

**Ph.D. RESEARCH SKILLS TRAINING COURSE:**

**DATA VISUALIZATION WITH “R”  
ACADEMIC YEAR 2023/24**

**LECTURER:** Iñaki Úcar Marqués

**TITLE:** Data visualization with R

**ABSTRACT**

This course aims to equip participants with the skills and knowledge required to create effective and impactful visual representations of data using ggplot2. The course covers the fundamentals of graphical practice based on the implementation of the grammar of graphs in R, and delves into specific types of data visualizations, such as distribution, correlation, ranking, maps, and more.

Throughout the course, participants will work with practical examples and exercises to apply the concepts learned in each module. By the end of the course, participants will be able to effectively create and communicate insights from data using R's powerful data visualization tools.

**SYLLABUS**

1. Fundamentals of graphical practice
  1. Graphical integrity
  2. Graphical perception
  3. Principles of graphical representation
2. The grammar of graphs in R
  1. Building graphs layer by layer
  2. Guides and scales
  3. Coordinate systems
  4. Facets
  5. Themes
3. Data visualization in R
4. Real-world practical examples

## **DURATION**

- 12 hours of instruction (4 lessons, 3 hours each)
- 12 hours of personal work

## **DATES AND SCHEDULE**

May 28, June 4, 11 and 18 2024 from 10 am to 1 pm.

## **REQUIREMENTS**

- Basic Programming in R

## **TECHNICAL REQUIREMENTS**

- R + RStudio: <https://posit.co/download/rstudio-desktop/>

## **METHODOLOGY**

- Class lectures by the professor with the support of computer and audiovisual media, in which the main concepts of the subject are developed and the bibliography is provided to complement the students' learning.
- Resolution of practical cases, problems, etc. posed by the teacher individually or in groups.
- Preparation of papers and reports individually or in groups.

## **CAMPUS**

Escuela Politécnica Superior (EPS)

## **LANGUAGE**

English

## **EVALUATION CRITERIA**

In order to obtain the 2 ECTS of this course, it is necessary to attend at least 75% of the sessions, participate in the proposed activities and complete the required assignments.

## **BIBLIOGRAPHY**

- Tufte, E. R.. The visual display of quantitative information. Graphics Press. 2018
- Wilkinson, L.. The grammar of graphics. Springer New York. 2005

## **ABOUT THE LECTURER**

Iñaki Ucar is Assistant Professor at the Department of Statistics and Research Fellow at the Big Data Institute of Universidad Carlos III de Madrid (Spain). He is Director of the Master in Computational Social Science, an open-source advocate and R package author.

He received his MEng in Telecommunications Engineering and MScEng in Communications from Universidad Pública de Navarra (Spain) in 2011 and 2013 respectively, and his MScEng and PhD in Telematic Engineering from Universidad Carlos III de Madrid in 2014 and 2018 respectively.

He has developed expertise in statistical software, high-performance computing, simulation, data wrangling and visualisation, network analysis and Markov processes. His current research interests are varied, including interpretability of ML models, and the application of data science to problems related to social networks, collective behaviour, inequality and misinformation.