

SAS Programming III: Advanced Techniques

Duration: 3.0 days

This Level IV course is designed for experienced SAS software programmers who want to add to their programming techniques and identify the most efficient of several techniques for accomplishing a particular task.

Course Description [\[Click to register ONLINE \]](#)

This course builds on the concepts presented in the [SAS Programming II: Manipulating Data with the DATA Step](#) course. This course focuses on reading data with direct access; combining data; sorting; using multidimensional arrays, hash tables, and formats for table lookups; efficiently storing data; utilizing best practices; and creating tables with the SAS Scalable Performance Data Engine.

This course is a combination of the previously offered [SAS Programming III: Advanced Techniques](#) and [Optimizing SAS Programs](#) courses.

Prerequisites

This course is **not** appropriate for beginning SAS software users. Before attending this course, you should have at least nine months of SAS programming experience and should have completed the [SAS Programming II: Manipulating Data with the DATA Step](#) course. Specifically, you should be able to do the following:

- understand your operating system file structures and perform basic operating system tasks
- understand programming logic concepts
- understand the compilation and execution process of the DATA step
- use different kinds of input to create SAS data sets from external files
- use SAS software to access SAS data libraries
- create and use SAS date values
- read, concatenate, merge, match-merge, and interleave SAS data sets
- use the DROP=, KEEP=, and RENAME= data set options
- create multiple output data sets
- use array processing and DO loops to process data iteratively
- use SAS functions to perform data manipulation and transformations.

Course Contents

Introduction

- measuring efficiencies
- SAS processing
- controlling memory and I/O resources

Accessing Observations

- creating a sample data set
- creating and using an index

Combining Data Horizontally

- joining data sets by value
- combining summary and detail data

- using an index to combine data
- updating data
- combining summary and detail data using two SET statements (self-study)

Combining Data Vertically

- appending SAS data sets
- appending raw data files

BY-Group Processing and Sorting

- eliminating duplicates
- sorting resources
- choosing the right sort routine (self-study)
- alternatives to sorting

Using Lookup Tables to Match Data

- using arrays as lookup tables
- using hash objects as lookup tables
- using formats as lookup tables
- transposing data to create a lookup table

Controlling Data Storage Space

- reducing the length of numeric variables
- compressing data files
- creating a DATA step view

Utilizing Best Practices to Improve Efficiency

- executing only necessary statements
- eliminating unnecessary passes through the data
- reading and writing only essential data
- networking efficiency considerations (self-study)

Using the Scalable Performance Data Engine (Self-Study)

- creating SPD engine tables
- using the SPD engine efficiently
- SPD Engine LIBNAME statement options list

Additional Topics (Self-Study)

- modifying SAS data sets in place
- creating generation data sets
- creating integrity constraints
- creating and using audit trails
- working with Perl regular expressions

Course Materials

Students attend classroom courses in one of our public training centers. You receive a hardcopy of the course notes.