

## **PPOL 5140: Quantitative Analysis and Empirical Methods (L2)**

Fall 2024

**INSTRUCTOR:** Julien de Troullioud de Lanversin

**EMAIL:** [jdtld@ust.hk](mailto:jdtld@ust.hk)

**CO-INSTRUCTOR:** Yatang Lin

**EMAIL:** [linyt@ust.hk](mailto:linyt@ust.hk)

**TEACHING ASSISTANT:** Dantu Lu

**EMAIL:** [dluag@connect.ust.hk](mailto:dluag@connect.ust.hk)

Monday 4:30-7:20 PM

Room: CYTG009B

### **COURSE DESCRIPTION**

This course introduces students the essential statistic concepts and methods and their applications in public policy analysis, using real-world data and hands-on data manipulation. This course provides an introduction to research design, measurement, sampling, survey research, descriptive statistics, probability theory, and statistical inference, with an emphasis on the ways in which they are applied to practical policy questions. Students will learn valuable tools for describing, analysing, and presenting data and research findings. They will also learn the importance of judgment in drawing inferences from data. The course also provides students with an opportunity to become proficient in the use of computer software that is widely used in analysing quantitative data.

### **GOALS**

After completing this course, you will be able to:

1. Familiarize with main research methods commonly used in public policy research and evaluation;
2. Take a data set and a broad descriptive policy question (such as “How home prices affect Hong Kong’s competitiveness?”), figure out what statistical analysis would be most appropriate to answer the question, conduct such an analysis, and present the findings in a way that is accessible to the public and policymakers;
3. Critically consume policy studies/papers/reports in which statistical analysis is used;
4. Understand basic statistical concepts and methods used in social science research;
5. Become proficient in the use of Stata to analyse real data.
- 6.

## TEXTBOOKS AND MATERIALS

### Required Textbooks

*Research Methods for Public Administrators* by Elizabethann O'Sullivan and Gary Raymond Russel, 6<sup>th</sup> Edition, 2016.

- *Statistical Methods for the Social Sciences* by Alan Agresti, 5<sup>th</sup> Edition, 2017.

### Recommended Textbooks

- *Introduction to the Practice of Statistics* by Moore, McCabe and Craig. W.H. Freeman, 9th Edition, 2017
- *How to Lie with Statistics* by Huff and Geis. W. W. Norton & Company, 1993.
- *The Drunkard's Walk: How Randomness Rules Our Lives* by Leonard Mlodinow, Pantheon Books, 2008.
- *Naked Statistics: Stripping the Dread from the Data* by Charles Wheelan, W.W. Norton & Company, 2013.

### Supplementary Reading Materials

You may be asked to read a few research articles as exemplary applications of the methods covered in the course. They will be posted in the electronic format at the course website.

### Statistical Software Packages

One of the objectives of the course is to help you gain proficiency using statistical software packages. You are required to use Stata to do statistical work in this course.

(Although you may find it useful to learn by yourself other packages such as SAS or SPSS, all the course work must be done using Stata.) Stata14 is installed in PCs at Computer Barn A Teaching Area. You may purchase Stata/IC using student discount at the website: <https://www.stata.com/order/new/edu/gradplans/student-pricing/> (USD 45/89/198 for 6 months/Annual/Perpetual license).

For many of you who have never used Stata before, we will give a lab tutorial to help you get familiar with Stata. It is also easy to train yourself given the rich self-learning resources available. Here are some recommended resources:

Hamilton, Lawrence C. *Statistics with STATA*. Belmont, CA: Duxbury Press.

UCLA Stata Portal (an extensive resource that leads you to many useful links):  
<https://stats.idre.ucla.edu/stata/modules/>

UNC Carolina Population Center  
[http://www.cpc.unc.edu/research/tools/data\\_analysis/statatutorial](http://www.cpc.unc.edu/research/tools/data_analysis/statatutorial)

Princeton Stata Tutorial:  
<http://data.princeton.edu/stata/>

The Stata YouTube Channel:  
<https://www.youtube.com/user/statacorp>

The Stata website: <https://www.stata.com/links/resources-for-learning-stata/>

## ASSESSMENT

The assessments of the course will be composed of four parts.

45% - Problem sets  
15% - Class participation and  
engagement 40% - Final exam

### **Problem sets (45%):** 5 problem sets (9 points each)

Problem sets will give you hands-on experience with the analytic techniques introduced in class. They will be posted on the course website, as will suggested answers.

We will give each problem set at least one week before it is due. You must submit the hand- or type-written solutions to TA before the beginning of the class on the due day. Problem sets not received before the deadline will be considered late. No late submissions will be accepted except in emergencies.

### **Class participation and engagement (15%)**

We strongly believe that student participation can substantially enrich the learning experience for both the students and the instructor. In this spirit, class participation is encouraged. Effective class participation requires that you do the assigned readings before coming to class. You are encouraged to ask questions and to share with the class any relevant insights you may have from your work experience or from previous exposure to these topics. We only ask that the questions and comments be brief and related to the topic at hand. Given that this is a large class, we will sometimes need to defer questions for a future class or office hours.

### **Final exams (40%)**

The final exam will be closed book/notes and a formula sheet will be provided. Calculators may be used, but statistical functions on them may not. Calculators that allow text storage are not permitted.

## TOPICS AND READINGS

### Week 1 (2 September) Course Overview

#### Readings:

Huff and Geis (1993) *How to Lie with Statistics*. W. W. Norton & Company. Chapter 10 How to talk back to a statistic

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 1 What's the Point? Chapter 7: The Importance of Data: "Garbage in, Garbage out"

"Save Dog or Foreigner? Dog, Say Many Americans," HUFFPOST, Aug 19, 2013.

### Week 2 (9 September) Key Concepts in Empirical Methods

#### Readings:

Babbie, Earl (2010). *The Practice of Social Research*, 12th Edition, Cengage Learning, Inc. Chapter 1: Human Inquiry and Science, Chapter 1: Human Inquiry and Science, pp 14-18, and Chapter 4: Research Designs, pp 98-110

O'Sullivan and Rassel, Ch. 4

"Covid-19 is likely to fade away in 2022" Economist, November 8, 2021

"Covid kills, but do we overestimate the risk?" Financial Times, November 21, 2020

"Statistics for Policy Professionals: Things that you need to know." [https://gss.civilservice.gov.uk/wp-content/uploads/2018/05/Guidance-on-Statistics-for-Policy-Professionals-v1.0\\_FINAL.pdf](https://gss.civilservice.gov.uk/wp-content/uploads/2018/05/Guidance-on-Statistics-for-Policy-Professionals-v1.0_FINAL.pdf)

### Week 3 (16 September): Descriptive Statistics

#### Readings: Agresti, Ch 3

Huff and Geis (1993) *How to Lie with Statistics*. W. W. Norton & Company. Chapter 2: The Well-Chosen Average

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 2 Descriptive Statistics; Chapter 3: Deceptive Statistics

"These Two Charts Prove a College Education Just Isn't Worth the Money Anymore," Business Insider, 06 June 2012.

### Week 4 (23 September): Probability and Probability Distribution

Readings: Agresti, Ch 2, 4

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 5: Basic Probability

"Baby Malnutrition and Developmental Delays in Rural China," Rural Education Action Program, Stanford University.

#### Week 5 (30 September) Sampling and Sample Statistics

Readings: Agresti, Ch 4

Huff and Geis (1993) *How to Lie with Statistics*. W. W. Norton & Company. Chapter 1: The Sample with Built-in Bias

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 8: The Central Limit Theorem; Chapter 10: Polling

"How Randomness Rules Our World and Why We Cannot See It" *Scientific American*. Oct 1st, 2008.

"A Weird Way of Thinking Has Prevailed Worldwide," *The New York Times*, 25th Aug 2010.

"As 'Normal' as Rabbits' Weights and Dragons' Wings," *The New York Times*, 23 Sep 2013.

#### Week 6 (7 October) Introduction to Inference (date needs to be confirmed)

Readings: Agresti, Ch 5

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 9: Inference

"Confidence intervals take some of the luck out of exam results" *The Guardian*. 22 Jun 2012.

#### Week 7 (14 October) Test of Significance

Readings:

O'Sullivan and Rassel Ch. 3

Agresti, Ch 6

"With Cancer Screening, Better Safe Than Sorry?" *The New York Times*, 17 Jul 2017.

#### Week 8 (21 October) Comparison of Means of Two Groups (date needs to be

confirmed)

Readings:

O'Sullivan and Rassel Ch. 12

"Which sex is more eco-friendly?" The Washington Post, 26 Nov. 2010.

"Millennials are narcissistic? The evidence is not so simple." BBC, 17 Nov 2017.

Week 9 (28 October) Comparing Several Means: Analysis of Variance (ANOVA)

Readings:

O'Sullivan and Rassel Ch. 13

Agresti, Ch 12

"Public and Scientists' Views on Science and Society," The Pew Research Center, 29 Jan 2015.

Week 10 (4 November) Simple Linear Regression

Readings: Readings:

O'Sullivan and Rassel Ch. 14

"Here's how much money you need to be happy, according to a new analysis by wealth experts," CNBC, 20 Nov 2017

Week 11 (11 November) Multiple Regression (1)

Readings:

O'Sullivan and Rassel

Ch. 14; Agresti, Ch. 11

Charles Wheelan (2013) *Naked Statistics: Stripping the Dread from the Data* by, W.W. Norton & Company. Chapter 11: Regression Analysis; Chapter 12: Problems with Regression

"Money, marriage, kids" The Harvard Gazette, 21 Feb 2013.

"What makes a good life? Lessons from the longest study on happiness," TED Talks by Robert Waldinger,

Week 12 (18 November) Multiple Regression (2)

Readings:

O'Sullivan and Rassel Ch. 14

Agresti, Ch. 11

"Outclassed: how your neighbor's income might affect your happiness," The Guardian, 11 May 2017,

"Unreliable research: Trouble at the lab," The Economist, 18 Oct 2013,

Franco, A., Malhotra, N., & Simonovits, G. (2014). Publication bias in the social sciences: Unlocking the file drawer. *Science*.

Week 13 (25 November) Communicating Findings

Readings: O'Sullivan and Rassel Ch. 15

Huff and Geis (1993) *How to Lie with Statistics*. W. W. Norton & Company. Chapters 3, 5, 6, 7 and 9

National Cancer Institute (2011): *Making Data Talk: a Workbook*. US Department of Health and Human Services.

"Communicating evidence visually," in *The Craft of Research*.

Schwabish, J. A. (2014). An economist's guide to visualizing data. *Journal of Economic Perspectives*, 28(1), 209-34

**PROBLEM SETS TENTATIVE SCHEDULE**

	<b>Distributed</b>	<b>Due</b>
<b>PS1</b>	Week 4	Week 5
<b>PS2</b>	Week 6	Week 7
<b>PS3</b>	Week 8	Week 9
<b>PS4</b>	Week 10	Week 11
<b>PS5</b>	Week 12	Week 13

