

[SAS-ST142]: Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression

Length : 3 Days
Delivery Method : Instructor-led (Classroom)

Course Overview

This introductory course is for SAS software users who perform statistical analyses using SAS/STAT software. The focus is on t tests, ANOVA, and linear regression, and includes a brief introduction to logistic regression. This course (or equivalent knowledge) is a prerequisite to many of the courses in the statistical analysis curriculum.

A more advanced treatment of ANOVA and regression occurs in the Statistics 2: ANOVA and Regression course. A more advanced treatment of logistic regression occurs in the Categorical Data Analysis Using Logistic Regression course and the Predictive Modeling Using Logistic Regression course.

Audience Profile

Statisticians, researchers, and business analysts who use SAS programming to generate analyses using either continuous or categorical response (dependent) variables

At Course Completion

- Generate descriptive statistics and explore data with graphs
- Perform analysis of variance and apply multiple comparison techniques
- Perform linear regression and assess the assumptions
- Use regression model selection techniques to aid in the choice of predictor variables in multiple regression
- Use diagnostic statistics to assess statistical assumptions and identify potential outliers in multiple regression
- Use chi-square statistics to detect associations among categorical variables
- Fit a multiple logistic regression model
- Score new data using developed models.

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Pre-Requisites

Before attending this course, you should

- have completed the equivalent of an undergraduate course in statistics covering p-values, hypothesis testing, analysis of variance, and regression
- be able to execute SAS programs and create SAS data sets. You can gain this experience by completing the SAS Programming 1: Essentials course.

This course addresses SAS/STAT software.

This course also addresses Base SAS software and touches on SAS/GRAPH software. The SAS Studio user interface, including statistical tasks, is addressed as an option for creating program code.

Course Outline

Module 1: Course Overview and Review of Concepts

Lessons

- Descriptive statistics
- Inferential statistics
- Examining data distributions
- Obtaining and interpreting sample statistics using the UNIVARIATE procedure
- Examining data distributions graphically in the UNIVARIATE and FREQ procedures
- Constructing confidence intervals
- Performing simple tests of hypothesis
- Performing tests of differences between two group means using PROC TTEST

Module 2: ANOVA and Regression

Lessons

- Performing one-way ANOVA with the GLM procedure
- Performing post-hoc multiple comparisons tests in PROC GLM
- Producing correlations with the CORR procedure
- Fitting a simple linear regression model with the REG procedure

Module 3: More Complex Linear Models

Lessons

- Performing two-way ANOVA with and without interactions
- Understanding the concepts of multiple regression

Module 4: Model Building and Effect Selection

Lessons

- Automated model selection techniques in PROC GLMSELECT to choose from among several candidate models
- Interpreting and comparison of selected models

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Module 5: Model Post-Fitting for Inference**Lessons**

- Examining residuals
- Investigating influential observations
- Assessing collinearity

Module 6: Model Building and Scoring for Prediction**Lessons**

- Understanding the concepts of predictive modeling
- Understanding the importance of data partitioning
- Understanding the concepts of scoring
- Obtaining predictions (scoring) for new data using PROC GLMSELECT and PROC PLM

Module 7: Categorical Data Analysis**Lessons**

- Producing frequency tables with the FREQ procedure
- Examining tests for general and linear association using the FREQ procedure
- Understanding exact tests
- Understanding the concepts of logistic regression
- Fitting univariate and multivariate logistic regression models using the LOGISTIC procedure
- Using automated model selection techniques in PROC LOGISTIC including interaction terms
- Obtaining predictions (scoring) for new data using PROC PLM

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