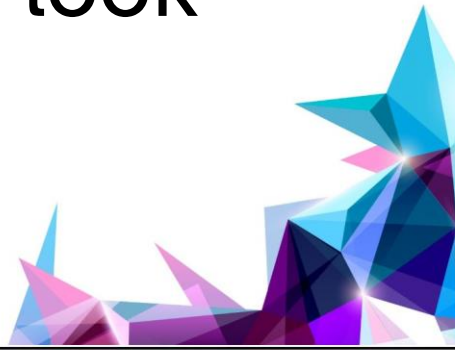


R:

# A first look





# The small print

## Prerequisites

Time in the workshop is precious – it is an opportunity for you to interact with the workshop leader and other participants through questions and discussions and to share your experiences and concerns. To make the most of this time we sometimes ask you to carry out learning activities ahead of the workshop so that everyone comes into the class with the same basic knowledge. We keep this prior learning to a minimum and often make use of online videos. Online videos provided through LinkedIn Learning can be accessed free of charge by University members anytime, anywhere, through a browser or app.

Your course booking will tell you if any prior learning activity is required. If you don't have an environment where you can do this learning, you can come along to one of our LinkedIn Learning sessions. These are a quiet space where you can work through videos or other workshop resources.

If you arrive for a workshop without having done the prior learning, the workshop leader may suggest that you come back on another session.

## Copyright

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## About the workshop designer

Graham Addis started his first technology role in 1978 and has gathered decades of practical experience in industry. He has always been passionate about passing on his knowledge and undertook his first formal teaching position as a Customer Training Specialist for Intel back in 1984. Since that time his career has combined extensive real world experience with teaching and mentoring. In 2017 he joined the academic world at the University of Oxford and currently specialises in teaching spreadsheets, databases and programming.

## Revision history

Version	Date	Author	Comments
2.0	January 2023	Graham Addis	Updated to latest templates
1.0	January 2021	Alex Homer	Created

## About this workshop

R is one of the most popular and flexible data analysis and visualisation tools. It is open source (and so free to use) and works on Windows, Mac OSX and Linux. In this workshop we will explore the four key areas that R is used for by looking at real examples of R code. This course is not intended to teach you the details of R - it aims to show you what R is capable of, and how easy it is to use. It is designed for people with little or no coding experience.

### What you will learn

You will be introduced to programming with R in the RStudio environment, where you will learn:

- How to run R commands in RStudio
- The basic syntax of R commands
- Pure R data types
- Manipulating data
- What packages are in R and how to use them
- The concept of *tidy data* and how the *tidyverse* package supports this.
- Options for data visualisation in R and using the ggplot2 package

### What you need to know

You will need a basic level of mathematics and basic IT skills.

Prior experience in programming will help but you will be taken through all the concepts necessary to complete the course.

If you need to review these activities, LinkedIn Learning is a great place to get guidance. There is an activity with relevant videos in the IT Learning Portfolio: visit [skills.it.ox.ac.uk/it-learning-portfolio](https://skills.it.ox.ac.uk/it-learning-portfolio) and search for "R: A First Look (Activity)".

### The resources you need

Sample R files and data that you can use to experiment with will be made available, but you may like to bring along your own.

Unless you have been told otherwise, in classroom workshops there will be a computer available for you to use with *RStudio* installed. For on-line courses you will need to register for a free account with Posit Cloud <https://login.posit.cloud/>

You can use your own computer with your preferred R environment installed if you want to – just bear in mind that I am not an expert in every app (although I am sure that between us we will be able to sort out most problems!).

## Further information

### Getting extra help

The IT Learning Centre offers bookable clinics where you can get pre- or post-course advice. Contact us using [courses@it.ox.ac.uk](mailto:courses@it.ox.ac.uk).

### Study Videos from LinkedIn Learning

On our website, you will find our collection of self-service courses and resources. This includes providing LinkedIn Learning video-based courses free to all members of the University. Visit [skills.it.ox.ac.uk/linkedin-learning](https://skills.it.ox.ac.uk/linkedin-learning) and sign in with your Single Sign-On (SSO) credentials.

Some courses recommend pre- and/or post-course activities to support your learning. You can watch the online videos anywhere, anytime, and even download them onto a tablet or smartphone for off-line viewing.

### About the IT Learning Portfolio online

Many of the resources used in the IT Learning Centre courses and workshops are made available as Open Educational Resources (OER) via our Portfolio website at [skills.it.ox.ac.uk/it-learning-portfolio](https://skills.it.ox.ac.uk/it-learning-portfolio).

Find the pre-course activity for this course in the IT Learning Portfolio: visit [skills.it.ox.ac.uk/it-learning-portfolio](https://skills.it.ox.ac.uk/it-learning-portfolio) and search for "R A first look activity".

### About the IT Learning Centre

The IT Learning Centre delivers over 100 IT-related teacher-led courses, which are provided in our teaching rooms and online, and we give you access to thousands of on-line self-service courses through LinkedIn Learning.

Our team of teachers have backgrounds in academia, research, business and education and are supported by other experts from around the University and beyond.

Our courses are open to all members of the University at a small charge. Where resources allow, we can deliver private courses to departments and colleges, which can be more cost-effective than signing up individually. We can also customize courses to suit your needs.

Our fully equipped suite of seven teaching and training rooms are usually available for hire for your own events and courses.

For more information, contact us at [courses@it.ox.ac.uk](mailto:courses@it.ox.ac.uk).

### About IT Customer Services

The IT Learning Centre is part of the Customer Services Group. The group provides the main user support services for the department, assisting all staff and students within the University as well as retired staff and other users of University IT services. It supports all the services offered by IT Services plus general IT support queries from any user, working in collaboration with local IT support units.

The Customer Services Group also offers a data back-up service; an online shop; and a computer maintenance scheme. Customer Services is further responsible for desktop computing services – for staff and in public/shared areas – throughout UAS and the Bodleian Libraries.

# R: A First Look

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# Resources for your learning

## Activities for you to practice today

In the coursebook

Work at your own pace!

Be selective



## Videos with today's topics

[LinkedIn Learning](#)

## Follow-up work

Continue with exercises after the session

Bookable Course Clinics later

# What is R and what can you use it for?

- *A statistical* programming language
  - Can be used for non-statistical programming too
  - Great for specific domains due to code repositories (CRAN, Bioconductor)
  - Great for [visualisation](#)
  - Versions and packaging are highly streamlined
- When to use other languages (e.g. Python)?
  - When speed and memory usage are considerations (but we are talking *millions* of data points!)
  - Image/video analysis



# What is RStudio?

- An Integrated Development Environment (IDE) for R
  - Not necessary but makes coding much easier!
  - Tools to visualise data, R objects, help files, etc.
  - Helps organise R files into "Projects"
  - Additional tools for reporting (R Markdown), building websites, integration with git (version control)
  - Posit Cloud (formally RStudio Cloud): An online version of RStudio, for teaching, collaborative projects

# 1-Intro The basics

- On the first worksheet, we'll:
  - Study the basics of R
  - Learn how to carry out arithmetical calculations
  - Store values as variables
  - Learn what vectors are and how to work with them

# 2-Data management

- On the second worksheet, we'll:
  - Learn about data frames and import one
  - Select columns and rows of a data frame
  - Filter data by its values

# 3-Data analysis and visualisation

- On the third worksheet, we'll:
  - Learn some exploratory data analysis methods using R
  - Make simple plots
  - (Optionally) Fit linear models and plot lines of best fit

# 4-Data reporting

- On the fourth worksheet, we'll:
  - Comment some pre-written code
  - (Optionally) Look at an R Markdown document

# 5-Tidyverse

- On the fifth worksheet, we'll:
  - Learn what packages are, and load one
  - Use pipes to chain up functions
  - Use tidyverse packages to manipulate data and make plots

# Continue to learn R...

- [Install swirl](#) and type swirl() into the R console
- Other courses offered by
  - Medical Sciences Division: [Intro to R for Biologists](#)
- LinkedIn Learning: [R for data science](#) (free through Oxford institutional subscription, needs SSO)
- Free online book: [R for Data Science](#) (also available to purchase in paper copy)
- Google!

# Find the resources for this workshop in our IT Learning Portfolio

Download the files  
(and more) from the  
IT Learning Portfolio at

[skills.it.ox.ac.uk/it-learning-portfolio](https://skills.it.ox.ac.uk/it-learning-portfolio)

The screenshot shows the IT Learning Centre website. At the top, there is a navigation bar with the logo and menu items: COURSES, TEACHING ROOMS, SERVICES, EVENTS, NEWS, ABOUT US. Below the navigation bar, the page title is "IT Learning Portfolio". The main content area includes a welcome message, a search bar, and a list of resources. The resources are organized into a table with columns for Audience, Category, Software, and Resource. Each resource entry has a right-pointing arrow icon. The resources listed include: 3D modelling: Kick-off AND Blender - Up and running (Activity), AR Effects: Animating texts and graphics (Activity), Apps for education (Activity), AR/VR: Augmented Reality for mobile devices (Activity), AR/VR: Unity - a practical introduction (Activity), AR/VR: Virtual Reality for desktop or mobile (Activity), Audacity: Recording your voice (Toolkit Activity), Audio: Recording the spoken word (Activity), Beginners IT: Making the most of single sign on (Course pack), C++: A comprehensive introduction (Course pack), Corpus - Why would I use a corpus (Toolkit Activity), Create an online presence with WordPress (Activity), Data analysis: ATLAS.ti (Activity), Data analysis: Introduction to working with statistics (Course pack), Databases: Building a database (Activity), Databases: Building a database (Course pack), Databases: Concepts for project managers (Activity), Databases: Concepts for project managers (Course pack), Databases: Concepts of database design (Activity), Databases: Concepts of database design (Course pack). On the right side of the page, there is a contact information section with the text: "Contact us: IT Learning Centre. Use our online contact form. Email us at [it.learning@ox.ac.uk](mailto:it.learning@ox.ac.uk). Call us on 01865 272200 (option 2)." There is also a small icon of an open book next to the contact information.



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