Course syllabus

In previous courses, you learned how to use structured thinking to solve business problems; prepare, clean, transform, and analyze data in spreadsheets and databases; and tell effective data stories. As part of your growing skillset, you also learned how to create dynamic and interactive data visualizations in Tableau. Up until now, the skills you learned were closely tied to the features and capabilities available in spreadsheets, SQL databases, and Tableau. But what if you want to work with your data in more custom ways? Or what if the standard tools don't have the exact functionality you need? This is when the R programming language can be super helpful. Using R, you will gain additional flexibility and control over your data and analysis.

1. Foundations: Data, Data, Everywhere
2. Ask Questions to Make Data-Driven Decisions
3. Prepare Data for Exploration
4. Process Data from Dirty to Clean
5. Analyze Data to Answer Questions
6. Share Data through the Art of Visualization
7. **Data Analysis with R Programming** *(this course)*
8. Google Data Analytics Capstone: Complete a Case Study

In this course, you will learn how to use the R programming language to work with your data without tool limitations. You will get plenty of practice using R for statistical analysis, and RStudio—an integrated developer environment (IDE) for R that you will use to create advanced data visualizations with lots of detail. R makes it easier to present your data with beautiful, artistic style. A few other advantages of R include its:

- **Popularity**: R is frequently used for data analysis
- **Tools:** R has a convenient library of ready-to-use tools for data cleaning and analysis
- **Focus**: R was created with statistics in mind; data analysts can conveniently use a rich library of statistical routines
- **Adaptability**: R adapts well for use in both machine learning and data analysis projects
- **Availability**: R is an open source programming language

After you get comfortable and more confident using R and RStudio, you might find that you are curious to learn and add even more programming languages to your skillset (and resume). Pretty exciting, right?

Course content

Course 7 – Data Analysis with R Programming

1. **Understanding the basics of R:** R is a programming language that can be used to perform tasks in every phase of the data analysis process. In this part of the course, you will learn about R and RStudio, an integrated developer environment (IDE) for R. You will explore the benefits of using RStudio to work with R. RStudio enables you to easily leverage the features and functionality of R.
2. **Programming using RStudio:** In this part of the course, you will explore the fundamental concepts associated with R. You will learn about functions and variables that you can use in your calculations and other programming. You will also learn about R packages, which are collections of R functions, code, and sample data that you can use in RStudio.
3. **Working with data in R:** The R programming language was designed to work with data at all stages of the data analysis process. In this part of the course, you will examine how R can help you structure, organize, and clean your data through functions and other processes. You will learn about data frames and how to work with them in R. You will also revisit the concept of data bias and how you can use R to address it.
4. **Visualizations, aesthetics, and annotations:** R is a great tool for creating detailed visualizations. In this part of the course, you will learn how to use R to generate and troubleshoot visualizations. You will also explore the features of R and RStudio that can help you improve the aesthetics of your visualizations. You will learn how to annotate visualizations and save the changes.
5. **Documentation and reports:** R has a number of different options to explore when you are ready to save and present your analysis. In this part of the course, you will explore R Markdown, a file format for making dynamic documents with R. You will learn how to format and export R Markdown and incorporate R code chunks in your documents.
6. **Course challenge:** At the end of the course you will apply everything you have learned in the Course Challenge. The Course Challenge will ask you questions about the key skills you have been practicing and will give you an opportunity to demonstrate those skills in three scenarios.

Are you already familiar with R programming?

If you have used R and RStudio before, you might find the first two weeks of this course a review of basic topics that you already understand. Feel free to skip these foundational videos and readings and proceed to the weekly challenges for Week 1 and Week 2. The weekly challenges will help prepare you for the course challenge at the end of this course. To earn the certificate, you need to score 80% or higher on all graded activities in the program.

What to expect

You can expect to finish this course in about four to five weeks. That involves completing all the activities, including:

- **Videos** of instructors teaching new concepts and demonstrating the use of tools
- **In-video questions** that pop up during or at the end of a video to check your learning
- **Readings** to introduce new ideas and build on the concepts from the videos
- **Discussion forums** to discuss, explore, and reinforce new ideas for better learning
- **Discussion prompts** to promote thinking and engagement in the discussion forums
- **Qwiklabs** to introduce real-world, on-the-job situations, and the tools and tasks to complete assignments
- **Practice quizzes** to prepare you for graded quizzes
- **Hands-on activities** to reinforce learned skills for the graded quizzes
- **Graded quizzes** to measure your progress and give you valuable feedback

Hands-on activities promote additional opportunity to build your skills, so try to get as much out of them as possible. Assessments are based on the approach taken by the course to offer a wide variety of learning materials and activities that reinforce important skills. Graded and ungraded quizzes will help the content sink in and reinforce important skills. Ungraded practice quizzes are a chance for you to prepare for the graded quizzes, and both the graded and ungraded quizzes can be taken more than one time.

As a quick reminder, this course is designed for all types of learners, so no degree or prior experience is required. Everyone learns differently, and the Google Data Analytics Certificate has been designed with that in mind. Personalized deadlines are just a guide, so feel free to work at your own pace. There is no penalty for late assignments. If you prefer, you can extend your deadlines by returning to **Overview** in the navigation pane and clicking **Switch Sessions**. If you already missed previous deadlines, click **Reset my deadlines** instead.

If you would like to review previous content or get a sneak peek of upcoming content, you can use the navigation links at the top of this page to go to another course in the program. When you pass all the required assignments, you will be on track to earn your certificate.

Tips

- Try to complete all the activities in order, since new information always builds on previous lessons.
- Treat every task as if it is real-world experience. Have a mindset that you are working at a company or in an organization as a data analyst. This will help you apply what you learn in this program to the real world.
- Repeat demonstrated tasks on your own for extra practice and speed. For example, after you follow along with a video once or twice to perform the demonstrated tasks, try performing the same tasks without playing the video and receiving help from the instructor's prompts.
- Even though they aren't graded, be sure to participate in and complete all of the practice activities. They will help you build a strong foundation as a data analyst and prepare you for the graded assessments.
- Take advantage of all the additional resources provided, including discussion forums and links to external articles for more information.
- When you encounter useful links in the course, remember to bookmark them so you can refer to the information for study or review.
- Additional resources are free, but some sites place limits on how many articles you can access for free each month. Sometimes you can register on the site for full access, but you can always bookmark a resource and come back to view it later.
- Maximize the value of hands-on activities. Hands-on activities supplement the demonstrated tasks by encouraging additional practice with similar scenarios. A programming language's syntax will become more natural to you the more you practice using it.
- Create a notebook or document to keep track of things to remember about the R syntax. This will become a handy and personalized reference that you can use throughout the rest of the program and anytime later.

Mark as completed