ECON 3640: PROBABILITY AND STATISTICAL INFECTION FOR ECONOMISTS

Instructor: Justin Polchlopek
Office: BUC 9
Email: justin@economics.utah.edu
(Please don't use WebCT mail)
Location and Time: Library 1725, W 4:35-7:25 PM
Office Hours: W 3:00-4:30 PM
and by appointment
Prerequisites: College Algebra (MATH 1090 preferred),

CATALOG DESCRIPTION

Frequency distributions, moments, sample spaces, random variables, probability distributions,
sampling theory, estimators, confidence intervals, hypothesis testing, two-variable regression
models. Applications of computer software packages.

INSTRUCTOR'S DESCRIPTION

The objects of an economist's interest are real world phenomena. Yet we reason about the
world through abstract models. In order to blend the two, we are in need of a bridge. This
is the role of probability and statistics. Probability and statistics are fundamentally two sides
of the same coin, and they are the means by which we try to rationalize hypotheses with noisy
data that describe actual behavior.

The ability to interact with and draw meaningful conclusions from data are among an economist's
most useful (and marketable) skills; thus, it is hugely important that economics students get
a chance to develop these skills. In this course, development will come as we navigate two
intertwined paths: one dealing with theory and one dealing with practice. The intent is for
the two paths to ultimately blend together into one cohesive picture.

Whereas, once upon a time, statisticians had to do a great deal of work by hand, the nature of
modern statistics is to interact with increasingly large sets of data. We now have easy access
to very powerful computers that can process massive quantities of data in very short order.
Thus, any course in statistics ought to introduce students to the use of computers in dealing
with real data.

But, on the same token, it is ill-advised to attempt to use computer programs without under-
standing what the program is doing. In much the same way that your graphing calculator
probably has many features that you don't know how to use, simply issuing commands to you
favorite statistical package will not get you to the answers you seek if you don't know what is
going on under the hood.

The result is that we will spend our time learning both mathematical theory and how to apply
it through computation.
TEXTBOOK

As most of the books for Business Statistics are quite expensive, I have elected to use a much cheaper book that covers the most important concepts, but may do it with less flair or slightly less clarity than the pricier books. The book is

**Schaum's Outline of Business Statistics, Fourth Edition**
by Leonard Kazmier
Published by McGraw-Hill (2009)
ISBN: 978-0071635271

As this book is perhaps a bit less thorough and lacks in the typical flash that you may be used to seeing from a more standard textbook, you can find many books on statistics at the library to help you if/when the core text is insufficient.

STUDENT RESPONSIBILITIES

The best kind of learning happens when individuals actively engage with the material. Thus, this course will rely on a mixture of book work, quizzes, and projects to induce students to interact with the concepts.

Naturally, students should attend class as frequently as possible. No special accommodations will be made for students who miss class.

Students should also work practice problems from the text. Although there is no assigned homework, working problems is the surest path to good scores on quizzes and the final. These problems will also give students the background knowledge needed to successfully complete the projects. I will attempt to indicate which problems in the text are relevant to each week’s lecture so that students can keep abreast of the material.

Spending an appropriate amount of time on projects is, of course, key. The projects are not so small that they can be done the day before they are due. Some of the projects will require students to learn new skills related to the computing packages as well. I will make some written tutorials available, and I will also be personally available to help with this material.

Finally, I encourage students to study together when they can. The social experience is useful so that you can fill in gaps in each other’s knowledge. Projects will be done in pairs, and while I have no problem with sharing knowledge between groups, sharing solutions crosses the line in terms of proper academic conduct and honesty. Use your best judgement when talking to others about projects.

TOPICS

This course is divided into three 5-week units: probability, statistics, and regression. Each will build on the last, so you must stay on top of the course material.

Table 1 contains the preliminary schedule of topics for the course. This schedule may change somewhat as the term goes on, but I expect that we will cover all the listed topics.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Quiz</th>
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<tbody>
<tr>
<td>Jan 13th</td>
<td>Intro, Events, Sample Spaces, Counting</td>
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<td>Jan 20th</td>
<td>Probability, Independence, Bayes’ Rule</td>
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<td><em>Last Day to Drop—Wed, Jan 20th</em></td>
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<tr>
<td>Jan 27th</td>
<td>Discrete Random Variables and Distributions</td>
<td>✓</td>
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<tr>
<td>Feb 3rd</td>
<td>Continuous Random Variables and Distributions</td>
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<td>Feb 10th</td>
<td>Joint Probability, Correlation, More Independence</td>
<td>✓</td>
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<tr>
<td>Feb 17th</td>
<td>Sampling, Summary Statistics, Visualizing Data</td>
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<td>Feb 24th</td>
<td>Point Estimation</td>
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<tr>
<td>Mar 3rd</td>
<td>Interval Estimation</td>
<td>✓</td>
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<td><em>Last Day to Withdraw—Fri, Mar 5th</em></td>
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<tr>
<td>Mar 10th</td>
<td>Hypothesis Testing</td>
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<td>Mar 17th</td>
<td>ANOVA</td>
<td>✓</td>
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<td>Mar 24th</td>
<td><em>Spring Break (No Class)</em></td>
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<tr>
<td>Mar 31st</td>
<td>Regression, Ordinary Least Squares</td>
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<td>Apr 7th</td>
<td>Econometric Models, Multiple Regression</td>
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<td>Apr 14th</td>
<td>Non-linear Regression, Dummy Variables</td>
<td>✓</td>
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<td>Apr 21st</td>
<td>$\chi^2$ Tests</td>
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<td>Apr 28th</td>
<td>Bayesian Methods, Review</td>
<td>✓</td>
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<tr>
<td>May 5th</td>
<td>Final Exam (6-8pm)</td>
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Table 1: Schedule of Topics
GRADING AND ASSESSMENT

Here is the grading scheme:

- Projects: 40%
- Quizzes: 30%
- Final: 30%

Although examinations are poor at actually testing knowledge, they do force students to stay on track with the material in the class. The projects should be thought of as the main event where the bulk of the genuine learning will take place.

There will be three projects, one for each unit of the course, but each project may not be equally weighted in the final assessment. Projects will be assigned early in each unit, and the due dates will be February 17th, March 19th, and April 30th.

As for the quizzes, there are 6 scheduled, and one drop grade will be allowed. Therefore, each quiz is worth 6 points towards the student's final grade. An initial quiz schedule can be found in table 1. It is your responsibility to be in class in order to keep abreast of the required work and to be aware of any changes to the quiz schedule.

Students will be allowed a single letter-sized sheet of notes during each quiz and the final. Ideally, students will constantly create, refine, and recreate their note-sheets for each quiz, incorporating new information and better understanding, with this refinement process culminating in a sheet that can be used at the final.

Every week throughout the term, bonus questions will be assigned. These bonus assignments will be graded and the scores averaged together to form a replacement quiz grade. This will replace the lowest quiz score that is left standing after the drop.

All graded assignments, excluding bonus questions, are median-curved. That is, I will add however many points I need to raise the median student to 75%. However, even with scaling, the numerical grades may be unreliable. Thus, to set grades for the course I use a qualitative process.

At the end of the term, all students will be organized in a list, sorted by the final numerical score. I will start from the bottom of the list and go up. The cutoff between C- and D+ will be set based on both numerical scores and a subjective assessment of your preparedness, participation, and demonstrated skill. In short: to pass, you must learn the basics to a reasonably level of proficiency and show commitment to the course.

ADA STATEMENT

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.