

# SAS Industry-Ready Bootcamp

SAS Data Engineer

Total Duration: 158 Hours

This comprehensive Learning program is designed to build proficiency in SAS Data Engineering, enabling Learners to gain expertise in SAS programming, master macros, and process SAS data using SQL, SAS Viya, and more.

## Basic Qualifications:

**Final year/Graduate/Master's degree:** A degree in a relevant field such as Computer Science, Data Science, Information Technology, Statistics, Engineering, or Mathematics preferred. A formal degree is helpful but not always mandatory, depending on practical experience and certifications.

**Pre-requisite:** Basic understanding of any programming language is preferred, as it will help in grasping core concepts more quickly.

## Instructor-Led Content (90 Hours)

SAS Programming I	
• The SAS programming process	• Reading and filtering data
• Using SAS programming tools	• Computing new columns
• Understanding SAS syntax. Accessing Data	• Conditional processing. Analyzing and Reporting on Data
• Understanding SAS data.	• Enhancing reports with titles, footnotes, and labels
• Accessing data through libraries	• Creating frequency reports
• Importing data into SAS. Exploring and Validating Data	• Creating summary statistics reports. Exporting Results
• Exploring data	• Exporting data
• Filtering rows	• Exporting reports. Using SQL in SAS
• Formatting columns	• Using Structured Query Language in SAS
• Sorting data and removing duplicates. Preparing Data	• Joining tables using SQL in SAS

SAS Programming II	
<ul style="list-style-type: none"> <li>Controlling DATA Step Processing               <ul style="list-style-type: none"> <li>Setting up for this course</li> <li>Understanding DATA step processing</li> <li>Directing DATA step output</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Creating Custom Formats               <ul style="list-style-type: none"> <li>Creating and using custom formats</li> <li>Creating custom formats from tables</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Summarizing Data               <ul style="list-style-type: none"> <li>Creating an accumulating column</li> <li>Processing data in groups</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Combining Tables               <ul style="list-style-type: none"> <li>Concatenating tables</li> <li>Merging tables</li> <li>Identifying matching and nonmatching rows</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Manipulating Data with Functions</li> </ul>	<ul style="list-style-type: none"> <li>Processing Repetitive Code               <ul style="list-style-type: none"> <li>Using iterative DO Loops</li> <li>Using conditional DO Loops</li> </ul> </li> </ul>

- Understanding SAS functions and CALL routines
- Using numeric and date functions
- Using character functions
- Using special functions to convert column type

- Restructuring Tables
  - Restructuring data with the DATA step
  - Restructuring data with the TRANSPOSE procedure.

## SAS Macros

- Introduction

- Why SAS macro?
- Setting up for this course

- SAS Macro Facility

- Program flow
- Creating and using macro variables

- Storing and Processing Text

- Macro functions
- Using SQL to create macro variables
- Using the DATA step to create macro variables
- Indirect references to macro variables

- Working with Macro Programs

- Defining and calling a macro
- Macro variable scope
- Conditional processing
- Iterative processing

- Developing Macro Applications

- Storing macros
- Generating data-dependent code
- Validating parameters and documenting macros

## SAS SQL

- Essentials

- Setting up for this course
- Overview of SAS Foundation
- Course Logistics
- Course data files
- Introducing the Structured Query Language
- Overview of the SQL procedure
- Exploring tables
- Specifying columns

- PROC SQL Fundamentals

- Subsetting data
- Presenting data
- Summarizing data
- Creating and managing tables
- Using DICTIONARY tables

- SQL Joins

- Introduction to SQL joins
- Inner joins
- Outer joins
- Complex SQL joins

- Subqueries

- Noncorrelated subqueries
- Correlated subqueries
- In-Line views
- Creating views with the SQL procedure
- Subqueries in the SELECT clause
- Remerging summary statistics

- Set Operators

- Introduction to set operators
- The INTERSECT operator
- The EXCEPT operator
- The UNION operator
- The OUTER UNION operator

- Using and Creating Macro Variables in SQL

- Interfacing PROC SQL with the macro language
- Creating data-driven macro variables with a query
- Using macro variables in SQL

- Accessing DBMS Data with SAS/ACCESS


- Overview of SAS/ACCESS technology
- SQL pass-through facility
- SAS/ACCESS LIBNAME statement
- PROC FedSQL

## SAS Viya Programming

<ul style="list-style-type: none"> <li>• SAS Viya Platform Overview <ul style="list-style-type: none"> <li>• Introducing the SAS Viya pLatform</li> <li>• SAS Viya programming interfaces</li> <li>• SAS Viya servers and processing environments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Running SAS Code on the SAS Compute Server <ul style="list-style-type: none"> <li>• Overview of running SAS code on the SAS Compute Server</li> <li>• SAS Viya Compute Server overview</li> <li>• Running SAS 9 Code on the Compute Server in SAS Viya</li> </ul> </li> </ul>
<b>SAS Viya Programming</b>	
<ul style="list-style-type: none"> <li>• SAS Cloud Analytic Services (CAS) Overview <ul style="list-style-type: none"> <li>• CAS fundamentaLs</li> <li>• Understanding casLibs</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Modifying DATA Step Code to Run in SAS Cloud Analytic Services (CAS) <ul style="list-style-type: none"> <li>• Introduction to SAS procedures in SAS Viya</li> <li>• Modifying DATA step code to run in SAS CLoud AnaLytic Services (CAS).Running SAS Procedures in SAS CLoud AnaLytic Services (CAS)</li> <li>• Running CAS-enabLed SAS procedures</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Managing Data in SAS Cloud Analytic Services <ul style="list-style-type: none"> <li>• Loading data to in-memory tableS</li> <li>• Accessing DBMS data</li> <li>• Saving and dropping in-memory tableS</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Modifying SQL Code to Run in SAS Cloud Analytic Services (CAS) <ul style="list-style-type: none"> <li>• Modifying SQL code to run in CAS</li> <li>• CoLumn data types in CAS</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Using the Native CAS Language (CASL) <ul style="list-style-type: none"> <li>• Introduction to CASL</li> <li>• Using CAS actions</li> </ul> </li> </ul>

## Workshop and Self-Paced Learning (68 Hours)

In addition to the above mentioned duration, each track wiLL have an additionalL moduLe for you to Learn at your own pace.

	<input type="checkbox"/> <b>Data Literacy Essentials &amp; Practice</b> Learn what is data, what does it mean to be data Literate, and why is it important in today's worLd?	<input type="checkbox"/> <b>Generative AI Using SAS®</b> Learn about different types of GenAI and see examPles of how SAS can enhance your efforts to make the most of these techniques
	<ul style="list-style-type: none"> <li>• <b>SAS Analytics getting Started</b>  Learn the skiLLs you need to acquire to use SAS Viya's functionaLity in the fieLds of Predictive ModeLing, Time Series, Forecasting and Optimization.</li> </ul>	<input type="checkbox"/> <b>Resonsible Innovation and Trustworthy AI</b> This course focusses on foundationaL knowLedge and skiLLs to consider the issues reLated to responsible innovation and trustworthy AI
	<input type="checkbox"/> <b>SAS® Programming for R Users</b> Learn to appLy R skiLLs in SAS Environment	<input type="checkbox"/> <b>Modern Data Science with SAS Viya Workbench and Python</b> SAS Viya Workbench wiLL heLp you expLore how to access, transform, and anaLyze data from cLoud object storage and data Lakehouses, then buiLd machine Learning modeLs in both SAS and Python

### Global Certification Mapping:

#### 1. SAS Programming 1 + SAS Programming 2

**Global Certification:** SAS Certified SpecialList: Base Programming Using SAS 9.4

#### 2. Accelerating SAS Code on Viya Platform

**Global Certification:** SAS Viya Programming Associate



84% said a SAS certification improved their performance and advanced their careers.

- Coursera Survey conducted by SAS, 2020

ASPIRE TECHSOFTE

## Super Specialization for Data Engineers

Course Name	Prerequisite	Duration	Global Certification
• SAS Programming 3	SAS Programming 2: Data Manipulation Techniques	2 Days	SAS Certified Professional: Advanced Programming Using SAS 9.4
• SAS Viya and Python Integration fundamentals	Python knowledge	2 Days	N.A.
• High Performance data processing using CASL	Accelerating SAS code on the SAS Viya Platform	3 Days	SAS Viya Programming Specialist
• Managing and querying data using flows in SAS studio • Using SAS Studio Engineer steps in SAS studio Flows		2 Days	N.A.



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