# GV300-6-FY
# Advanced Quantitative Political Analysis
# 2025-2026

**Lecturer and Module Supervisor**
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**Academic Support Hours**
Date/Time:Tue 10:30-11:45
Room: 5.425

Module available for Study Abroad students: Yes ☐ No ☒

**ASSESSMENT**: This module is assessed by 100% coursework.

**LISTEN AGAIN: ☒ Listen again is available and should be fully utilised.**

***INSTANT DEADLINE CHECKER – COURSEWORK***

*FY variant*

| **Assignment Title** | **Due Date** | **Coursework Weighting** | **Feedback Due** |
|---|---|---|---|
| Homework 1 | 04-Nov | 15% | 25-Nov |
| Homework 2 | 25-Nov | 15% | 16-Dec |
| Homework 3 | 20-Jan | 20% | 10-Feb |
| Homework 4 | 10-Feb | 15% | 3-Mar |
| Homework 5 | 10-Mar | 15% | 31-Mar |
| Homework 6 | 24-Mar | 20% | 14-Apr |

**ASSESSMENT**

This module has 6 homework assignments spaced through the year.

Within this class, you are welcome to use foundation models (ChatGPT, Claude, GitHub Copilot, and anything after) in a totally unrestricted fashion, for any purpose, at no penalty. However, you should note that **all** large language models make up incorrect facts and fake citations, code generation models produce inaccurate outputs, and image generation models may generate highly offensive products. You are responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit, regardless of whether it originally comes from you or a foundation model.

If you use a foundation model, its contribution must be acknowledged in the assignment, and you will be penalized for using a foundation model without acknowledgement. Having said all these disclaimers, the use of foundation models is allowed.

If a foundation model is used, greater assessment weight will be given to analytical understanding and presentation.

The university's policy on plagiarism still applies to any uncited or improperly cited use of work by other human beings, or submission of work by other human beings as your own.

Assignments are graded holistically (meaning the complete assignment is graded rather than each component) and based on three components:

1. demonstrating analytical understanding (~33%)
2. writing clear and reproducible coding (~33%)
3. clearly presenting results in a friendly format (~33%)

Students receive top marks when they do all these things; lower marks if they only do two of these things (or all three but demonstrate significantly lower mastery); and a passing grade if and only if they do one of these things to a high standard. Failure to demonstrate all three assessment components across the assessment will result in a failing grade.

**TOP READS**

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

Gelman, Andrew, Jennifer Hill, and Aki Vehtari. Regression and other stories. Cambridge University Press, 2021.

Healy, Keiren. (2024). Data visualization: a practical introduction. Princeton University Press.

Grimmer, Justin, Margaret E. Roberts, and Brandon M. Stewart. Text as data: A new framework for machine learning and the social sciences. Princeton University Press, 2022.

**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 an initial examination of some tools for statistical inference the rest of the rest term of this module focuses particularly on regression analysis. Attention is paid to the potential problems of the classical regression model and solutions to these problems. In the second term, we focus on how to use these tools to answer substantive questions about politics. We pay specific attention to threats to causal inference and how research can be designed to overcome them. We also introduce students to non-standard data, especially textual analysis.

**Objectives and transferable skills**

The aims of the module are to:
1. understand the statistical ideas underpinning quantitative methods in political science research.
2. 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 (Stata or R) in their research.

On successful completion of the module, students should have:

1. Advanced knowledge of descriptive and inferential statistics.
2. Knowledge required to understand the assumptions underlying a broad range of basic and advanced statistical models used in social sciences.
3. Understanding how advanced 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.

This module is part of the Q-Step pathway. Q-Step is an award which you can gain simply by enrolling on specific modules and will signal to employers your capability in quantitative research. Learn more about the Q-Step pathway and enhance your degree now.

## MODULE STRUCTURE AND TEACHING

This module will be delivered with a two-hour weekly seminar. It will also have 1 hour optional lab sessions that you can attend in the weeks prior to handing in the assignment. More information will be given.

**What we expect of you during lecture and classes:**

- To attend all lectures and classes after having done the required reading
- To pay attention and take notes as necessary.
- To think about the readings and lectures notes before the class and be ready to discuss them: try to identify the key assumptions in the texts; map the structure of the argument; underline the conclusions. Highlight to yourself

points you don't understand. (If you don't understand it, there's great likelihood others have not understood it either, so don't be shy to ask.) Ask yourself whether you agree with the text, whether you can identify weaknesses or gaps in the argument, and what could someone who disagrees with it argue against it.

- To offer your participation as required (answering questions, asking questions etc.). Learning about and discussing these texts is a communal endeavour and it is a matter of good citizenship to contribute. Further, part of what we want you to achieve, and what we mark you for, is clear and confident oral presentation. You are expected to answer questions, raise new points, and contribute to the progression of discussion in class.

**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*. You may find it helpful to look at the FASER guide https://faser.essex.ac.uk/Student/Help. 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.

All work submitted to the Department will be run through plagiarism detection software 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: https://www.essex.ac.uk/student/exams-and-coursework/about-academic-offences

**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.

## SCHEDULE OF TOPICS AND READINGS

## DETAILED SCHEDULE

What follows is a tentative schedule for the year. As the semester progresses, we 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.

**Autumn term:**

**Week 2:** Course Introduction and Introduction to Reproducible Research using R Markdown

**Week 3:** Data Visualisation 1: Introduction to data plotting

**Week 4:** Data Visualisation 2: Advanced plotting and geospatial data

**Week 5:** Introduction to Causality

**Week 6:** Linear models part 1: bivariate to multiple regression

**Week 7:** Linear models part 2: Interactions and non-linearities

**Week 8:** Maximum Likelihood Estimation and Choice models 1: Dichotomous choice with OLS, logit/probit models

**Week 9:** Choice models 2: Ordered choice models

**Week 10:** Choice models 3: Unordered choice models

**Week 11:** Count models 1: Poisson regression

**<u>Spring term:</u>**

**Week 16:** Missing Data

**Week 17:** Measurement: Reliability, Validity, and Bias

**Week 18:** Measurement and latent variables: Item Response Theory

**Week 19:** Multilevel models: data with structure – Fixed, Random, Varying Slope Varying Intercept Models

**Week 20:** Causal Inference with Observational Data 1: – Diff in Diff and RDD

**Week 21:** Causal Inference with Observational Data 2: Synthetic Control and Matching

**Week 22:** Machine Learning 1: Supervised Learning

**Week 23:** Machine Learning 2: Unsupervised Learning

**Week 24:** Catch up week

**Week 25:** Presenting quantitative results