



## College of Social Sciences

<b>Course Title:</b>	<b>Quantitative Data Analysis</b>
<b>Course Code:</b>	SPS5033
<b>Course Co-ordinator:</b>	Dr David McArthur
<b>E-mail:</b>	<a href="mailto:David.McArthur@glasgow.ac.uk">David.McArthur@glasgow.ac.uk</a>
<b>Location:</b>	Room 402, 7 Lilybank Gardens
<b>Office hours:</b>	By appointment only

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**Lectures:** Mondays, 12pm - 2pm from 7th January – 18th March 2019 **Semester Two** (11 weeks)  
**VENUE:** Main Building, Room 226 East Quad.

**Tutorials:** Mondays, 2-4pm (TUT01-TUT03) **OR** 4-6pm (TUT04–TUT06) **OR** 6-8pm (TUT07-TUT09) from 14<sup>th</sup> January – 18<sup>th</sup> March 2019. *Please note that tutorial slots are allocated on a first come, first served basis when enrolling on MyCampus.*

### Course summary

The course introduces basic statistics and data analysis from univariate summary statistics up to multivariate linear regression. The main aim of the course is to enable students to summarise, analyse, and present data in valid ways and understand the basics of statistical inference and association as required in quantitative social science research.

### Course aims

The course introduces basic statistics and data analysis from univariate summary statistics up to multivariate linear regression. The main aim of the course is to enable students to summarise, analyse, and present data in valid ways and understand the basics of statistical inference and association as required in quantitative social science research. At the end of the course, students should be able to describe, summarise, and visualise data, calculate the association between variables at various scale levels, understand sampling and inference, test hypotheses with given datasets, quantify the uncertainty arising from data, and apply, interpret, and understand the assumptions of, linear regression models.

At all times, special care is taken to ensure that students can associate the statistical techniques with real-world examples from across the social sciences, and especially a themed example chosen from the set of research themes identified by the College of Social Sciences. In addition to basic statistics, students will acquire computational skills that allow them to apply their newly acquired skills using the statistical computing environment R. The overarching aim is to enable students to transfer these skills to new datasets, possibly including their own research topics. Students will learn how to evaluate theories and claims based on data by selecting the appropriate statistical tools and applying them to the data using R. In each session of the course, the relevant concepts are taught using words, numbers, equations, examples, and R code.

### Learning outcomes

After taking this course, students should be able to:

- Manage, visualise, summarise, and present univariate and bivariate data.
- Construct a robust linear regression model.
- Test hypotheses involving data measured at different levels e.g., interval, binary and categorical.
- Use the statistical software R for quantitative analysis of univariate variables, bivariate associations and linear regression analysis.
- Critically evaluate theories, test hypotheses, and answer substantive research questions using quantitative approaches with available data from a social science perspective beyond the examples given in the course.
- Describe quantitative methods, and to interpret and write up the results of quantitative analyses, clearly and concisely.



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### **Summative Assessment**

Students will conduct a quantitative data analysis project. They will choose a dataset, research question, dependent variable, and independent variables and apply the skills acquired in the course to the data in order to answer the research question. The students will produce a paper of 4,000 words (excluding references and R code), in which they focus on the statistical analysis and present the results. The paper must include the R source code and be written as a knitr document (e.g., in RStudio). Each paper must contain summary statistics, data visualisations, bivariate associations, hypothesis tests, and a regression model as well as a discussion of the regression assumptions in the light of the data and model.

### **Formative Assessment**

Early in the course, students will produce a short research proposal for the project they will conduct for the summative assessment. In this, they will identify a research question and the dataset they will use to answer it. They will also identify and define the dependent and independent variables they will use. They will receive feedback on the suitability of their proposed research for the summative assessment.

Students will use the free statistical software R on their own laptops in the tutorials. They will work on exercises and their own data analysis projects. This will allow students to receive feedback from tutors throughout the course on how their project is progressing. It should also mean that by the last tutorial, students should have most of their summative assessment completed.

**Further details will be provided at the beginning of semester 2.**