

Course Description:

It has been said that nothing is certain but death and taxes. But everyday we confront the uncertainty in life when we decide which course of action to take. Most economic decisions are about the future and what could be more uncertain or risky than the future? Statistics is the field of study that attempts to understand the nature of the risks we face in order for us to manage them. Statistics is the art and science of the measurement of risk and uncertainty – the limits of our knowledge. It quantifies what we believe we know and the limits to this knowledge. It is about the collection and use of data for the purpose of estimation, hypothesis testing, explanation, and prediction. While we will focus upon the statistical methods that economists use in studying economic problems, we will also examine how statistics is employed in other everyday contexts.

Goals for Course:

1. Be able to appropriately use data for the estimation, testing of hypothesis, interpretation, and prediction,
2. Gain an understanding of the limits of the techniques, and
3. Become a knowledgeable consumer of empirical economic research.

Lecture Attendance Policy:

The Academic Code (reprinted in Du Lac) states 'students are expected to attend classes regularly and punctually.' I have the same expectation as the university in this regard and to hold students accountable I have instituted the following attendance policy. Prior to each lecture students will 'sign in' by checking off their name on the class list. This list will be collected at the beginning of the lecture. Any student found to signing in for other students will be guilty of an honor code violation as well as the student who falsely was 'signed in.'

University approved excuses will be recognized but after one unexcused absence, your semester average grade will be lowered by .10 for every unexcused absence.

Honor Code Policy:

I expect all students to abide by the Notre Dame Honor Code. While I encourage all students to form study groups to promote peer tutoring, I expect all students to fully participate in the course and homework. Specifically, the copying of another student's homework is considered an honor code violation just as copying answers during an exam would be considered an honor code violation. However, seeking help either from me or another student on the homework is encouraged.

Class Website: <http://www.nd.edu/~dbetson/courses/courses.html>

Text:

Business Statistics: A First Course (5th Edition – 4th is also acceptable) by David Levine, Timothy Krehbiel, and Mark Berenson, Prentice Hall.

Computer Requirement:

Computers ease the tedium of doing the calculations that were once done by hand. In the past, I have asked students to use Excel for their work. Excel is not an easy platform to use and is quite limited in capabilities. Now that all majors are required to take an Econometrics course, I have decided to require all students to use Stata for their work. This software was developed by a company that was founded by an economist (Finis Welsh) and consequently caters to econometric methods and is widely used in the profession. Stata is available in the clusters on all Windows machines. Unfortunately for MAC users like myself, the university doesn't provide the software on the MACs in the clusters. If you don't want to use the clusters, you can

purchase a one year license to Small Stata 11 for \$48. It can be purchased either for the MAC or Windows OS. To purchase a license, you need to go to the Stata website

<http://www.stata.com/order/schoollist.html>

to place your order. About 24 hours after you have placed your order, you can pick up your copy on campus (instructions will be given to you where you can pick it up).

If this requirement is a problem for you, please come and see me early in the semester.

Grading:

The overall course grade will reflect the following weighted average

First Midterm (2/10)	25%
Second Midterm (3/24)	25%
Final Exam (5/5)	25%
Homework Problem Sets	15%
Short Research Project	10%

Each component will be assigned a letter grade (for example, an A- will be recorded as 3.67) and then weighted to arrive at course grade.

Math Requirements:

High school algebra and single variable calculus will be sufficient for the level of material presented in this course.

Homework:

I believe that more frequently assigned homework with fewer problems helps you keep up with the material. Every Monday, a problem set will be posted on the class web site that will be due at the beginning of class the next Monday. The problems will reflect the material that we covered during the week's lectures. Answers to the problem sets will be posted on the class web site on the Tuesday after they are due. Problem sets will not be accepted late unless accompanied with a University Approved Excuse.

Short Research Project:

This research project is intended to give you an opportunity to 'test drive' your knowledge of statistics by examining a research question. The project has four distinct parts: deciding upon a topic; a proposal; conducting the research; and the write up.

Deciding Upon a Topic: This may be the hardest part of the exercise. Try to pick a topic with a clear and well-defined hypothesis. You should consider a topic that interests you and while I would prefer it have an economic context, it does not have to have one. Once you have thought of a question you want to examine then turn to the question of how you would gather or acquire data to examine it. One requirement of the project is that you will be collecting the data through a survey that you will design and administer.

Proposal: This is a one page description of your project that contains the following:

1. A statement of the problem or hypothesis you are proposing to examine; and
2. What data will you need and how do you plan to acquire the data for your study.

All proposals must be received by the start of class on February 17.

Final Paper: This should be a concise report that should not exceed 10 pages – 12 point font (double spaced including any charts or tables and references). The report should contain the following four components:

1. Introduction – description of the problem you examined in the research including any hypothesis you tested;
2. The Data – a description of how you collected the data and any limitations the data may impose on your ability to conduct the research; summary statistics and other global statistics
3. Analysis of data and testing of hypothesis

4. Results and Conclusions – What did you find? Are your conclusions limited or biased? Is there anything you would have done differently?

The final report is due at the beginning of class on April 28 (last day of classes). You may turn in your project report early.

Office Hours:

My regular office hours will be from 10:30 to Noon on Tuesday and from 1:30 to 4:30 PM on Thursday. I am not available on Fridays. If you are not available for these times, appointments at other times can be arranged. You should be aware that my other class is at 3 to 4:15 on MW. Prior to the due dates for home works and midterm exams, I will hold extra hours. My office is 404 Decio Hall. You are strongly encouraged to come and talk even if you are not having problems with the material. I can be contacted at 1-5068 (office telephone) or via email at dbetson@nd.edu.

Tentative Class Schedule (changes will be announced)

Week 1: Lecture

1/13 1 Class is cancelled but you should read Chapter 1 of the text
Reading: Chapter 1

Week 2:

1/18 2 Introduction to Stata and the Visual Presentation of Data: Charts and Tables
Reading: Chapter 2 and "Introduction to Stata" (web handout)

1/20 3 Numerical Summary Statistics: Central Tendency, Variation and Shape
Reading: Chapter 3

Week 3:

1/25 4 Probability Theory
Reading: Section 4.1 and 4.2

1/27 5 Bayes' Theorem and Counting Rules
Reading: Sections 4.3 through 4.5

Week 4:

2/1 6 Discrete Probability Distributions
Reading: Chapter 5

2/3 7 Continuous Probability Distributions: Uniform and Normal
Reading: Chapter 6

Week 5:

2/8 8 Review for First Exam

2/10 *First Midterm Exam: Covers Lectures 1 through 8*

Week 6:

2/15 9 Sampling and the Central Limit Theorem
Reading: Sections 7.1 through 7.3

2/17 10 Confidence Intervals (How much confidence can we place in our estimates?)
Reading: Sections 8.1 through 8.3

Week 7:

2/22 11 Sample Design Issues
Reading: Sections 7.4, 7.5, 8.4 and 8.5

2/24 12 Theory of Hypothesis Testing
Reading: Sections 9.1 and 9.2

Week 8:

3/1 13 Tests of means and proportions (Single Sample)
Reading: Sections 9.3 through 9.6

3/3 14 Tests with Two Samples (means and proportions)
Reading: Sections 10.1 through 10.3

SPRING BREAK

Week 9:

3/15 15 F-Tests: equality of variances and ANOVA
Reading: Sections 10.4 and 10.5

3/17 16 Chi-Squared Tests
Reading: Chapter 11

Week 10:

3/22 17 Review for Second Midterm Exam

3/24 *Second Midterm Exam – Covers Lecture 9 through 17*

Week 11:

3/29 18 Least Squares Regression Analysis (Single Explanatory Variable)
Reading: Sections 12.1 through 12.4 and A12.1

3/31 19 Confidence Intervals of estimates and Hypothesis Testing
Reading: Sections 12.7 and 12.8

Week 12:

4/5 Easter Monday – No Class

4/7 20 Multivariate Regression Analysis
Reading: Sections 13.1, 13.2, 13.4, and A13.1

Week 13:

4/12 21 Dummy Variables, Interaction Effects and Testing Model Differences
Reading: Sections 13.5 and 13.6

4/14 22 Model Selection and Review of Assumptions
Reading: Sections 12.5 and 12.9

Week 14:

4/19 23 More Violations of the Assumptions

4/21 24 Logistic Regression
Reading: TBA

Week 15:

4/26 25 Time Series Modeling
Reading: Section 12.6

4/28 26 Review for Final Examination

5/5 FINAL EXAM 4:15 to 6:15 (Wednesday)

This schedule is tentative – there are usually some adjustments to the schedule in the section on regression since this material is new to most students and we might need more time.