SPEA-V 370 (15353) – Research Methods and Statistical Modeling

Spring 2017, PV 277 at 4:00pm–5:15 MW

Course information

Building/Room: SPEA PV 277

Time: 4:00pm-5:15pm on Mondays and Wednesdays

Department: School of Public and Environmental Affairs

Instructor: Mir Usman Ali miruali@indiana.edu

Course Secretary: Mrs. Jennifer Mitchner (SPEA 460) jmitchne@indiana.edu

Web site: https://canvas.iu.edu/

Office Hours: Wednesday 2:30 PM-3:30 PM/Location: PV 412 or by appointment

Pre-requisites: Introductory Statistics K300 or equivalent

Student workload: up to 12 hrs/wk approximately

Required text:

Damodar Gujarati, *Essentials of Econometrics, 4/e,* McGraw-Hill, 2010 (Gujarati)

Recommended texts:

Carter Hill, William Griffiths, George Judge, *Undergraduate Econometrics, 2/e,* John Wiley & sons, 2000 (Hill)

Michael Bailey, *Real Econometrics: The Right Tools to Answer Important Questions, 1/e,* Oxford University Press, 2016 (Bailey)

The course consists of two modules linked with each other: Statistical modeling and Research Methods.

The first module of the course covers basics of the regression analysis and use of statistical software. You will be actively involved with computer exercises in this course using the STATA econometrics program, available in every Student Technology Center (STC) Computer Lab. Throughout the course you will use STATA to implement a series of econometrics exercises designed to provide hands-on experience with various tests and estimation procedures.

The second module of the course is designed to develop each student's ability to design an empirical study and to understand the results of empirical research presented in professional journals. Specific research designs covered in this module include experimental designs, naturalistic observation, participant observation, quasi-experimental designs, and survey research. Research examples will be drawn from the fields of business, public policy, education and others with a special emphasis on social issues (e.g. cultural and gender issues, environmental concerns, global change, and social justice).

Course objectives

The purpose of this course is to introduce students to basics of statistical modeling. At the end of this course, you should be able to:

- Understand and explain statistical methodology behind social science research; and question the assumptions behind statistical information that we encounter in our daily lives (e.g., in news sources, and in academic research)

- Construct valid statistical models, carry out an adequate statistical analysis for basic types of data, interpret and present results

- Use STATA software for estimating and evaluating linear models.

- Recognize and describe some of the misuses of statistical analysis

- Demonstrate your ability as to how to design a valid social study/experiment, with an understanding of the key decision variables involved in designing a study

Class format

Most of the time we will work in two modes – class discussion and group in-class exercises.

If something happens to be unclear, you can interrupt me by just raising your hand to ask a question. Asking questions <u>during class</u> rather than putting them off till later is likely to be of most benefit to you. Class-participation and attendance will also contribute towards your class participation grade.

I would advise you to take lecture notes to note down concepts which are unclear, and ask about later. You are allowed to use lecture notes for the descriptive portion of your exams (35% of your final grade).

However, please remember that lecture notes are not a replacement for reading of the textbook and working on class exercises/homework.

Exercises given at the end of each chapter of the textbook will help you to understand important concepts. Please work through as many problems as you can. This will make your home works and exams much easier.

Computing

The software we will use is STATA and Microsoft EXCEL. I will demonstrate statistical application of this program in lectures. You may use any statistical software you are familiar with: SPSS, STATA, SAS, or R.

For illustrating certain statistical procedures and programming in STATA, I shall provide you with handouts periodically over the semester. The handouts walk you through techniques in a gradual and cumulative fashion. By cumulative, I mean that the techniques that you learn from the earlier material will also be useful in subsequent, more advanced assignments. It is your responsibility to go through them and ask in class/email me if you have any questions about them.

How to succeed in this course

Succeeding in this course requires your commitment to:

- Take personal responsibility for your learning.
- Apply the techniques you have learnt in a well-informed way (asking yourself what you want to do (goals)? Which technique should be used (method)? Why? How to use it?
- Reading the assigned chapters in advance of class
- Reviewing your notes after a given class, questioning me on concepts that you are unsure about in the beginning of the subsequent session
- Not putting off homework until the last 2-3 days
- Making sure that you don't miss class (see important information about attendance below)
- Try to earn as many bonus points as possible.

If you have any difficulties with the material we study, I am your best resource for help. I can also meet you via Skype. However, try not to approach me in the week immediately before an exam, or just 2-3 days before an assignment is due.

The fact that this course is likely not to duplicate any other course that you have taken makes this course challenging. However, the fact that statistical analysis and STATA programming are skills that are valued and can differentiate **you** in the job market (regardless of the field that you ultimately work in) make this course very rewarding.

Attendance

Important! Students can accumulate a maximum of 5 absences in this course. On the 6th absence, the student will be automatically given a failing grade (F) for the entire course, unless you have a valid, documented reason for not attending a particular session/series of sessions.

Components of Grade

There will no curve on any of the components of, or the final grade.

Assignments (15% of final grade): Roughly every 1-2 weeks you will have to complete an assignment, and you will get around 10 days to complete the assignment. Students shall do assignments in groups of 4-5 students and turn in a joint submission on Canvas. Students will also have the opportunity to rate their peers' participation, which I will take into account in determining the final grade for each group member on the assignment. I will set up the group membership randomly in Canvas, which you can find under People>Groups.

Your homework assignments ought to be typed (or written clearly) and submitted via Canvas. Every day of delay in submission will reduce your score progressively: 10% deduction per day. Submitting an assignment 3 days early will qualify for a 10% bonus. You can potentially earn more than 100% if you claim the bonus.

Things happen. Everyone is allowed to miss ONE assignment because of circumstances.

Exams (35% of final grade): Two exams will be given during the semester. Makeup exams will not be taken except in extraordinary cases (e.g., severe illness, documented by a physician's note; family emergency). In these cases students are expected to contact the instructor **well before** the scheduled exam time to arrange a makeup time.

Some additional instructions:

- If you would like to take the final exam earlier than the scheduled date (May 1, 2017), then please let me know as close to the beginning of the semester as possible, so that I can schedule an alternate time and location.

- Please let me know at least a couple of weeks in advance if you would like to have a review session before the exam.

- You are not allowed to use the textbook, past pop-quizzes, sample exams or their solutions during exams.

Short 5-10 min pop-quizzes (20% of final grade): Pop quizzes are a quick indicator/diagnostic of how well you are doing in this class at a given time. Pop-quizzes will usually be on what we have already discussed in the past few sessions (and that you have not been tested on) or on material that we are going to discuss on that day. Poor performance on a pop-quiz should alert you to seek help from the instructor or your colleagues, as

soon as possible. Bonus questions on a quiz can enable you to earn more than 100% points on a particular quiz. Of the total quizzes that we have during the semester, the one with the lowest score will be dropped.

Pop-quizzes may either be in class or online on Canvas. Therefore, you are expected to check your Canvas notifications regularly, so that you do not miss online quiz announcements.

Readings. In the first part of the course we will heavily use the following text: Damodar Gujarati, *Essentials of Econometrics, 4/e,* McGraw-Hill, 2010 (referred to as **GUJARATI** in the reading list). Since we do not cover the whole textbook, I will post required readings on Canvas. I have also put a copy on reserve at the SPEA library for V-370. However, I encourage you to get this textbook, as flipping back and forth over photocopied pages can be tedious.

For the "Research Methods" section I will post readings from Phillip H. Pollock III, "*The Essentials of Political Analysis*" at Canvas.

Class Participation: (10% of final grade): Class participation grade consists of **in-class participation (5%) and online participation (5%)** on the Canvas discussion board. This grade depends on the quality of questions that you raise, responses to questions asked by the instructor/other students, and/or your feedback to colleagues during their presentations.

> **In-Class Participation:** In-class participation will be graded on a weekly basis with 1 point for participation each week. Each time you participate in a given week, you will receive half a point. Therefore, students can potentially score more than 100% per week for actively participating. Be sure to take advantage of this opportunity for bonus points.

> **Online Participation:** Online participation on the Canvas discussion board will also be graded on a cumulative/semester-long basis, with students who participate 16 or more times getting the whole 5%. You will score proportionally less if you participate less than 16 times.

Technical Review Report (5%+15% of final grade): This assignment has two components: a draft technical report (5% of overall grade), and the final report (15% of overall grade). For these reports (in which you will work on the same groups as for assignments, with a similar peer review process) you will critically assess an instructor-assigned, published research paper, especially regarding the econometric techniques used. The overall purpose of the assignment is to introduce you to basic economic/policy research, familiarize you with the presentation of statistical analysis as it is performed in actual research papers, and enhance critical thinking skills. The idea is to help you take the first step in critically assessing the claims/arguments made in published research.

I am available if you specifically need advice/guidance on the technical report. Draft technical reports are due by **11:59 PM, Monday April 24, 2017** **on Canvas**. I will review your report, and return them to you with feedback on areas of improvement. You then have to incorporate that feedback and turn in the final report by **11:59 PM, Friday May 5, 2017** **on Canvas**.

Grading Policy Your final grade will be determined based on a combination of your performance on assignments, quizzes, class participation, research paper and presentations:

- **Assignments:** 15%

- **2 Exams**: 35% (15% Midterm + 20% Final)

- **Short 5-10 min pop-quizzes:** 20%

- **In-class and online participation:** 10%

- **Technical Review Report**: 20%

  I will use the following grade ranges.

  A+: >97
  A: >93-97
  A-: >90-93
  B+: >87-90
  B: >83-87
  B-: >80-83
  C+: >77-80
  C: >74-77
  C-: >71-74
  D+: >67-71
  D: 63-67

  Your scores and grades will be posted Canvas.

  Incomplete. Please, don't do it. The University policy on grades of "*incomplete*" includes the following statement:

  "CIRCUMSTANCES PERMITTING INCOMPLETES

  The grade of Incomplete used on the final grade reports indicates that the work done by the end of the semester is satisfactory but has not been completed due to the factors like substantial illness, family emergencies, and like that. Poor preparation, unwise planning or an overloaded schedule will not be considered as "hardship" factors".

  Any grade including incompletes granted in this course will be strictly based on the University policy.

COURSE ETHICS

Cheating on assignments (from any source e.g., solution manual or other groups' work) is easily detected and will warrant zero points on the entire assignment (and zero points for the other group as well).

Please read carefully the Student Handbook guidelines. Understand what plagiarism and cheating are. Academic dishonesty will not be tolerated. You may verbally discuss a problem in a group. You may help your classmate with a computer program, and so on. What you may not is: you may not copy other student's work! You may not allow others to copy your work! You may not share your computer files or data. Your assignment you turn in must be your own product!

According to university policy - **if it is determined that a student has cheated in the course, then that student will be dropped out from the course and receive a failing course grade. It is also required, such incidents to report to SPEA's Undergraduate Program Director and to the Dean of Students.**

Emergency Classroom Procedures

At any of our campuses at Indiana University we may face an emergency situation, and knowing what to do can make all the difference -- not only for ourselves but for our visitors and guests. Please take the time to visit the following links for procedures to follow in a variety of emergencies (e.g., active shooter, bomb threats, fire and building evacuation, tornadoes, and severe weather etc.).

https://protect.iu.edu/emergency-planning/procedures/index.html

Useful Resources for Learning About Basic Statistical Concepts and STATA

1. Keynes Academy YouTube Channel https://www.youtube.com/user/KeynesAcademy/playlists

    a. Check out the Econometrics Playlist (Has only three brief videos)

2. Econometrics Academy YouTube Channel

    a. Linear Regression Example https://www.youtube.com/watch?v=ccWkOUtiyFQ

    b. Linear Regression in STATA https://www.youtube.com/watch?v=F6m8I1RBWbg

3. Institute for Digital Research and Education at UCLA

    a. Introduction to various simple and useful commands in STATA (Version 13/14)
       http://www.ats.ucla.edu/stat/stata/notes/default13.htm

    b. Similar introduction as above with movies (but released at time of Version
       http://www.ats.ucla.edu/stat/stata/notes/default.htm

Resources to Stay Up-To-Date on Policy Issues (all podcasts are available on Android apps as well as iTunes)

1. Freakonomics Podcast
   Podcast: https://itunes.apple.com/us/podcast/freakonomics-radio/id354668519

2. More or Less: Behind the Stats
   Podcast: http://www.bbc.co.uk/programmes/p02nrss1/episodes/downloads

3. Democracy Now
    YouTube: https://www.youtube.com/user/democracynow/videos
    Podcast: https://itunes.apple.com/us/podcast?id=73802554

4. The Real News
    YouTube: https://www.youtube.com/user/TheRealNews

5. EconTalk
    https://itunes.apple.com/us/podcast/econtalk/id135066958

6. Maxwell School of Syracuse University
    YouTube: https://www.youtube.com/user/maxwellschool/videos

Tentative Class Schedule and Readings (SUBJECT TO CHANGE BY INSTRUCTOR!)

Readings:

GUJARATI: Damodar Gujarati, Essentials of Econometrics, 4/e, McGraw-Hill, 2010.

1. Statistical Modeling Section

Week	Date	Session #	Location	Topic
1	Jan 9	1	PV 277	GUJARATI: Ch. 1, "The Nature and Scope of Econometrics"
	Jan 11	2	PV 277	GUJARATI: Appendix A: Review of Statistics: Probability and Probability Distributions (pages 405-422) Appendix B: Characteristics of Probability Distributions (pages 434-447 & pages 452-455)

Week	Date	Session #	Location	Topic
2	Jan 16		PV 277	MLR Jr. Day – No Class
	Jan 18	3	PV 277	GUJARATI: Appendix C: Some Important Probability Distributions (pages 461-477) Appendix D: Statistical Inference: Estimation and Hypothesis Testing (pages 487-507)

Week	Date	Session #	Location	Topic
3	Jan 23	4	PV 277	GUJARATI: Appendix D: Statistical Inference: Estimation and Hypothesis Testing (pages 487-507)
	Jan 25	5	PV 277	GUJARATI: Ch. 2. Basic Ideas of Linear Regression: Two-Variable Model

Week	Date	Session #	Location	Topic
4	Jan 30	6	PV 277	GUJARATI: Ch. 2. Basic Ideas of Linear Regression: Two-Variable Model (contd.)
	Feb 1	7	PV 277	GUJARATI: Ch. 3: The Two-Variable Model: Hypothesis Testing

Week	Date	Session #	Location	Topic
5	Feb 6	8	PV 277	GUJARATI: Ch. 3: The Two-Variable Model: Hypothesis Testing (contd.)
	Feb 8	9	PV 277	GUJARATI: Ch. 3: The Two-Variable Model: Hypothesis Testing (contd.) Ch. 4: Multiple Regression: Estimation and Hypothesis Testing

Week	Date	Session #	Location	Topic
6	Feb 13	10	PV 277	GUJARATI: Ch. 4: Multiple Regression: Estimation and Hypothesis Testing (contd.)
	Feb 15	11	PV 277	GUJARATI: Ch. 5: Functional Forms of Regression Models

Week	Date	Session #	Location	Topic
7	Feb 20	12	PV 277	GUJARATI: Ch. 5: Functional Forms of Regression Models (contd.)
	Feb 22	13	PV 277	Exam 1

Week	Date	Session #	Location	Topic
8	Feb 27	14	PV 277	GUJARATI: Ch.6: Dummy Variable Regression Models
	Mar 1	15	PV 277	GUJARATI: Ch.6: Dummy Variable Regression Models (contd.)

Week	Date	Session #	Location	Topic
9	Mar 6	16	PV 277	GUJARATI: Ch.7: Model Selection: Criteria and Tests
	Mar 8	17	PV 277	GUJARATI: Ch.7: Model Selection: Criteria and Tests (contd.)

Week	Date	Session #	Location	Topic
10	Mar 13	18	PV 277	Spring Break – No classes
	Mar 15	19	PV 277	

Week	Date	Session #	Location	Topic
11	Mar 20	20	PV 277	GUJARATI: Ch. 8: Multicollinearity
	Mar 22	21	PV 277	GUJARATI: Ch. 8: Multicollinearity

Week	Date	Session #	Location	Topic
12	Mar 27	22	PV 277	GUJARATI: Ch. 9: Heteroscedasticity (contd.)
	Mar 29	23	PV 277	GUJARATI: Ch. 9: Heteroscedasticity (contd.)

Week	Date	Session #	Location	Topic
13	Apr 3	24	PV 277	GUJARATI: Ch. 10: Autocorrelation
	Apr 5	25	PV 277	GUJARATI: Ch. 10: Autocorrelation (contd.)

Week	Date	Session #	Location	Topic
14	Apr 10	26	PV 277	II. Research Methods Section (Tentative) Readings on Canvas: 1. The Definition and Measurement of Concepts; Measuring and Describing Variables 2. Proposing Explanations, Framing Hypotheses, and Making Comparisons
	Apr 12	27	PV 277	3. Making Controlled Comparison

Week	Date	Session #	Location	Topic
15	Apr 17	26	PV 277	II. Research Methods Section (Tentative) Readings on Canvas: 1. Research design and the logic of control. 2. Survey design
	Apr 19	27	PV 277	

Week	Date	Session #	Location	Topic
16	Apr 24	28	PV 277	Technical Report Presentation - Day 1 (Presentations to be in random order)
	Apr 26	29	PV 277	Technical Report Presentation - Day 2 (Presentations to be in random order)

<u>Final Exam</u>

Exam 3 (Final) – May 1, 2017 2:45 PM-4:45 PM in PV 277

Draft Technical Reports due on Monday, April 24, 2017 at 11:59 PM on Canvas

Final Technical Reports due on Friday, May 5, 2017 at 11:59 PM on Canvas