COURSE OBJECTIVES

Most public policy and management arguments are predicated on the availability and interpretation of good evidence. It is important, therefore, to have a sound understanding of what constitutes credible evidence in support of a policy argument and a management decision in the public and nonprofit sectors. It is expected that by the end of the course you will be familiar with basic statistical logic and computer based statistical analyses. In the process, you will be well on the way to developing your own framework which you can use to become an informed consumer and initiator of statistical analyses to support policy and management decisions.

COURSE CONTENTS

The course is designed to provide a conceptual and intuitive overview of how to ensure that you have credible data and to make inferences about and from numerical data. We will consider the characteristics of data that can be used to support sound arguments and claims. The most commonly used data analysis tools for public policy analysis and management are statistical techniques. Most of the time in the course will be devoted to understanding the underlying concepts; most computation will be left to computers. The statistical software we will be using is STATA. The course will include the following:

I. Review of data quality and collection, storage and retrieval, and introductory statistics

Initial lectures will be devoted to an overview of the properties of sound data, how one might obtain them and organize them for easy storage and retrieval. The bulk of the remainder of the introduction will
be an overview of introductory statistics. We will discuss data collection using surveys. The focus of the introductory statistics classes will be on data collection and description. Measures of central location and dispersion, and graphical tools will be discussed.

II. Statistical Inference

There are two types of procedures for making statistical inferences to a population from a sample - hypothesis testing and estimation. The role of the formal theory of probability and sampling distributions in statistical inference will be discussed. Included here will be a discussion of different types of error, construction of statistical hypotheses and their tests.

III. Linear Models

The form of the data and their quality determine the type of techniques that can be used to analyze them. An overview of analysis of variance, correlation and ordinary least square regression analysis with emphasis on applications will be provided. Attention will also be drawn to important limitations in the hope of warning against misuses and abuses.

COURSE FORMAT

The class time will be devoted, in the main, to three activities.

• Lectures on and discussion of statistical concepts, tools and arguments;
• Information about the use of STATA and the interpretation of its output;
• General discussions of topics at hand.

In addition to understanding the concepts, statistics also requires a fair amount of drill and practice. To help with the practice, regular homework assignments and in class exercises will be given.

There is considerable redundancy in the way in which the material will be introduced in this class. It is expected that while the main source will be the class discussions you will supplement that with the textbook, the software, fellow students, the teaching assistant, the professor and the internet. Each week, there will be an optional 60 minute review session conducted by the TAs.

Course Materials and Resources

Textbook


• Allison, *Multiple Regression: A Primier*, ISBN 13: 9780761985334 [Note: Students can access textbook information for via the Barnes & Noble bookstore website: www.shopOhioState.com as well as from their BuckeyeLink Student Center. This information is disseminated by B&N to all area bookstores. You may buy from a store of your choice and/or shop for books (always use ISBN# for searches) on line.]

• Supplementary reading materials will be available through Carmen.
Software
- The course uses Small Stata, v. 11, which is available on the computers in the 030 and 040 labs. Small Stata is designed for classes and is limited to 99 variables and 1,200 observations. If you have data with more observations, a full “IC” version of Stata 12 is installed on lab computers 030p07-030p12.
- See Carmen for a Stata getting started guide.
- Printed user manuals are in the 030 lab and a pdf version is installed with each copy of Stata.
- If you would like to purchase Stata for use on your own computer, pricing information is available at http://www.stata.com/order/new/edu/gradplans/gp-campus.html.
- Note: While you are free to use different software (or no software) for the course if you’d prefer, the classroom examples and labs will use Stata. Instructor and TA support will be limited to Stata.

COURSE POLICIES

Requirements and Evaluation
You can earn up to 300 points in the course. The final course grade will be based upon your performance on six homework assignments and three examinations. While you do not receive an explicit grade for class participation, in the past I have found there to be a correlation between class participation and grades. Following are the grade breakdowns for the course:

1. Six Homework Assignments (75 points, 25% of the course grade)
2. Three Exams (3 x 75 = 225 points, 75% of the course grade)

I will rely on the following grading scale:
- 275 – 300 points = A
- 267 – 274 points = A-
- 255 – 266 points = B+
- 245 – 254 points = B
- 237 – 244 points = B-
- 230 – 236 points = C+
- 215 – 229 points = C
- 200 – 214 points = C-
- 191 – 199 points = D+
- 180 – 190 points = D
- 000 – 179 points = E.

Homework Assignments
There will be a total of six homework assignments. While you must submit all assignments, your final grade will be calculated using five highest scores on the homework assignments. **Not submitting all six assignments will result in a loss of 10 points from your final grade.** While you are encouraged to collaborate with other students in the course in solving homework problems, you must turn in your own write ups. Assignments must be submitted when they are due, and late assignments will not be accepted. **All homework assignments must be submitted in hard copies (unless otherwise noted) at the beginning of the class on the day they are due.** If you cannot deliver an assignment on time, you are responsible for submitting assigned material to the TA through some other means (e.g., Page Hall 110B, fax 614-292-2548, or email a Microsoft Word document [no other file types, please] to
Informing me of your intention to be absent does not waive your obligation to submit assigned work. Late work will be accepted with a 2 point penalty for each day that it is late.

For your homework assignments,
- Assignments will be posted on Carmen
- To receive full credit, show all work
- Feel free to use Stata as much as you can/want
- When you use Stata to answer a problem
  - Provide the Stata output as part of what you turn in (a Stata log file will save results)
    - This is “showing your work” for Stata problems
  - Organize (properly label) your output
    - It should be obvious which output goes with which questions: It may be best to incorporate the output by cutting & pasting
    - Minimize the amount of output (and number of pages) if at all possible
  - Make sure that you also directly answer the question
    - E.g., it is not enough to provide the Stata output that shows that a mean is 1234. You should also tell me that the mean is 1234, as is indicated in the Stata output.

Topics and tentative timeline for the individual assignments are:
1. Measures of Central Location, Dispersion, and Graphical Representation of data (Due 9/14)
2. Hypothesis Testing and Estimation (Due 10/05)
3. Analysis of Categorical Data and Simpson’s Paradox (Due 10/21)
4. Conditional Probability and Bayes’ Theorem (Due 10/28)
5. Regression Analysis 1 (Due 11/17)
6. Regression Analysis 2 (Due 12/07)

Examinations
There will be a total of three examinations. Each examination will be 90 minutes long, in-class, open book, and open notes. Barring instances of illness documented by a medical professional, there is no make-up exam for this course. Collaboration on the exam is strictly forbidden and unnecessary given the open book policy. Students are reminded to obey all Ohio State rules regarding academic misconduct.

Academic Integrity
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional
information, see the Code of Student Conduct (http://oaa.osu.edu/coam.html).

**Grade appeals**

Your grades on assignments and exams are intended to reflect the overall quality of work you submit. If you think the grade does not reflect the quality of your performance on the assignment, you may appeal your grade on an assignment. To appeal a grade, submit a clear written explanation describing why you believe the assigned grade is inappropriate within one week after your work is returned. I will carefully consider all such appeals.

**Disability Statement** “Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated. Students should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.”

**COURSE TIMELINE**

**WEEK 1** (Aug. 24)
Discussion of the syllabus, course requirements, and expectations

**WEEK 2** (Aug. 31)
Basics of Data Collection, Sampling, and Research Design

READINGS: Chapters 5 and 6

**WEEK 3** (Sep. 7 and 9)
Measures of central location and variation and graphical presentation of data using STATA).

READINGS: Chapters 1 and 2.

ASSIGNMENT 1: Due on 9/14
**WEEK 4** (Sep. 14 and 16)

Understanding Sampling Distributions: The building blocks of all statistical decision-making and inference will be introduced in this week. **A thorough understanding of this material is essential for a proper understanding of statistics and doing well on the course.**

READINGS: Chapter 9

**WEEK 5** (Sep. 21 and 23)

Estimating Proportions and Means with Confidence

READINGS: Chapters 10 and 11

ASSIGNMENT 2: Due on 10/05 (HW2 needs to be submitted through Carmen)

**WEEK 6** (Sep. 28 and 30)

Testing Hypotheses about Proportions and Means

READINGS: Chapters 12 and 13

**WEEK 7** (Oct. 5 and 7)

Exam 1 Review

Exam 1 on 10/07 (75 minutes)

**WEEK 8** (Oct. 12 and 14)

Chi-square test and Conditional Probability

READINGS: Chapters 4, 15, 16 and supplemental readings in Carmen

ASSIGNMENT 3: Due on 10/21

**WEEK 9** (Oct. 19 and 21)

Conditional Probability and ANOVA

READINGS: 7

ASSIGNMENT 4: Due on 10/28


**WEEK 10** (Oct. 26 and 28)

ANOVA and Correlation Analysis

READINGS: Chapters 3, supplemental readings in Carmen

**WEEK 11** (Nov. 2 and 4)

Exam 2 Review

Exam 2 (11/04)

**WEEK 13** (Nov. 9)

Two Variable Regression Analysis

READINGS: Allison Chapters 1 and 2.

ASSIGNMENT 5: Due 11/17

**WEEK 14** (Nov. 16 and 18)

Multiple Regression Analysis

READINGS: Allison Chapters 6, 7, and 8

**WEEK 15** (Nov. 23)

Multiple Regression Analysis

READINGS: Allison Chapters 6, 7, and 8

ASSIGNMENT 6: Due 12/07

**WEEK 16** (Nov. 30 and Dec 2)

Multiple Regression Analysis

**WEEK 16** (Dec 7)

Exam 3 Review

**WEEK 17** (Dec. 17, 2:00-3:45)

Exam 3