



R APPLICATIONS CURRICULUM



R Applications Curriculum

VR Data Systems offers our R Applications Curriculum to any individual seeking education and training in sophisticated statistical, data analysis and data modeling techniques using the R package. Courses in this curriculum will provide an understanding of graphical data analysis, statistical models, and inference. Students will learn using practical applications, and are welcome and encouraged to use challenges from their own profession as learning tools during class discussions and projects.

R is a language and environment for statistical computing and graphics. It is a GNU project which is similar to the S language and environment which was developed at Bell Laboratories (formerly AT&T, now Lucent Technologies) by John Chambers and colleagues. R can be considered as a different implementation of S. There are some important differences, but much code written for S runs unaltered under R. R provides a wide variety of statistical (linear and nonlinear modeling, classical statistical tests, time-series analysis, classification, clustering, ...) and graphical techniques, and is highly extensible.*

VRDS has over 15 years of experience working with and teaching S, the predecessor of R and we apply that same knowledge base and expertise in our curricula for R.

Courses

Code	Course Title	Length
RAC-350	Introduction to Statistics using R	2 Days
RAC-355	Graphical Data Analysis using R	2 Days
RAC-360	Statistical Inference using R	3 Days
RAC-365	Statistical Models using R	3 Days

Customized Courses

VR Data Systems will customize any course(s) to suit the unique business requirements of our clients. From the modification of standard curriculum to new course development, we will provide the education and training your organization needs to be more productive in today's competitive environment. Ask a VR Data Systems representative for more information.

About VR Data Systems, Inc.

VR Data Systems, Inc. (VRDS) is a training and consulting firm that specializes in Quality, Statistics, and Data Analysis. For more than 15 years, we have offered comprehensive, hands-on curricula for professionals at any experience level in numerous industries, including Pharmaceutical, Clinical, Manufacturing, Financial, and Software & Hardware Development. Our courses are taught by seasoned instructors who possess long-term expertise in their respective fields – from Sales and Marketing to Finance and R&D.

* from <http://www.r-project.org/about.html>

R Applications Curriculum

RAC-350 Introduction to Statistics using R

Length: 2 days

Course Goal

Upon completion of this course, the student will be able to understand fundamental statistical concepts and terminology, as well as know how to use R to perform basic data analysis.

Course Description

This course is ideal for any student who has no prior knowledge of statistics or data analysis. Using R, an integral part of this course, students will learn how to make sense of raw data, including patterns of dispersions, simple graphical analysis and relationships between two sets of data.

Broad Topics

- Using R as a tool for data analysis
- Organizing and analyzing data using R
- Qualitative and quantitative data
- Measures of location and dispersion
- Using R to create and interpret basic charts
- Summary statistics
- Normal distributions and applications
- Simple linear regression

Target Audience

Any technical or non-technical individual who has no experience in statistics or data analysis and would like to learn how to analyze data using R.

Prerequisites

None.

“What we have to learn to do, we learn by doing.”

-- Aristotle

Contact VRDS

Call
(732) 219-5935

Email
info@vrds.com

Fax
(888) 291-6501

Visit
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R Applications Curriculum

RAC-355 Graphical Data Analysis using R

Length: 2 days

Course Goal

Upon completion of this course, the student will understand how to analyze data graphically by using R.

Course Description

Since the emphasis of this course is placed on how to look at data as graphics rather than summary statistics, students will learn that well-designed data graphics are usually the simplest and most powerful methodology to analyze, explore, describe, summarize and communicate different types statistical information.

Broad Topics

- Using R as a tool for data analysis
- Elements of graphing data
- Portraying the distribution of a single set of data
- Comparing two sets of empirical distributions
- Comparing empirical data to theoretical distributions
- Studying two-dimensional data
- Developing and assessing regression models
- Plotting multivariate data

Target Audience

Any individual who would like to learn how to analyze patterns and/or trends within data using R.

Prerequisites

None.

“[data analysis is] the process of simplifying data in order to make it comprehensible.”

-- Fraenkel and Wallen

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RAC-360 Statistical Inference using R

Length: 3 days

Course Goal

Upon completion of this course, the student will understand how to generate samples and draw valid conclusions by applying rigorous statistical analysis methods to find and/or confirm research questions. These questions are then transformed into statistical hypotheses that can be tested using probability theory.

Course Description

In this course, students will learn the concepts of setting up several types of statistical tests to verify a hypothesis for population parameters based on sample statistics. Students will also be taught how to use R to perform calculations. Group projects, based on the students' actual business requirements, will be used as tools to allow participants to combine all of the steps they have learned in order to set up experiments and draw conclusions from their data.

Broad Topics

- Using R as a tool for data analysis
- Descriptive statistics
- Concepts in probability
- Discrete and continuous probability distributions
- Sampling distributions
- Confidence intervals
- Hypothesis testing
- Inferences on population mean, proportion and variance
- Linear regression

Target Audience

Any technical individual who would like to learn how to analyze patterns and/or trends within data.

Prerequisites

BDC-105 (Introduction to Statistics) or equivalent knowledge.

“Years ago a statistician might have claimed that statistics deals with the processing of data. . . today’s statistician will be more likely to say that statistics is concerned with decision making in the face of uncertainty.”

-- H. Chernoff and
L. E. Moses

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RAC-365: Statistical Models using R

Length: 3 days

Course Goal

Statistical models and simplified descriptions are central to studying natural or human phenomena. Upon completion of this course, the student will learn how statistical models can be applied to data sets that, in the past, were too large to analyze. Overall, the student will know the theory, methodology and diagnostics of using these models.

Course Description

This course introduces the concept of learning to use and apply state-of-the-art statistical models using R. Different models as well as the built-in diagnostics are used to find the best model using different situations.

Broad Topics

- Introductions to Models in R
- Linear Models and ANOVA
- Generalized Linear Models
- Generalized Additive Models
- Tree Based Models
- Nonlinear Models
- Mixed Effects Models
- Group project

Target Audience

This course is intended for statisticians or others that are proficient in statistics and want to quickly learn how to use and apply modeling techniques using R.

Prerequisites

RCC-300 (Introduction to the R Command Language) or equivalent knowledge and proficiency in statistics.

“Data is a lot like humans: It is born. Matures. Gets married to other data, divorced. Gets old. One thing that it doesn't do is die. It has to be killed.”

--Arthur Miller.

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