

Absolute BeginnerR and Statistical ModellerR: Syllabus

The course is available over two days, and is as an introduction to the R statistical programming environment; participants can attend one day or both. Both days will consist of interactive workshops, together with time for guided computational practice on the material, supported by the tutor.

Course 1, “Absolute BeginnerR”, is suitable for people with no experience of R, and will be an introduction to programming in R. There is little mathematical or statistical knowledge assumed, and will be an introduction to how the programming language works.

Course 2, “Statistical ModellerR”, is suitable for those that have attended Day 1, or who have some previous experience in R. It will give an overview of statistical modelling in R. There is some necessary theory, but this is minimised to allow participants as much time as possible to get practical experience of statistical modelling.

Teaching Materials and Learning Environment

Computers with appropriate software are available, although participants are welcome to use their own laptops. Instructions for installing software will be sent after bookings are made.

An online resource is provide for reference during and after the course, which contains example datasets, R scripts, and the slides presented. A certificate of attendance is provided. We are always happy to receive questions, comments, or clarifications during or after the course.

Logistics and costs

Timings, costs, and logistics vary depending on where and when the course is held. Please look at www.mathematicallyspeaking.co.uk for full details and bookings, and contact us there with any queries.

Day 1: Absolute Beginner

Day 1 Aims:

By the end of the course, participants will be able to

- use R in collection, analysis, and graphical presentation of data;
- interpret the output of R procedures;
- extend basic R functionality by using external libraries;
- implement algorithms and statistical methods in R;
- know where to go to get additional help.

Day 1 Syllabus:

- Introduction to R and R Studio
- Input and output of data
- Finding help in the R language
- Understanding and writing functions in R
- Navigation in R: Conditional execution and loops in R
- Graphics in R
- Programming skills in R to problems arising in data analysis
- Interpretation of R output
- A very brief Introduction to Linear Modelling in R

Day 2: Statistical Modeller

Day 2 Aims: To introduce the concepts and principals in statistical modelling in R.

After taking this module, participants will be able to

- understand the importance and theory behind statistical modelling;
- use the terminology associated with modelling;
- perform modelling with simple examples having worked through many examples;
- understand the principles behind more complex examples;
- use R to fit a variety of statistical models;
- understand the limitations where models do not fit the data;
- present output from R to assist in their analysis.

Day 2 Syllabus:

- Revision on R: Data input, plotting and summaries
- Principles of statistical inference
- Linear Modelling
- Discrete data and generalised linear mixed models
- Model construction and estimation
- Model selection
- Shrinkage regression (Lasso and ridge methods)
- Introduction to random effects and estimation of mixed models
- Introduction to time series: Autoregression and moving average models
- Advanced modelling: where to find help.