

Ec157.01 Statistics - Honors
MWF 12
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Boston College

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Office Hours: Wednesdays 1:10-1:50 p.m., Mondays and Fridays 11:00-11:50 a.m. and by appointment

TEXT: Carlson, William L. and Betty Thorne, 1997, **Applied Statistical Methods for Business, Economics and the Social Sciences**, Prentice Hall.

Introduction

This course is an introduction to probability theory and statistics for economics and management students. Its objectives are to acquaint the students with : a) statistical inference and the basic concepts used in probability theory and statistics, b) statistical problem solving, and c) the basics of computerized data analysis.

The work in the course consists of lectures, homework problems (based on problems in the text) and some computer assignments. Testing takes the form of three examinations (two during the term and one final examination), 5-7 preannounced quizzes on the homework problems, and at least one graded computer assignment.

Because of the quizzes, the homework problems do not have to be handed in and are not graded (although you are welcome to see me about them during the office hours). A copy of **The Student's Solutions Manual**, available at the Reserves Desk of the O'Neill Library, gives precise answers to all the odd-numbered chapter problems in the textbook. The computer assignments will be discussed in a later handout. These assignments are to be handed in.

Statistics is an inherently cumulative discipline: concepts studied early in the course are still needed in the final sections. This means that you should **not** plan to leave the work until the night before the exam! Doing the homework problems regularly is a good way to make sure that you keep up with the material.

Examination Schedule and Grading Policy

Your course grade depends on two in-term examinations, the final examination, the computer assignments and the quizzes. The in-term examinations are each worth 25%, the final exam 30%, and the computer assignments 10%. The remaining 10% is the total weight of the quizzes.

The dates of the quizzes will be preannounced at least one week in advance. The in-term examination dates are likely to fall on or near the following dates:

First in-term exam: 2/23/2001

Second in-term exam: 4/6/2001

The due dates of the computer assignments will be given at a later date. The final examination will be held as scheduled by the Registrar. Let me know as soon as possible if the midterm dates clash with your general schedules.

Make-up examinations for in-term examinations may be given a) in the case of a temporarily incapacitating illness (a note from a health care practitioner is needed), b) if the examination is missed because of an absence for religious reasons as described in the Undergraduate Catalog, provided that I am informed about this prior to the scheduled examination date. Make-ups may also be arranged for reasons of 'severe life-events'. A letter of support from the relevant dean is required.

All students in this course are expected to follow Boston College's code of academic integrity. In particular, collaboration is not allowed in the examinations, quizzes or graded computer assignments, and all students must be the true authors of any work they submit.

Course Outline and Assigned Readings in the Text

DATE	TOPIC	CHAPTERS TO STUDY
1/17	I. Introduction	1
1/19-2/5	II. Descriptive Statistics	
	A. Describing Data	2.1-2.6
	B. Measures of Central Tendency and Dispersion	2.8-2.11
	C. Describing Relationships Between Variables	3.1-3.3 3.6-3.7
	III. Introduction to Probability Theory	
2/7-2/12	A. Basic Tools	
	Defining the Concepts	4.1-4.2
	Probability Rules	4.3,4.5-4.6
2/14/-2/21	B. Discrete Probability Distributions	
	Discrete Random Variables	5.1-5.4
	The Binomial Distribution	5.5-5.6
	The Poisson Distribution	5.7-5.8

First In-Term Examination 2/23/01 (Chs. 1-5, with some sections excluded as noted above)

2/26-3/2,
3/12

C. Continuous Random Variables and Probability Density

Functions

Introduction 6.1-6.2

The Uniform and Exponential Functions 6.3-6.4

The Normal Distribution and its 6.5-6.7

Applications

Linear Functions of a Random Variable 6.8

Linear Combinations of Random Variables 7.6

IV. Statistical Inference

	A. Sampling and Data Collection	8
	(NOTE: You should read this chapter on your own.)	
3/14-3/16	B. Distribution of Sample Statistics	
	Introduction	9.1-9.2
	Sampling Distribution of \bar{x}	9.3-9.5
	Sampling Distribution of p	9.6
	The Chi-Square Distribution	9.7
	The Student's t Distribution	9.8-9.9
	The F Distribution	9.10
3/19-3/23	C. Estimation; Single Population Case	
	Introduction	10.1-10.2
	Confidence Intervals for μ	10.4-10.5, 10.7
	Confidence Intervals for σ^2	10.6
	Sample Size Determination	10.11
	Confidence Intervals for μ^2	10.12
3/26-3/30	D. Hypothesis Testing; Single Population Case	
	Introduction	11.1-11.2
	Tests about μ	11.3-11.5
	Tests about σ^2	11.6
	Determining Type II Error Probability	11.7
4/2-4/4	E. Estimation and Hypothesis Testing; Comparing Two Populations	
	Statistical Inferences About Two Population Means	10.8-10.9, 11.9.1-2
	Statistical Inferences About Two Population Proportions	10.10, 11.9.3
	Statistical Inferences About Two Population Variances	10.13
	<i>Second In-Term Examination, 4/6/01 (Chs. 6-10, with some sections excluded as noted above)</i>	
4/9-4/11	F. Chi-Square Tests	
	Introduction	12.1
	Goodness-of-Fit	12.2
	Contingency Tables	12.3
4/18-4/27	G. Simple Linear Regression	
	Introduction	14.1
	The Simple Linear Regression	14.2-14.3

Model	14.6	
Estimation, Testing and Prediction	14.4	
Correlation	14.5	
An Application		14.7

4/30 Review

NOTE: The chapter appendices may safely be skimmed.

ASSIGNED PROBLEMS:

You should work on the assigned problems during the same week as the related material is discussed in class. As an example, we plan to discuss Chapter 4 during 2/11-2/16. Thus, you should work on the problems for Ch. 4 from the following list during that same week. In general, try to do the problems in roughly the order they are listed below. Consult the manual (on reserve) for complete answers to odd-numbered chapter problems. You may also see me during my office hours for explanations.

Topic	Chapter	Chapter Problem Numbers
I:Introduction	1	1.2
IIA: Describing Data	2	2.1, 2.32, 2.33
IIB: Central Tendency and Dispersion	2	2.13, 2.15, 2.17, 2.20, 2.49
IIC: Relations between Variables	3	3.1, 3.2, 3.8, 3.20
IIIA:Basic Probability Theory	4	4.1, 4.2, 4.9, 4.17, 4.23, 4.33, 4.38, 4.42, 4.44
IIIB:Discrete Probability Distributions	5	5.3, 5.7, 5.9, 5.14, 5.16, 5.17, 5.21, 5.27, 5.33, 5.36
IIIC: Continuous Random Variables and Probability Density Functions	6-7	6.1, 6.2, 6.4, 6.9, 6.10, 6.15, 6.18, 6.19, 6.21, 6.31, 6.38, 6.39, 7.37, 7.39, 7.41
IVA: Sampling	8	8.1, 8.9, 8.11, 8.13, 9.21
IVB: Distribution of Sample Statistics	9	9.3, 9.5, 9.11, 9.15, 9.19, 9.22, 9.27, 9.33, 9.35, 9.40, 9.43
IVC: Estimation; Single Population Case	10	10.3, 10.13, 10.15, 10.17, 10.19, 10.38, 10.39

IVD: Hypothesis Testing Single Population Case	11	11.1, 11.3, 11.5, 11.9, 11.13, 11.16, 11.7, 11.21
IVE: Comparing Two Populations	10-11	10.21, 10.23, 10.27, 10.31, 10.33, 10.39, 10.41, 11.23, 11.27, 11.29, 11.32
IVF: Chi-Square	12	12.1, 12.3, 12.13, 12.14, 12.15
IVG: Simple Linear Regression	14	14.3, 14.8, 14.9, 14.11, 14.19, 14.21, 14.23
