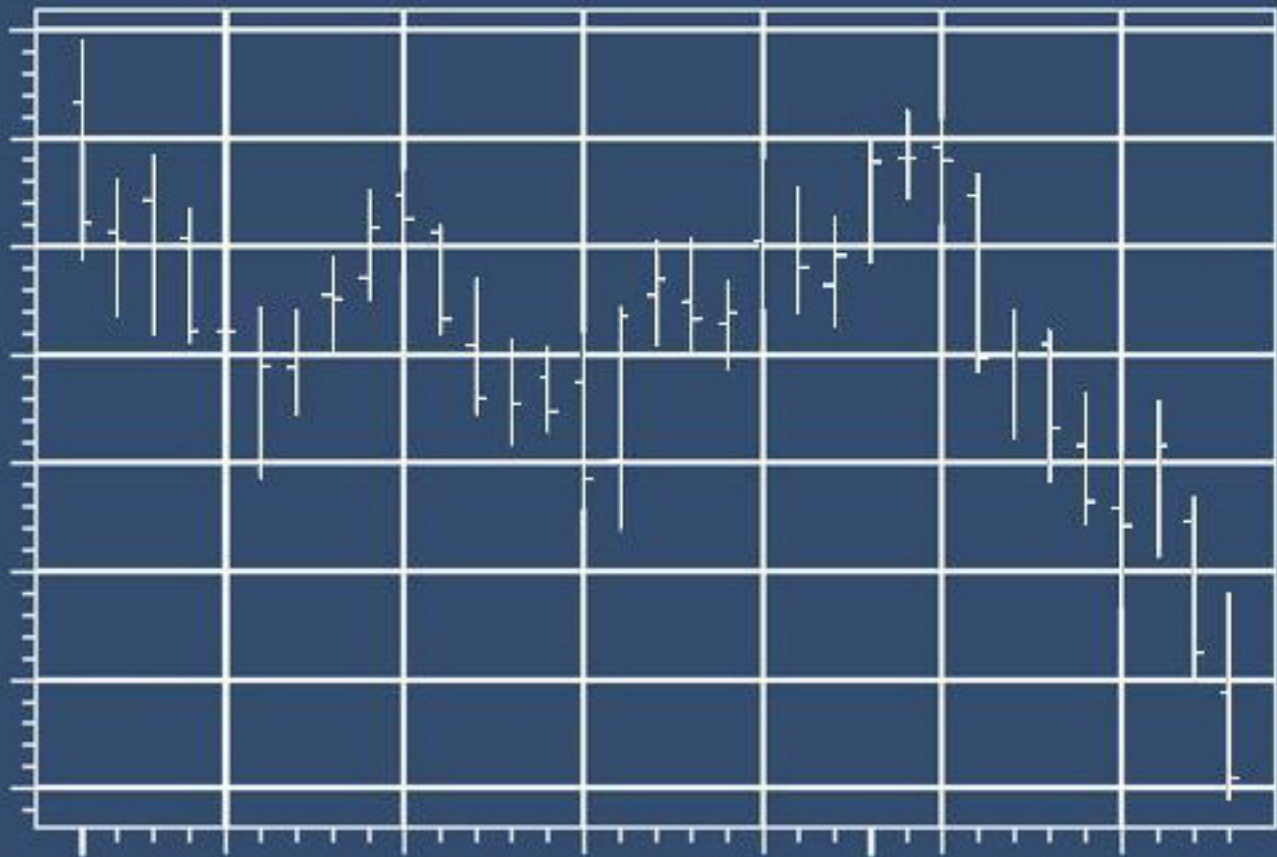


ADVANCED DATA ANALYSIS CURRICULUM



Advanced Data Analysis Curriculum

VR Data Systems offers our Advanced Data Analysis Curriculum to any individual seeking education and training beyond basic statistical concepts or those who simply need a refresher of higher-level subject matter. This series of courses will provide an understanding of experimentation, hypothesis testing, comprehensive data analysis and forecasting. 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.

All courses in our Advanced Data Analysis Curriculum address one or more topics required for the following certifications by the American Society for Quality (ASQ):

- Certified Six Sigma Black Belt (CSSBB)
- Certified Quality Engineer (CQE)
- Certified Quality Manager (CQM)

Courses

Code	Course Title	Length
ADC-150	Methods and Applications for Forecasting	2 Days
ADC-155	Basic Statistical Inference	3 Days
ADC-160	Design of Experiments	3 Days
ADC-165	Robust Design through Efficient Experimentation	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.

Advanced Data Analysis Curriculum

ADC-150: Methods and Applications for Forecasting

Length: 2 days

Course Goal

Upon completion of this course, the student will understand how to perform quantitative procedures used to predict future estimates by analyzing historical data. Forecasting is a key decision-making element in for managers as well as R&D personnel.

Course Description

In this course, students will learn how to apply forecasting theories to practical problems such as planning and decision-making. Participants will get an overview of the elements of forecasting and the building blocks of examining and presenting several different quantitative forecasting methodologies. Finally, students will be taught a number of descriptive statistics and performance measures, as well as the graphical methods with which to analyze their data.

Broad Topics

- Fundamentals of forecasting
- Smoothing methods
- Decomposition methods
- Simple/Multiple regression
- Time series forecasting
- Box Jenkins (ARIMA) models
- Multivariate time series analysis
- Data requirements for forecasting
- Predicting the cycle
- Qualitative methods for forecasting

Target Audience

Any technical or non-technical individual, including sales and marketing managers, and R&D personnel, who would like to learn how to analyze historical data to predict future behavior.

Prerequisites

BDC-105 (Introduction to Statistics), BDC-110 (Introduction to Statistics and Probability) or equivalent knowledge.

“To guess is cheap. To guess wrongly is expensive.”

-- Chinese proverb

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Advanced Data Analysis Curriculum

ADC-155: Basic Statistical Inference

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 learn the concepts of setting up several types of statistical tests to verify a hypothesis for population parameters based on sample statistics. The group projects, based on the students' actual business requirements, are useful learning tools that allow participants to combine all of the steps they have learned in order to set up experiments draw conclusions from their data. At the end of the course, relevant topics from the body of knowledge of ASQ's **Six Sigma Black Belt** Certification are discussed (optional).

Broad Topics

- Fundamental concepts of hypothesis testing
- Statistical vs. practical significance
- Sample size
- Point and interval estimation
- Confidence intervals
- Tests for means, variances and proportions
- Paired-comparison tests
- Goodness-of-fit tests
- Analysis of variance
- Contingency tables
- Non-parametric tests
- Testing for correlation coefficients

Target Audience

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

Prerequisites

BDC-110 (Introduction to Statistics and Probability) 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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Advanced Data Analysis Curriculum

ADC-160: Design of Experiments

Length: 3 days

Course Goal

Upon completion of this course, the student will be able to perform basic and advanced experimentation to understand the relationships between multiple sets of data.

Course Description

This course teaches the concepts and terminology used in the field of experimental design and then covers the planning and execution of multi-factor experiments. The planning step enables students to make decisions regarding objectives, responses, factors and the plan to be used in the experiment. The execution step teaches students to allocate resources, collect data and analyze their results. The group projects, based on the students' actual business requirements, are useful tools that allow students to combine all of the steps they have learned in order to achieve a successful experiment protocol.

This course is an absolute must for Six Sigma Black Belt Certification through the American Society for Quality (ASQ).

Broad Topics

- Introduction to experimentation
- Statistics of planned experimentation
- 2x2 Model: introduction to factorial experiments
- Analysis of two setting factorial experiments
- Two-Level fractional factorial experiments
- Analysis of variance and hypothesis tests
- Factorial experiments
- Iterative experimentation
- Group projects and case studies

Target Audience

Any technical individual who would like to learn how multiple sets of data influence each other.

Prerequisites

BDC-110 (Introduction to Statistics and Probability) or equivalent knowledge.

"If your result needs a statistician then you should design a better experiment."

--Baron Ernest
Rutherford

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Advanced Data Analysis Curriculum

ASC-165: Robust Design through Efficient Experimentation

Length: 3 days

Course Goal

Upon completion of this course, the student will be able to use statistical experimentation to plan experiments for obtaining dependable information about variables, including any noise factors, to make optimized R&D decisions.

Course Description

In this course, students learn to apply Taguchi's robustness concepts and techniques such as signal-to-noise ratio, as well as control and noise factors. In doing so, participants will use the Fundamental Principle to improve the quality of a product by minimizing the effect of the causes of variation without eliminating the causes. Students also construct experiments and apply computational and graphical methods to analyze and evaluate the significance of results. Group projects will help them apply concepts to case studies.

Broad Topics

- Robust design method
- Robust design method and quality engineering
- Operational steps of robust design method
- Selecting response, control and noise parameters
- Signal-to-noise ratios
- Constructing control and noise arrays
- Predicting better control parameter settings
- Confirming improved robustness
- Robust design case study

Target Audience

Any technical individual who would like to learn how to make optimum decisions within development and manufacturing environments.

Prerequisites

BDC-110 (Introduction to Statistics and Probability) or equivalent knowledge.

"To call in the statistician after the experiment is done may be no more than asking him to perform a postmortem examination: he may be able to say what the experiment died of."

-- R.A. Fisher

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