



Short Courses

2019-2020







<u>Short Courses</u>

Our courses in quantitative data analysis and research methods are tailored for academics, postgraduate researchers, and applied researchers in the public and private sectors.

Cathie Marsh Institute Short Courses are developed and delivered by academic experts in research methods, and offer the opportunity to learn using real-life data sets. We run courses on all aspects of the research process, including research design, data collection and data analysis. We can also provide in-house courses and workshops for local authorities and other organisations.

Courses are designed to suit a range of skills, including:

- Introductory courses, for participants with some prior experience of statistics and/or data analysis
- Essential Skills courses, for complete beginners
- Intermediate courses, for more advanced data analysts to develop their skills.

Most courses are one day in duration, although a number run over two or three days. Courses are designed to be free-standing, though many build together to provide learning pathways from basic skills to more advanced data analysis.

Our courses include a combination of lectures and/or demonstrations, supported by a substantial practical component, to ensure participants gain hands-on experience in the application of the methods being taught.

What's new?

Previous participants told us they wanted more advanced training in certain areas, and we are excited to be able to offer brand new Intermediate courses in R and Stata for 2019-20, as well as a new Essential Skills course for beginners in SQL.

For further information and to book your place, visit: www.cmi.manchester.ac.uk/study/short



CATHIE MARSH INSTITUTE

Fees & Funding

The majority of our Short Courses are one-day courses, and are charged at £195, which includes lunch and refreshments.

A discounted rate of £140 is available to participants from educational institutions, charities, or government bodies.

We also offer up to five subsidised places at £60 for staff and postgraduate researchers in the Faculty of Humanities at The University of Manchester. These places are awarded on a first-come first-served basis.

Visit the website below for further details about our two- and three-day courses.

Humanities postgraduate students from The University of Manchester may also be eligible for <u>methods@manchester</u> funding towards attending short courses. After booking your place on a course, contact <u>methods@manchester.ac.uk</u> for a bursary application form and further information.

Follow us on Facebook (<u>CMI Short Courses</u>) or Twitter (<u>@cmi courses</u>) for announcements about events and funding opportunities.

> For further information and to book your place, visit: www.cmi.manchester.ac.uk/study/short





Essential Skills Week

18-22 November 2019

11-15 May 2020

Designed for complete beginners, these hands-on, half-day courses introduce the basics of a range of programming languages and software for use in data analysis.

2019	2020	
19 November	12 May	<i>R</i> - An introduction to the R programming environment and using the R language for performing basic data analysis.
20 November	13 May	Python - An introduction to the Jupyter Python programming environment and using the Python language for performing basic data analysis.
21 November	14 May	SQL - An introduction to SQL using the DB Browser for SQL environment.
22 November	-	Excel - Exploring the data analysis functionality of Microsoft Excel 2010.
-	15 May	NVivo - Introducing NVivo, a data management tool for qualitative and mixed methods research.

Some courses require a basic level of experience with data and statistics; see the individual course pages for full descriptions and prerequisites. Essential Skills courses are charged at a fixed rate of £60, and lunch is not provided.

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2019-20

NVivo for Qualitative Data Analysis	Introductory	17 October 2019
Introduction to R	Introductory	24 October 2019
Fuzzy Set and Qualitative Comparative Analysis	Intermediate	25 October 2019
Introduction to Data Analysis 1	Introductory	7 November 2019
Introduction to Data Analysis 2	Introductory	8 November 2019
Introduction to Stata	Introductory	14 November 2019
R Essential Skills	Introductory	19 November 2019
Python Essential Skills	Introductory	20 November 2019
SQL Essential Skills	Introductory	21 November 2019
Excel Essential Skills	Introductory	22 November 2019
Social Media Data Analysis	Introductory	29 November 2019
Data Carpentry in Social Sciences with R	Introductory	12-13 December 2019
Introduction to Survival Analysis with Stata	Introductory	23 January 2020
Intermediate R	Intermediate	6 February 2020
Introduction to Cluster Analysis	Introductory	7 February 2020

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Multiple Linear Regression	Introductory	11 February 2020
Logistic Regression	Introductory	12 February 2020
Introduction to Longitudinal Data Analysis	Introductory	19 February 2020
Longitudinal Data Analysis	Intermediate	20 February 2020
Structural Equation Modelling using Mplus	Intermediate	4-6 March 2020
Multilevel Modelling	Intermediate	20 March 2020
NVivo for Qualitative Data Analysis	Introductory	2 April 2020
Introduction to Data Analysis 1	Introductory	23 April 2020
Introduction to Data Analysis 2	Introductory	24 April 2020
R Essential Skills	Introductory	12 May 2020
Python Essential Skills	Introductory	13 May 2020
SQL Essential Skills	Introductory	14 May 2020
NVivo Essential Skills	Introductory	15 May 2020
Introduction to Stata	Introductory	26 May 2020
Intermediate R	Intermediate	22 May 2020
Intermediate Stata	Intermediate	28 May 2020
Social Media Data Analysis	Introductory	29 May 2020
Design of Experiments and Analysing Experimental Data	Introductory	16 June 2020

For further information and to book your place, visit: www.cmi.manchester.ac.uk/study/short





Cathie Marsh Institute Short Courses NVivo for Qualitative Data Analysis

17 October 2019

This course introduces NVivo as a data management tool.

The structure of the training session will be a combination of formal presentation alongside the practical application. Those attending the training session will have access to data sets for practical sessions and can also bring their own data to use in the practical parts of the session. Among the techniques we teach are: coding, adding attributes, queries, models, and charts.

The various uses of NVivo will be presented and discussed. Included will be working in teams, adding in notes, importing files, and using NVivo for managing literature. Examples of qualitative and mixed methods research will be presented to showcase how NVivo can be used to manage large amounts of various data.

Prerequisites

No prior knowledge of NVivo is needed; however, the course would be suitable as a refresher. Some knowledge of qualitative methods including thematic analysis would be helpful, though not necessary.





Cathie Marsh Institute Short Courses Introduction to R

24 October 2019

Practically all research now involves the use and manipulation of data. An appreciation of how data can be manipulated into forms and shapes which can immediately assist your research is an obvious advantage. In addition, a basic understanding of data analysis techniques using R programming allows you to imagine further possibilities for the data, enhancing your research.

This Introduction to R course is for any researcher who has data they want to analyse using the R programming language. No prior computational experience is required. This is a hands-on course which provides an introduction to the R programming language and commonly used extension packages using the popular RStudio environment.

Examples of using R and R packages to perform data and statistical analysis as well as basic mapping tasks will be demonstrated and the required code discussed.

After completion of this course the participant will be able to create their own R environment and have confidence in using it to produce effective R programs for a variety of data and statistical analysis tasks.

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Cathie Marsh Institute Short Courses Fuzzy Set and Qualitative Comparative Analysis

25 October 2019

Qualitative Comparative Analysis is a systematic method of studying data on multiple comparable cases from about N=8 through to large datasets of N=10,000 etc. The QCA methods firstly involve casing, i.e. delineating cases; secondly organising a systematic data matrix (we will show these in NVIVO and in Excel); thirdly examining sets of cases known as configurations; fourth interpreting these in terms of 'necessary cause' and 'sufficient cause' of each major outcome of interest. We demonstrate the fsQCA software for QCA. A fuzzy set is a record of the membership score of a case in a characteristic or set. A crisp set is a membership value of 0 (not in the set) or 1 (fully in the set), and thus is a simplified measure compared with a fuzzy set. Fuzzy sets or crisp sets, and combinations can be used in QCA. All the permutations of the causal factors, known as X variates, are considered one by one. We test whether X is necessary, or sufficient, or both, for an outcome Y. We then augment the standard measures of 'consistency'. We show that one can generate both within-group and sample-wide consistency levels for testing sufficient cause.

This one-day training course will attract those doing case-study research, those doing comparative research, and those who want to extend their skills in fuzzy set analysis from beginner to intermediate levels. It will suit qualitative as well as quantitative and mixed-methods researchers; all are welcome.

Prerequisites

This is an intermediate course; please see the website for the full course outline and prerequisites before booking.



Cathie Marsh Institute Short Courses Introduction to Data Analysis 1

7 November 2019 / 23 April 2020

Introduction to Data Analysis 1 is designed for those who would like to know more about the theory and practice of quantitative methods, but lack a background in statistics. Rather than burdensome mathematics, the course focuses on practical research skills. In particular, it emphasises hands-on practical learning and uses real-world data and cutting-edge software.

This course covers the following topics:

- Collecting data from surveys and other sources
- Different types of data and how to analyse them
- Describing and summarising data
- Data management skills
- Visualising data and findings

Prerequisites

None / basic computer literacy.

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Cathie Marsh Institute Short Courses Introduction to Data Analysis 2

8 November 2019 / 24 April 2020

Introduction to Data Analysis 2 builds on the skills taught in Introduction to Data Analysis 1. Namely, data management, summary, and visualisation. In particular, the course introduces methods to analyse the relationship between variables using cross-tabulation and linear regression analysis. Like the IDA 1, it emphasises hands-on practical learning and uses real-world data and cuttingedge software.

This course covers the following topics:

- Understanding probability and statistical significance
- Testing correlations between different types of variable
- Analysing the relationship between variables using linear regression
- When and how to control for confounding variables
- Drawing inferences from your results

Prerequisites

Participants should have a basic familiarity with a statistical software package (e.g. R or PSPP). Ideally, participants should also have taken Introduction to Data Analysis 1 or have equivalent experience.

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Cathie Marsh Institute Short Courses Introduction to Stata

14 November 2019 / 26 May 2020

The course provides introductory training in Stata, a statistical package increasingly used for social research data analysis which has powerful data manipulation procedures and extensive and powerful statistical capabilities.

The aim of the course is to familiarise participants with the basic features of Stata 14. On completing the course, participants will have covered the following through a combination of presentation and practical sessions:

- The Stata environment: Opening and exploring files, looking at labels, editing and entering data.
- Exploratory analysis: logging outputs, producing tables, subsetting and descriptive statistics.
- Data manipulation: computing new variables, recoding, keeping and dropping, saving commands in a .do file.
- Stata graphics, help and support resources.

On completion of the course, participants will have the necessary familiarity with Stata to move on to further Stata courses and/or continue learning themselves.





Cathie Marsh Institute Short Courses R Essential Skills

19 November 2019 / 12 May 2020

This 'Essential Skills in R' workshop is for any researcher who has data they want to analyse using the R programming language. No prior computational experience is required. This hands-on workshop provides an introduction to the R programming environment and demonstrates the use of the R language for performing basic data analysis.

On completion of this workshop, the participants will be able to;

- Install R and RStudio on their own machine
- Be familiar with the RStudio GUI layout
- Understand R Variables, data types and objects
- Understand the use of Vectors and Dataframes
- Understand how to get help and make use of R libraries
- Read datasets of different formats into the R environment
- Perform simple visualisations of data

After completion of this workshop, the participant will be in a position to create their own R environment and have confidence in using it to produce small effective R programs for a variety of simple data analysis tasks.

Essential Skills Week offers a range of half-day introductory courses including R, Python, SQL and Excel.

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Cathie Marsh Institute Short Courses Python Essential Skills

20 November 2019 / 13 May 2020

This workshop is for any researcher who has data they want to analyse using the Python programming language. No prior computational experience is required. This hands-on workshop provides an introduction to the Jupyter Python programming environment and demonstrates the use of the Python language for performing basic data analysis.

On completion of this workshop, participants will be able to;

- Install Python and the Jupyter environment on their own machine
- Be familiar with the Jupyter Notebook environment
- Understand Python variables, data types, objects and simple programming constructs
- Understand how to get help and make use of 3rd party Python libraries like pandas
- Read csv based files into pandas dataframes
- Manipulate data within pandas dataframes
- Perform simple visualisations of data.

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Cathie Marsh Institute Short Courses SQL Essential Skills

21 November 2019 / 14 May 2020

This workshop is for any researcher who has a larger amount of data they want to pre-process (clean, reduce, summarise), before further analysis. No prior computational experience is required. This hands-on workshop provides an introduction to SQL using the DB Browser for SQL environment as well as illustrating how SQL and Relational databases can be used directly from a programming environment such as Python or R.

On completion of this workshop, the participants will be able to;

- Install the DB Browser environment on their own machine
- Understand what a database is
- Know what the key components of a relational database are
- Use basic SQL commands to retrieve data from database tables
- Perform basic data analysis using SQL commands
- Perform joins on two or more tables and understand the results
- Access a database table directly from Python or R
- Prepare large datasets for use in other programming environments.

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Cathie Marsh Institute Short Courses Excel Essential Skills

22 November 2019

This introductory course will explore the data analysis functionality of Microsoft Excel 2010. Examples will be worked through to demonstrate what Excel can be used for and how to make the most of some of the data analysis functions, including: built-in statistic functions; organising data using filters; pivot tables; charts.

At the end of the course you will be able to:

- Apply analysis techniques to datasets in Excel
- Use statistical functions to understand and describe your data
- Organise, sort and summarise data for analysis
- Open an Excel workbook, enter data and use simple formulae
- Load existing data and carry out a range of analysis of individual variables to answer a range of research questions
- Work with complex datasets, preparing worksheets and variables for a series of analyses
- Analyse the interactions between variables and produce pivot tables
- Present your findings in professional-looking tables and graphs

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Cathie Marsh Institute Short Courses NVivo Essential Skills

15 May 2020

This course introduces the most used features of NVivo, a data management tool for qualitative and mixed methods research. The half day introductory course focuses on types of data, ways of coding, adding attributes and running simple queries.

At the end of the course you will be able to:

- Apply analysis techniques to datasets in Excel
- Use statistical functions to understand and describe your data
- Organise, sort and summarise data for analysis
- Open an Excel workbook, enter data and use simple formulae
- Load existing data and carry out a range of analysis of individual variables to answer a range of research questions
- Work with complex datasets, preparing worksheets and variables for a series of analyses
- Analyse the interactions between variables and produce pivot tables
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Cathie Marsh Institute Short Courses Social Media Data Analysis

29 November 2019 / 29 May 2020

This course describes how to use the free Windows software Mozdeh to gather tweets and to download comments on YouTube videos. The course will also describe simple and big data-style text analysis methods to gain insights into the meaning of the downloaded texts and to identify patterns within the data. Analysis methods will cover identifying topic, gender, time and sentiment differences in tweets or comments.

Using Mozdeh, participants will learn:

- How to gather social media texts from Twitter and YouTube
- Simple techniques for interrogating the downloaded texts to gain insights into topics of discussion
- Simple data mining techniques to identify trends and patterns in the data
- An awareness of the limitations of social media data analysis
- How to gather tweets from specified users or matching a set of keyword queries
- How to gather comments on one or more YouTube videos
- Simple quantitative methods in Mozdeh, such as word frequency analysis, gender difference detection, sentiment analysis and time-series graphs
- Word frequency comparison methods in Mozdeh to data-mine patterns in the texts.

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Cathie Marsh Institute Short Courses Data Carpentry for the Social Sciences with R

12-13 December 2019

Data Carpentry workshops are for any researcher who has data they want to analyse, and no prior computational experience is required. This hands-on workshop teaches basic concepts, skills and tools for working more effectively with data.

On completion of this two-day course, participants will be able to:

- understand problems which can occur in spreadsheets of data
- create 'clean' spreadsheets either from scratch or by reformatting a 'dirty' spreadsheet
- use OpenRefine to clean datasets and perform basic exploratory data analysis on the data
- use SQL to summarise data and to join different data sources
- use basic functionality in the R programming language to perform basic EDA (Exploratory Data Analysis) and to create a simple visualisation of data.
- convert data formats using R

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• understand the importance of documenting work for future use.

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Cathie Marsh Institute Short Courses Introduction to Survival Analysis with Stata

23 January 2020

This course aims to introduce participants to the theory and concept of survival analysis and provides strategies to decide for which research questions this method has benefits over alternative approaches. The course will cover the preparation of datasets, discuss some common pitfalls and train participants in interpretation of statistical and graphical results. The practical exercises should enable the participants to set up data and conduct analysis on their own.

This course is designed for people who are familiar with the Stata software and want to use it for analysing survival/event history data. Topics will include:

- Theoretical foundation of survival analysis
- Finding appropriate research questions for this method
- Data manipulation as preparation for survival analysis
- Analysis and interpretation of results in Stata
- Graphical representation of results with Stata
- Integration of time-constant and time-varying covariates

<u>Prerequisites</u>

No previous knowledge of survival analysis is required; however, familiarity with the Stata environment, basic command files and manipulation is essential in order to get the most out of the course.

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Cathie Marsh Institute Short Courses Intermediate R

6 February 2020 / 22 May 2020

Cleaning data is one of the most important and time-consuming aspects of being a data analyst and researcher. Most courses typically teach statistical models or basic use of statistical software, but few of these teach students how to efficiently clean real-world data.

This course will tackle this important topic. We will do this by introducing the tidyverse package in R, a large package that brings together some of the best tools for data cleaning and visualization in R. Inspired by the concept of "tidy data", the package enables users to import, merge, recode, restructure and plot data very efficiently. Half of the course will focus on data cleaning, while the other half will focus on data visualization. The practical section of the course uses real-world data to get participants used to the typical challenges they can expect to encounter when working with their own data.

Prerequisites

Participants should have a basic knowledge of R and R-Studio.

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Cathie Marsh Institute Short Courses Introduction to Cluster Analysis

7 February 2020

Participants will develop an understanding of clustering methods and procedures, carrying out analysis in the program R. By the end of the course, they will be able to carry out preliminary analysis to select and transform variables for cluster analysis, choose a clustering method, evaluate and choose cluster solutions, interpret clusters and present cluster analysis results. Hierarchical and non-hierarchical cluster analysis will be applied to 2011 Census local area data to produce an area classification to group areas with similar overall population characteristics into clusters.

Prerequisites

Participants should have familiarity with statistical software and an understanding of basic data analysis techniques including correlation and regression analysis.





Cathie Marsh Institute Short Courses Multiple Linear Regression

11 February 2020

This course provides a thorough grounding in the theory and methods of multiple linear regression including model selection, nonlinear relationships, and transformations, dummy variables, interaction terms and assumption testing. The course comprises taught and practical components in about equal proportions, using the Stata software.

At the end of the course participants should be able to:

- Run multiple linear regression models on suitable datasets
- Choose between different models
- Understand the meaning of b and beta coefficients
- Understand and interpret R2 values
- Create dummy variables, interaction and quadratic terms
- Run and interpret assumptions tests and diagnostics
- Understand and interpret multicollinearity.

Prerequisites

Participants should have a basic familiarity with statistical software, and an understanding of basic data analysis techniques and concepts; see the website for further details.

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12 February 2020

This course examines the fitting of models to predict a binary response variable from a mixture of binary and interval explanatory variables, using Stata software.

The approach is illustrated using examples from a social science perspective, including cases where logistic regression models are used as a means of analysing tabular data where one of the dimensions of the table is a two-category outcome variable. You will also learn how to fit a logistic regression model, and how to interpret the results.

At the end of the course, participants should be able to:

- Understand the concepts of odds and odds ratios
- Generate odds for given contingency tables
- Understand the basic theory behind binary logistic regression
- Run and interpret a logistic regression model
- Interpret Log Likelihoods to evaluate models
- Choose between different models.

<u>Prerequisites</u>

MANCHES

The University of Manchester

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Cathie Marsh Institute Short Courses Introduction to Longitudinal Data Analysis

19 February 2020

The course covers basic concepts in longitudinal design and analysis.

The morning session focuses on the strengths and methodological difficulties of the longitudinal approach such as defining longitudinal populations and target samples; levels and dimensions of change; age, period and cohort effects. After lunch, we start with an overview session on the sources and causes of missing data, and how to adjust for missingness; this will be followed by a group exercise.

By the end of the course, students should have gained:

- an understanding of the different ways of measuring and explaining change using longitudinal data
- an appreciation of the particular problems posed by missing data in longitudinal research
- a basic understanding of ways of adjusting for missing data
- confidence to address questions about longitudinal design and missing data.

<u>Prerequisites</u>

Students should have some background in empirical social science and a basic grounding in statistical modelling, at least in linear regression.

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Cathie Marsh Institute Short Courses Longitudinal Data Analysis

20 February 2020

The course covers two of the most useful ways of analysing longitudinal data. In the morning we cover growth curve analysis within a multilevel modelling framework. The theoretical ideas are embellished with practical work using data from the National Child Development Study. After lunch, basic concepts in survival analysis and event history analysis are introduced, followed by practical work with a simple (pencil and paper) example.

By the end of the course, participants should have gained:

- an understanding of how growth curve models can be used to analyse repeated measures data
- an appreciation of the ways in which duration and transition data can be analysed using techniques initially developed in medicine and industry
- confidence to carry out practical work with some kinds of longitudinal data.

Prerequisites

Participants should have a strong background in empirical social science and a good understanding of the basics of statistical modelling, at least up to multiple linear regression. Some experience with Stata would be useful but not essential.

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Cathie Marsh Institute Short Courses Structural Equation Modelling Using Mplus

4-6 March 2020

Structural Equation Models (SEM) amalgamate regression analysis, path/ mediation analysis and factor analysis, allowing for more richly detailed statistical models to be specified and compared to data than by using these techniques individually.

This three-day course aims to train quantitative social scientists to use the Mplus programme in the application of structural equation modelling techniques to continuous and non-continuous observed data.

The course also aims to integrate approaches that assume latent dimensions of variation (e.g. factor analysis) with approaches that assume unobserved groups or categories (e.g. latent class analysis).

Prerequisites

Participants should be experienced users of linear and binary logistic regression or probit regression. No previous experience of SEM models or the Mplus programme is required.





Cathie Marsh Institute Short Courses Multilevel Modelling

20 March 2020

This one-day course begins with a description of some examples where multilevel models are useful in statistical analysis and some examples of multilevel populations. We then cover the basic theory of multilevel linear regression models (for continuous dependent variables) including random intercept and random slope specifications, the use of contextual variables in multilevel analysis and modelling repeated measures. This course is suitable for social scientists who want to learn about a quantitative technique that allows both individual and group level variations to be simultaneously taken into account when modelling social phenomena.

The course will:

- Introduce the general idea of multilevel modelling
- Consider some issues of multilevel modelling from a substantive and theoretical perspective
- Show how multilevel modelling can be applied to social data using specialist software MLwiN and R.

Prerequisites

No prior knowledge of multilevel modelling is assumed. Participants will need to have some familiarity with regression models.

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Cathie Marsh Institute Short Courses Intermediate Stata

28 May 2020

The course will provide intermediate training in the statistical programming software Stata, which is a great tool for dealing with a large dataset, for data manipulation, and for various analysis strategies including extensive and powerful statistical capabilities.

The aim of the course is to familiarise participants with some features of Stata 14 which go beyond the introductory level. Participants will cover the following topics through a combination of lecture and practical sessions:

- Quick review of some more basic operations
- The proper use of weights and weighted tables
- Merging datasets and combining information from different sources for combined analysis
- Strategies of analysis and modelling with the example of logistic regression.

Prerequisites

Basic operational experience of Stata is required for the course, although participants do not need to be advanced users of Stata.

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Cathie Marsh Institute Short Courses Design of Experiments and Analysing Experimental Data

16 June 2020

This course is designed for those interested in the design, conduct, and analysis of experiments. The course will examine how to design and analyse the experimental data in the context of medical statistics.

We will discuss various designs and their respective differences, advantages, and disadvantages. The course includes a review of statistics background that is needed for conducting and analysing experiments. We will start discussing how to summarise data, confidence intervals and hypothesis testing and illustrate analysis techniques such as t-test, Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA).

In addition, basic models with one independent variable and more complex models with two or more independent variables will be explained in greater detail. Stata and/or R software will be used to analyse the data.

Prerequisites

Participants should be familiar with statistical software.

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