Course SIST231: Statistics 2: ANOVA and Regression

Length : 3 days
Audience(s) : Data Analyst, Researchers
Delivery Method : Instructor-led (classroom)

Course Overview

About this Course

This course teaches you how to analyze continuous response data and discrete count data. Linear regression, Poisson regression, negative binomial regression, gamma regression, analysis of variance, linear regression with indicator variables, analysis of covariance, and mixed models ANOVA are presented in the course.

Audience Profile

- Data analysts
- Researchers

Prerequisites

Before attending this course, you should

- have some experience creating and managing SAS data sets, which you can gain from the SAS Programming 1: Essentials course
- be able to fit simple and multiple linear regression models using the REG procedure
- be able to analyze a one-way analysis of variance using the GLM procedure
- understand the statistical concepts of normal distribution, sampling distributions, hypothesis testing, and estimation
- have completed a graduate-level course in regression and analysis of variance methods or the Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression course.

Students should have completed the SAS Programming 1: Essentials and Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression courses, or have equivalent experience.
This course addresses SAS/ETS, SAS/STAT software. You benefit from this course even if SAS/GRAPH software is not installed at your location.

Course Objectives

After completing this course, students will be able to:

- Fit polynomial regression models using the GLMSELECT and REG procedures
- Select models based on several statistics and automatic model selection methods using PROC GLMSELECT
- Evaluate model fit and model assumptions using the GLMSELECT, REG, GLM, GENMOD, and UNIVARIATE procedures

- Fit Poisson and negative binomial models using the GENMOD procedure, and fit gamma regression models using the GLIMMIX procedure
- Perform analysis of variance using the GLM procedure
- Write LSMESTIMATE statements in PROC GLM
- Fit ANCOVA models using PROC GLM
- Fit models with random effects using the GLIMMIX procedure
- Create a variety of statistical graphs.

Course Outline

Module 1: Regression

- building and evaluating polynomial regression models using PROC GLMSELECT and PROC REG
- dealing with violations of model assumptions and multicollinearity

Module 2: Analysis of Variance

- performing n-way ANOVA
- interpreting significant interactions
- writing LSMESTIMATE statements
- performing evaluation of model assumptions and remedial measures

Module 3: Regression Using Indicator Variables and Analysis of Covariance

- building and interpreting analysis of covariance models using the GLM procedure
- least squares means from an ANCOVA model
- diagnostics and remedial measures for ANCOVA models

Module 4: Generalized Linear Models

- using the GENMOD procedure to fit Poisson and negative binomial regression models
- using the GLIMMIX procedure to fit gamma regression models

Module 5: Linear Mixed Models

- performing linear mixed model analysis with PROC GLIMMIX