

# Course : R environment, manipulations and elementary statistics

*Practical course - 2d - 14h00 - Ref. MDR*

*Price : 1680 CHF E.T.*



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R is a language and software dedicated to statistical processing. It also offers high-quality tools for data visualization. This course is designed for participants who are already familiar with the R language and who wish to carry out elementary statistical processing and professional displays.



## Teaching objectives

**At the end of the training, the participant will be able to:**

- ✓ Build datasets for analysis from multiple sources
- ✓ Manipulate data to transform them using various functions
- ✓ Drawing curves and graphs with R
- ✓ Apply several algorithms for calculating statistical indicators

## Intended audience

Statisticians, analysts, engineers, developers. Anyone who needs to manipulate data, process data numerically and graphically, or create statistics in R.

## Prerequisites

Basic knowledge of R software, or knowledge equivalent to that acquired in the course "R environment, introduction" (ref. TDA).

## Course schedule

### 1 Reminders

- The RStudio environment.
- Data types in R, lists, DataFrames, factors and ordinal variables.
- Dates and time series.

### Hands-on work

Getting to grips with scripts in the RStudio environment.

## PARTICIPANTS

Statisticians, analysts, engineers, developers. Anyone who needs to manipulate data, process data numerically and graphically, or create statistics in R.

## PREREQUISITES

Basic knowledge of R software, or knowledge equivalent to that acquired in the course "R environment, introduction" (ref. TDA).

## TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

## ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more. Participants also complete a placement test before and after the course to measure the skills they've developed.

## 2 Import-export and data production

- Read an ASCII text file, Excel, SPSS, Minitab, SAS or Matlab.
- Read data from the keyboard and copy and paste.
- Read/write files and databases.

### Hands-on work

Read/write data from files, database, data lake and in R format.

## 3 Data manipulation, functions

- Operations on matrices or DataFrames.
- The outer, apply, lapply, sapply and mapply functions.
- Logical and relational operations.
- String manipulation. Date and time unit manipulation.

### Hands-on work

Handle matrices and DataFrames. Use lapply or sapply functions to replace for loops.

## 4 Techniques for drawing curves and graphs

- Graphic windows: handling, saving.
- Low-level plot functions.
- Color management and graphic parameters.
- Add text, titles, axes and captions.
- Cross, organ pipe, stacked or circular diagrams. Mustache box.
- Empirical distribution function graph. Density histogram with equal or unequal class amplitudes.
- Frequency polygon. Graphical representations in a bivariate framework.

### Hands-on work

Techniques for drawing curves and graphs.

## 5 Elementary mathematics and statistics

- Structuring variables according to type.
- Digital summaries.
- Association measures.
- Concepts of random number generation and random variables.
- Law of large numbers and central limit theorem.
- Confidence intervals.
- Standard hypothesis testing. Other hypothesis tests.
- One-factor, two-factor or repeated-measures analysis of variance.

### Hands-on work

Implementation of the algorithm for determining the type of a variable.  
Interpretation of a confidence interval.

### TEACHING AIDS AND TECHNICAL RESOURCES

- The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
- At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
- A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

### TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

### ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at [psh-accueil@orsys.fr](mailto:psh-accueil@orsys.fr) to review your request and its feasibility.

## Dates and locations

### REMOTE CLASS

2026 : 30 Mar., 28 May, 8 Oct.