

# GV300-6-FY

## Advanced Quantitative Political Analysis

### 2020 – 2021

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**Lecturer and Module Supervisor**

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**Module Administrator**

Sallyann West, [govquery@essex.ac.uk](mailto:govquery@essex.ac.uk)

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Module available for Study Abroad students: Yes (FY only)  No

**LISTEN AGAIN:** Provided

**ASSESSMENT:** This module is assessed by 60% coursework, 40% exam

***INSTANT DEADLINE CHECKER***

Assignment Title	Due Date	Coursework Weighting	Feedback Due
Problem Sets	Every two weeks at the evening before the day of lecture at 18:00	100% of coursework mark	Three weeks after assignment is handed in

**TOP READS**

Jeff Gill, Essential Mathematics for Political and Social Research, Cambridge University Press, 2006

Jeffrey Wooldridge, Introductory Econometrics: A modern approach 5th Edition, Cengage Learning, 2012

Joshua Angrist and Joern-Steffen Pischke, Mastering'metrics: The path from cause to effect, Princeton University Press, 2014

Rebecca Morton and Kenneth Williams, Experimental Political Science and the Study of Causality, Cambridge University Press, 2010

**MODULE DESCRIPTION**

This module examines quantitative methods in political research and shows how different methods can be used to answer substantive questions about political phenomena. After initially reviewing the basics of probability theory for statistical inference, the rest of the first term of this module focuses particularly on regression analysis and we investigate potential

problems of the classical regression model and introduce extensions.

In the second term, we pay specific attention to threats to causal inference and introduce statistical tools and experimental methods to overcome them. We focus on how to use these methods to answer substantive questions about politics.

### **Aims**

1. understand the statistical ideas underpinning quantitative methods in political science research.
2. understand and evaluate the core assumptions of the classical regression model.
3. understand the consequences for statistical inference when these assumptions are violated and to correct these violations in order to make valid inferences.
4. explore issues of causal inference.
5. understand how research design allows causal questions to be answered.
6. employ a variety of functionality of standard statistical software (R) in their research.

### **Outcomes**

1. Advanced knowledge of descriptive and inferential statistics.
2. Knowledge required to understand the assumptions underlying the most common statistical models and their advanced extensions used in social sciences.
3. Understanding how statistical techniques can be used to answer substantive research questions in political science.
4. Foundations for undertaking work involving the statistical modelling of political phenomena and the study of causal mechanism thereof.
5. Key skills required for research employed in various professional settings.

## **MODULE STRUCTURE AND TEACHING**

### **Prerequisites**

This module assumes that students are familiar with the material from GV207. Students who did not take GV207 or who are not comfortable with their command of the material should talk to me before the deadline to switch modules.

### **Lectures and Classes**

The module will be delivered by a (i) weekly pre-recorded lecture and (ii) a weekly interactive lecture. The pre-recorded lecture will consist of one or more items of prepared content that students can access electronically and must study before the interactive lecture. The interactive lecture will consist of one 50-minute lecture in which students can ask questions about, and discuss various aspects of the prepared content with the module supervisor. Additionally, the interactive lecture will cover programming in R relevant for the problem sets due next.

### **Difficulties**

If you have any difficulties with the module the person to approach in the first instance is me or the module administrator Sallyann West. Please keep to administration office hours, which are posted on the door of the office and on the lists in the Government corridors. You can further approach Dr. Crowley or the mathematics help desk for assistance on writing or

mathematics respectively.

### **Assessment and workload**

Assessment is based on 60% coursework and 40% final exam. Students are expected to read for each class and to work any extra exercises needed to cement their understanding. Students averaging more than eight hours of work per week outside of class should talk to me.

### **Final Exam**

The exam will take place during weeks 33-36. It will be based on lectures, interactive lectures, and the reading assigned for the module. The exam is take-home, open book, and due 24h after it was published online.

### **Group work**

While plagiarism is unacceptable, I actively encourage students to work together on their problem sets. In the real world, most people work in teams on the job, and the ability to work with colleagues is necessary. While different people bring different skills to the table, most people would not tolerate a colleague who never contributed, and understand the difference between teamwork and freeloading. I expect you can make the same determination.

## **ASSESSMENT**

<b>Assignment Title</b>	<b>Due Date</b>	<b>Coursework Weighting</b>	<b>Feedback Due</b>
Problem Sets	Every two weeks at the evening before the day of lecture at 18:00	100% of coursework mark	Three weeks after assignment is handed in

The final exam counts for 40% of the overall module mark.

Where a student is unable to undertake the assessment by the deadline, and it is deemed impossible to consider a late submission request due to the nature of the assessment, an extenuating circumstances form should be submitted which will be considered by the Board of Examiners.

## **COURSEWORK SUBMISSION**

### **How to submit your essay using FASER**

You will be able to access the online submission system via your myEssex portal or via <https://FASER.essex.ac.uk>. FASER allows you to store your work-in-progress. This facility provides you with an ideal place to keep partially completed copies of your work and ensures that no work, even drafts, is lost. If you have problems uploading your coursework, you should contact [ltt@essex.ac.uk](mailto:ltt@essex.ac.uk). You may find it helpful to look at the FASER guide <http://www.essex.ac.uk/it/elearning/faser/default.aspx>. If you have any questions about FASER, please contact your administrator or refer to the handbook.

**Under NO circumstances is your coursework to be emailed to the administrators or the lecturer. This will NOT be counted as a submission.**

### **Coursework deadline policy for undergraduates**

There is a single policy at the University of Essex for the late submission of coursework in undergraduate courses. Essays must be uploaded before 09.45 on the day of the deadline.

All coursework submitted after the deadline will receive a mark of zero. The mark of zero shall stand unless the student submits satisfactory evidence of extenuating circumstances that indicate that the student was unable to submit the work prior to the deadline. For further information on late submission of coursework and extenuating circumstances procedures please refer to <http://www.essex.ac.uk/students/exams-and-coursework/ext-circ.aspx>.

Essay feedback will be given via FASER.

ALL submissions should be provided with a coversheet (Available from Moodle).

### **Plagiarism**

Plagiarism is a very serious academic offence and whether done wittingly or unwittingly it is your responsibility. **Ignorance is no excuse!** The result of plagiarism could mean receiving a mark of zero for the piece of coursework. In some cases, the rules of assessment are such that a mark of zero for a single piece of coursework could mean that you will fail your degree. If it is a very serious case, you could be required to withdraw from the University. It is important that you understand right from the start of your studies what good academic practice is and adhere to it throughout your studies.

The Department will randomly select coursework for plagiarism checks and lecturers are very good at spotting work that is not your own. **Plagiarism gets you nowhere; DON'T DO IT!**

Following the guidance on referencing correctly will help you avoid plagiarism.

Please familiarise yourself with the University's policy on academic offences: <http://www.essex.ac.uk/about/governance/policies/academic-offences.aspx>.

### **Extenuating circumstances for late submission of coursework**

The university has guidelines on what is acceptable as extenuating circumstances for later submission of coursework. If you need to make a claim, you should upload your coursework to FASER and submit a late submission of coursework form which can be found here: <http://www.essex.ac.uk/students/exams-and-coursework/late-submission.aspx>. This must be done within seven days of the deadline. FASER closes for all deadlines after seven days. The Late Submissions committee will decide whether your work should be marked and you will be notified of the outcome.

If you experience significant longer-term extenuating circumstances that prevent you from submitting your work either by the deadline or within seven days of the deadline, you should submit an Extenuating Circumstances Form for the Board of Examiners to consider at the end of the year <http://www.essex.ac.uk/students/exams-and-coursework/ext-circ.aspx>.

### **READING**

We will make use of large parts of

Jeff Gill. Essential Mathematics for Political and Social Research. Cambridge University Press. 2006

Jeffrey Wooldridge. Introductory Econometrics: A modern approach 5th Edition. Cengage Learning. 2012

Joshua Angrist and Jörn-Steffen Pischke. Mastering'metrics: The path from cause to effect. Princeton University Press. 2014.

Rebecca Morton and Kenneth Williams. *Experimental Political Science and the Study of Causality*. Cambridge University Press. 2010

and read excerpts of

Paul Kellstedt and Guy Whitten. *The Fundamentals of Political Science Research* Second Edition. Cambridge University Press. 2013.

Kaplan, Daniel: *Statistical Modeling: A Fresh Approach*. Project Mosaic. (2011).

Stephen Morgan and Christopher Winship. *Counterfactuals and Causal Inference*. Cambridge University Press. 2014

Donald Kinder and Thomas Palfrey. *Experimental Foundations of Political Science*, University of Michigan Press. 1993

Thad Dunning. *Natural Experiments in the Social Sciences*. Cambridge University Press. 2012.

Alan Gerber and Donald Green. *Field Experiments: Design, analysis, and interpretation*. WW Norton. 2012

Andrew Gelman and Jennifer Hill. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press. 2007.

Greene. *Econometric Analysis*. Pearson. 2012.

For applied social science data analysis, the book by Angrist and Pischke is the most comprehensive companion. It is the most valuable book to own.

The following books provide alternative approaches to presenting the material covered in the books above or help you with statistical software. There will be no assigned readings from these books

Sheldon Ross. *A First Course in Probability*. Pearson, 2012

Wheelan. *Naked Statistics*. Norton. 2013

Imai. *Quantitative Social Science*. Princeton. 2017

Dalgaard. *Introductory Statistics with R*. Springer. 2008

## **DETAILED SCHEDULE**

What follows is a tentative schedule for the rest of the year. As the semester progresses, I may need to make amendments and alterations to it. Changes as announced in lecture or in emails to the class always take precedence over the schedule as listed here.

### **Fall term:**

**Week 2:** Introduction and discussion of the module: research design, statistics, and quantitative social science.

Angrist and Pischke. Chapter 1  
Morgan and Winship. Chapter 1

**Week 3:** Correlation, causality, and experiments

Gerber, Green, and Kaplan. The Illusion of Learning from Observational Research (Moodle)  
Morton and Williams Chapters 1-4  
Angrist and Pischke. Chapter 2.  
Kinder and Palfrey. pp. 1-39

**Week 4:** Probability 1: Definitions, samples, conditional probability, independence

Gill. Chapters 1 and 7.1-7.4

**Week 5:** Probability 2: Bayes Theorem, random variables, and probability mass functions

Gill. Chapters 7.4-8.10  
Kellstedt and Whitten. Chapter 6

**Week 6:** Exploratory data analysis, descriptive statistics, and fundamentals of statistical inference

Wooldridge. Appendix C.1-5  
Kaplan. Chapter 1-2

**Week 7:** Hypothesis testing

Kellstedt and Whitten. Chapter 7 (2013  
eBook edition)  
Wooldridge. Appendix. C.6

**Week 8:** Regression analysis 1: Basics and conditional expectation function

Angrist and Pischke. Chapter 2  
Wooldridge. Chapter 2

**Week 9:** Regression analysis 2: Deriving the ordinary least squares estimator and sampling distribution

Wooldridge. Chapter 3

**Week 10:** Regression analysis 3: Model fit, omitted variable bias and conditional independence assumption, asymptotics, robust estimation

Wooldridge. Chapter 4 and 7

**Week 11:** Maximum Likelihood estimation, Generalized linear model

Greene. Chapter 16.1-16.6  
Gelman and Hill. Chapter 6

## **Spring term:**

### **I. Methods for causal inference**

#### **Week 16:** Survey Experiments

Blair, Imai and Lyall. "Comparing and Combining List and Endorsement Experiments: Evidence from Afghanistan." *American Journal of Political Science*. 2014 (Moodle)  
Gains and Kuklinski. "The Logic of the Survey Experiment Reexamined." *Political Analysis*. 2007 (Moodle)

#### **Week 17:** Field Experiments

Gerber and Green. Chapter 1  
Nickerson. "Is voting contagious? Evidence from two field experiments." *American Political Science Review*. 2008 (Moodle)

#### **Week 18:** Natural Experiments

Dunning. Chapter 1

#### **Week 19:** Instrumental variables regression

Angrist and Pischke. Chapter 3  
Miguel, Satyanath and Sergenti "Economic shocks and civil conflict: An instrumental variables approach." *Journal of Political Economy*. 2004 (Moodle)

#### **Week 20:** Regression discontinuity design

Angrist and Pischke. Chapter 4  
Pettersson-Lidbom: "Do Parties Matter for Economic Outcomes? A Regression-Discontinuity Approach." *Journal of the European Economic Association*. 2008 (Moodle)  
Ludwig and Miller. "Does Head Start improve children's life chances? Evidence from a regression discontinuity design." *Quarterly Journal of Economics*. 2007 (Moodle)

#### **Week 21:** Differences-in-Differences method

Angrist and Pischke. Chapter 5

### **II. Advanced regression analysis**

#### **Week 22:** Panel data and multi-level models 1

Gelman and Hill. Chapter 11 and 12

#### **Week 23:** Panel data and multi-level models 2

Gelman and Hill. Chapter 11 and 12

#### **Week 24:** Time-series data, survival and duration analysis

Wooldridge. Chapters 10-12

#### **Week 25:** Current topics in quantitative political analysis