This course is for scientists and analysts who want to analyze observational data collected over time. It is not for SAS users who have collected data in a complicated experimental design. They should take the Mixed Models Analyses Using SAS® course instead.

**Skills Gained**

- create individual and group profile plots and sample variograms
- use PROC MIXED to fit a general linear mixed model and a random coefficient model
- plot information criteria for models with selected covariance structures
- generate diagnostic plots in PROC MIXED
- fit a binary generalized linear mixed model in PROC GLIMMIX
- fit an ordinal generalized linear mixed model and a model with spline effects in PROC GLIMMIX
- fit a binary GEE model in PROC GENMOD.

**Who Can Benefit**

- Epidemiologists, social scientists, physical scientists, and business analysts

**Prerequisites**

- Before attending this course, you should be able to
  - execute SAS programs and create SAS data sets
  - fit models using the GLM and REG procedures in SAS/STAT software.

**Course Details**

**Longitudinal Data Analysis Concepts**

- understanding the merits and analytical problems associated with longitudinal data analysis
Exploratory Data Analysis
- graphing individual and group profiles
- identifying cross-sectional and longitudinal patterns

General Linear Mixed Model
- understanding the concepts behind the linear mixed model
- examining the different covariance structures available in PROC MIXED
- fitting a general linear mixed model in PROC MIXED

Evaluating Covariance Structures
- creating a sample variogram that illustrates the error components in your model
- plotting information criteria for models with selected covariance structures

Model Development, Interpretation, and Assessment
- learning the model building strategies in PROC MIXED
- creating interaction plots
- specifying heterogeneity in the covariance structure
- computing predictions using EBLUPs
- fitting a random coefficient model in PROC MIXED
- generating diagnostic plots in PROC MIXED using ODS Graphics

Generalized Linear Mixed Models
- fitting a binary Generalized Linear Mixed Model in PROC GLIMMIX

Applications Using PROC GLIMMIX
- fitting an ordinal generalized linear mixed model in PROC GLIMMIX
- fitting a generalized linear mixed model with splines in PROC GLIMMIX

GEE Regression Models
- fit a binary GEE model in PROC GENMOD

Schedule (as of 2)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Enroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 7, 2021 – Apr 16, 2021</td>
<td>Virtual</td>
<td></td>
</tr>
<tr>
<td>Sep 15, 2021 – Sep 24, 2021</td>
<td>Virtual</td>
<td></td>
</tr>
</tbody>
</table>