



London Interdisciplinary Social Science Doctoral Training Partnership

Advanced Research Methods in the Social Sciences

Course Code & Title	LISS005 Introduction to Quantitative Research		
Convenor(s)	Dr Yang Ye: yang.ye@qmul.ac.uk		
Institution	Queen Mary University of London	Department	Department of Linguistics
Academic Year	2018-19	Term	Summer
Number of Sessions	9	Length of Session(s)	3hours
Day, Date		Start : End	Room Location
Monday 13 May 2019		10:00 - 13:00	Room GC2.04, Graduate Centre, Queen Mary
Monday 13 May 2019		14:00 - 17:00	
Monday 20 May 2019		10:00 - 13:00	
Monday 3 June 2019		10:00 - 13:00	
Monday 3 June 2019		14:00 - 17:00	
Monday 10 June 2019		10:00 - 13:00	
Monday 17 June 2019		10:00 - 13:00	
Monday 17 June 2019		14:00 - 17:00	
Monday 24 June 2019		10:00 - 13:00	
Enrolment Link:	http://tiny.cc/6sld5y You may be prompted to log into SkillsForge		

Course Description:

The main purpose of this course is to introduce students to the basic concepts and logic of statistical reasoning and gives the students introductory-level practical ability to choose, generate, and properly interpret appropriate descriptive and inferential methods. Moreover, the course helps students gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study. The course does not assume any prior knowledge in statistics and its only prerequisite is basic algebra.

The course requires the usage of the free statistical software R on the platform RStudio (<https://www.rstudio.com/products/rstudio/download/>). It is preferred that students download RStudio on their own working laptops and bring the laptops to the sessions. Students who do not have their own laptops should contact liss-dtp@kcl.ac.uk to discuss options for borrowing one.

The course materials are largely based on the open course “Statistical Reasoning” as part of the Open Learning Initiative (2019) by Carnegie Mellon University (for a link to course, see end of the syllabus). The use of the course materials is under the Creative Commons Attribution: Noncommercial-Share Alike 4.0 License. Copyright 2019 Open Learning Initiative.

Course Outline:

Session 1: Introduction and exploratory data analysis, part 1

- Introduction
 - Welcome and pre-course survey
 - An overview of statistics



- Getting started with R and R Studio
- Exploratory data analysis, part 1
 - Examining distributions
 - One categorical variable
 - One quantitative variable
 - Histogram and boxplot
 - Measures of center and spread

Session 2: Exploratory data analysis, part 2

- Examining relationships
 - Explanatory and response variables
 - Role-type classification
 - Categorical -> Quantitative
 - Categorical -> Categorical
 - Quantitative -> Quantitative
 - Scatterplot
 - Linear relationships
 - Causation vs. association

Session 3: Producing quantitative data

- Sampling
 - Methods of sampling
- Study design
 - Observational studies
 - Surveys
 - Experiments
 - Single explanatory variable
 - More than one explanatory variable
 - The concept of control

Session 4: Probability, part 1

- Introduction to probability
- Random variables
 - Discrete random variables
 - Continuous random variables

Session 5: Probability, part 2

- Random variables (continued)
 - Normal random variables
- Sampling distributions
 - Parameters vs. statistics
 - Sample mean and proportion

Session 6: Statistical inference, part 1



- Introduction
- Estimation
 - Point estimation
 - Interval estimation
 - Confidence intervals
- Hypothesis testing
 - Overview
 - Testing population proportion
 - Testing population mean

Session 7: Statistical inference, part 2

- Categorical -> Quantitative relationships
 - Two independent samples (independent t-tests)
 - Matched pairs (matched t-tests)
 - Analysis of Variance (ANOVA)
 - Non-parametric tests

Session 8: Statistical inference, part 3

- Categorical -> Categorical relationships
 - Chi-square tests
- Quantitative -> Quantitative relationships
 - Correlations
 - Single and multiple regression
- Quantitative -> Categorical relationships
 - Logistic regression

Session 9: Review and statistical communication

- Review of course
 - Exploratory data analysis
 - Producing data
 - Probability
 - Statistical inference
- Communicating results of quantitative research

Useful reading:

- Field A., Miles, J. and Field, Z., "Discovering Statistics using R", (2012), Sage.

Useful links:

- "Statistical Reasoning" open course at Open Learning Initiative offered by Carnegie Mellon University: <https://oli.cmu.edu/courses/statistical-reasoning-copy/>

Course materials:



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- Course materials such as powerpoint slides, R scripts, and R data files are shared in this dropbox folder:

https://www.dropbox.com/sh/ormlulscr4le8kt/AABYJ2cbL_VAM0VFEjKlrzna?dl=0

Number of students: 20