expected. Plagiarism is the use of another person's words or ideas without crediting that person. Plagiarism will not be tolerated and will result in a grade of 0 for the assignment and will be subject to appropriate university disciplinary procedures. View this campus policy here:

<http://www.umsl.edu/services/academic/assets/PDFs/Dishonesty-Rev-9-08.pdf>

7. Dates to Remember:

1/21 Special session on Excel at 11 AK in room 104 Express Scripts Hall.

2/13 Monday: Last day to drop a course or withdraw from school without receiving a grade. Last day any student may place a course on satisfactory/Unsatisfactory basis.

3/13 Monday: Last day to drop a course or withdraw from school without instructor approval. EX grade will be assigned.

4/17 Monday: Last day a student may drop a course. Instructor's approval is required. A grade of EX or F will be assigned.

8. Tentative Schedule

I reserve the right to deviate from this schedule if needed. Check these pages frequently to see revisions.

Class	Chapter	Topics
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1/18	1	There will be no class this evening. Please read the chapter and sign up and work through the Khan Academy assignment.
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<https://www.khanacademy.org/math/probability/descriptive-statistics>

1/21		We will have a special optional class this morning at 11 in room 104 Express Scripts Hall. There we will review topics from Excel and discuss term project topics.
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1/25	1, 2, 3	Introduction and Course Overview; Descriptive Statistics
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<https://www.khanacademy.org/math/probability/independent-dependent-probability>
<https://www.khanacademy.org/math/probability/probability-and-combinatorics-topic>

2/1	4.1-4.5, 5.1-5.3	Probability; Bayes' Theorem, Random Variables; Expected Values, Variance
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https://www.khanacademy.org/math/probability/independent-dependent-probability/dependent_probability
https://www.khanacademy.org/math/probability/random-variables-topic/random_variables_prob_dist

2/8 5.4, 5.5, 6.1-6.3 Discrete Distributions; Continuous Distributions
https://www.khanacademy.org/math/probability/random-variables-topic/binomial_distribution
https://www.khanacademy.org/math/probability/statistics-inferential/normal_distribution

2/15 7 **Quiz 1; Sampling and Sampling Distributions, Project description and data collection plan due (4 pts)**
https://www.khanacademy.org/math/probability/statistics-inferential/sampling_distribution/v/central-limit-theorem

2/22 8 Interval Estimation for Population Means and Proportions
<https://www.khanacademy.org/math/probability/statistics-inferential/confidence-intervals/v/confidence-interval-1>
<https://www.khanacademy.org/math/probability/statistics-inferential/margin-of-error/v/mean-and-variance-of-bernoulli-distribution-example>

3/1 9 Hypothesis Testing, Means and Proportions, **Project data due (8 pts)**
<https://www.khanacademy.org/math/probability/statistics-inferential/hypothesis-testing/v/hypothesis-testing-and-p-values>

3/8 10 Statistical Inference about Means and Proportions of Two Populations
<https://www.khanacademy.org/math/probability/statistics-inferential/hypothesis-testing-two-samples/v/variance-of-differences-of-random-variables>

3/15 MIDTERM EXAMINATION

3/22 11, 12 Tests of Population Variances, Goodness of Fit and Independence,
<https://www.khanacademy.org/math/probability/statistics-inferential/chi-square>

4/5 14 Simple? Linear Regression **Project hypotheses and testing plan due (4 pts)**
<https://www.khanacademy.org/math/probability/regression>

4/12 15 **Quiz 2; Multiple Regression**

4/19 15 Multiple Regression Continued, **Project draft due (10 pts)**

4/26 16 Model Building

5/3 13 Experimental Design and ANOVA, **Project report due (14 pts)**
<https://www.khanacademy.org/math/probability/statistics-inferential/anova>

5/10 FINAL EXAMINATION 5:30-7:30

9. INSTRUCTIONS FOR TERM PROJECT

The purpose of this exercise is to give the student experience in using statistical analysis in an actual business setting. The student may use whatever combination of analytical techniques is appropriate for the task (e.g., Chi-Square tests on cross-tabulations, regression modeling to test relationships, analysis of variance. Teams of up to three students may be formed for work on projects that require substantial analysis. A common report for the team may be submitted, but in the case of team projects, a separate memo is required to describe the contributions of each team member to the final product. You should limit the scope of the project to ensure that the work can be completed in about 30 hours of concentrated effort per team member. The project should analyze at least 30 observations on at least two variables.

1. Describe the analytical problem, indicating the question to be answered, statistical measures to be used, and the analytical techniques to be employed. Examples of questions that one might choose to address are:

What will be the future sales or deliveries of a product?

Are product defect rates within quality standards? What causes them to vary?

How do service times compare for different server configurations? What is the form of their distributions?

What will be the market share for a product? To what factors is market share sensitive?

Is employee turnover unusually high? What affects turnover?

How has managed care affected medical expenses for a company?

How do consumer or product characteristics depend on consumers' preferences?

How do attitudes or opinions on an issue vary among population segments?

What should be the market value of a property considering its location and characteristics?

2. Present alternative models or hypotheses that will be tested and the criteria to be used in reaching a conclusion.

3. Collect the data.

4. Perform statistical analyses and tests.

5. Draw conclusions.
6. Write a concise report (perhaps four to eight pages in length) describing your results in plain English (as opposed to statistical jargon).
7. The report must also include complete citations for sources of the ideas and the data.
8. Submit the final report at or before class during the last week of classes