



Learn with Newtyne

Fundamentals: the Language of SAS

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Duration: 20-22 hours (plus additional time for exercises)

Learning Overview:

This is the first course in a series by Newtyne, designed to give you an insight and fundamental understanding of data analytics and how it can benefit you in your steps to becoming a Data Analyst using the Language of SAS.

This online course is delivered using a blended learning pathway via our digital learning platform and will provide you with a fundamental knowledge and understanding of the essential elements of the programming language of SAS.

There are mini quizzes and comprehensive exercises throughout to help assess and reinforce your learning.

Learning Outcome:

By the end of this course, you will be able to:

1. Explain the introductory elements and concepts of the Language of SAS.
2. Describe the fundamental Programming Concepts within the Language of SAS.
3. Use Procedures to summarise data and create customised list reports.
4. Apply techniques to read from and write to non SAS files.

Delivery Schedule:

On day 1 we invite you to join a short online welcome to meet your instructor, introduce you to our Digital Learning platform and get you started on the eLearning modules of this course.

You will need 4 hours to complete the 6 eLearning modules with additional time required for exercises.

We ask you to complete these modules before joining us for the online masterclass on day 2.

This is followed by 3 x 4 hour live online classes to complete your learning.

In addition, you will also need to set aside time to complete the Hands-On exercises.

Each day finishes with an opportunity for you to join an open Q&A session with the instructor if you need any additional support.

Day 1	Welcome and Introduction to eLearning modules	09:00 – 10:00 (GMT)
Day 2	Live Online Masterclass to consolidate eLearning	09:00 – 13:00 (GMT)
Day 3	Live Online Class 1	09:00 – 13:00 (GMT)
Day 4	Live Online Class 2	09:00 – 13:00 (GMT)
Day 5	Live Online Class 3	09:00 – 13:00 (GMT)

Pre-requisites:

This course is aimed at those who are new to the Language of SAS.

You should already have:

- Knowledge of your computer system
- Basic computer literacy
- Some previous programming experience, although this is not essential

For the hands-on practice activities in the course, you will need access to an environment that runs the programming Language of SAS. On our courses, we signpost you to some of the free tools available.

Check out the link below to review system requirements:

- [SAS® OnDemand for Academics](#)

Learning Modules:

Introduction to SAS Programming (eLearning)

Learning Objective: Explain what the Language of SAS is used for and by whom.

- Explanation about SAS and who uses it
- Data Access
- Data Management
- Data Analysis
- Data Presentation

Basic Concepts (eLearning)

Learning Objective: Explain how the Language of SAS is used to access, manage, analyse and present data.

- What is a dataset, a database and a relational database?
- Libraries, LIBREFS, LIBNAME statement
- Referencing a dataset
- The Data Step procedure
- Basic Procedures including PROC MEANS and PROC PRINT

Investigating SAS datasets (eLearning)

Learning Objective: Define how to investigate datasets in the Language of SAS using two types of Procedure.

- The PRINT procedure
- Metadata, the CONTENTS procedure
- Types of data

Programming Concepts (eLearning)

Learning Objective: Describe the key programming concepts within the Language of SAS.

- Program components – Data Steps and Procedures
- Programming language is made up of statements, expressions, functions & call routines, options, formats, and informats
- Managing Syntax errors
- Naming conventions

Data Step Processing (eLearning)

Learning Objective: Explain how the two phases of Data Step Processing work to create new datasets and variables.

- Data Step syntax: The DATA and SET Statements
- Creating Datasets
- Creating Variables
- Data Step processing, i.e. what goes on in the background when you submit your data step code.

Selecting Variables and Observations (eLearning)

Learning Objective: Define Variables and Observations to be read from and written to datasets.

- KEEPing and DROPing Variables
- The IF Statement
- The WHERE Statement
- Comparison and Logical Operators
- FIRSTOBS= and OBS=
- Special WHERE operators

Introduction to Functions (live online class)

Learning Objective: Describe how functions are used to transform Numeric, Date and Character values.

- SUM and MEAN functions for numerics
- TODAY, MDY, DAY, WEEKDAY, WEEK, MONTH, QTR and YEAR
- UPCASE, LOWCASE and SUBSTR functions for character values

IF THEN ELSE Processing (live online class)

Learning Objective: Apply conditional logic to assign values to variables and to control which observations are written to multiple output datasets.

- IF-THEN-ELSE syntax
- DO-END syntax
- The LENGTH statement
- The OUTPUT statement
- The DELETE statement

System Formats (live online class)

Learning Objective: Describe how formats can be used to change the displayed values of Character, Numeric and Date variables.

- System supplied formats
- \$w. simple character
- w.d, COMMAw.d, NLMNYw.d numeric and currency formats
- DATEw. and DDMMYYw. date formats

Sorting data with PROC SORT (live online class)

Learning Objective: Use the Sort Procedure to re-order observations in a dataset, remove duplicate data and create an output dataset.

- PROC SORT syntax
- Using BY and NODUPKEY to remove duplicates
- The OUT= option

Combining Datasets Vertically (live online class)

Learning Objective: Explain the three methods which can be used to combine datasets together vertically.

- Concatenate multiple datasets
- Append one dataset to another
- Interleave multiple datasets

Combining Datasets Horizontally (liveonline class)

Learning Objective: Describe how datasets can be combined together horizontally or merged including matches and non-matches.

- One-to-One merging
- One-to-Many merging
- Selecting matches and non-matches
- Introduction to Proc SQL joins

Frequency Counts with PROC FREQ (live online class)

Learning Objective: Use the Freq Procedure to generate frequency counts and percentages of data values within a dataset.

- One-way frequencies
- Two-way frequencies
- N-way frequencies
- Create an output dataset

Summary Statistics with PROC MEANS (live online class)

Learning Objective: Use the Means Procedure to calculate summary statistics within a dataset, selecting classification and analysis variables.

- PROC MEANS syntax
- CLASS and VAR statements
- Specifying Statistic keywords
- Create an output dataset

Summary Tables with PROC TABULATE (live online class)

Learning Objective: Use the Tabulate Procedure to calculate summary statistics in one, two and three dimension tabular form.

- PROC TABULATE syntax
- CLASS and VAR statements
- Define table content – TABLE statement
- Produce multiple output tables

Analysing Values with PROC UNIVARIATE (live online class)

Learning Objective: Describe the 5 default statistical tables produced by the Univariate Procedure and the options available to modify the output.

- PROC UNIVARIATE syntax
- CLASS and VAR statements
- ID statement and Options

List Reports with PROC PRINT (live online class)

Learning Objective: Create customised list reports with the Print Procedure.

- Select variables and observations
- Creating and using variable labels
- Adding titles and footnotes
- Grouping observations
- Calculating totals and sub-totals

Reading from and writing to Non-SAS Files (live online class)

Learning Objective: Explain methods which can be used to read from or write to non-SAS Files including delimited raw data and Excel files.

- Use Data Step syntax to read and write raw data
- Access Excel workbooks using the XLSX engine
- Create output files with Proc Export

- Create datasets with Proc Import

Error handling and Debugging (live online class)

Learning Objective: Writing and running SAS programs is often not successful on the first attempt so it's important to be able to read and understand Log messages.

- NOTES, WARNINGS and ERRORS
- Making sense of common error messages
- Methods for finding and correcting errors
- Testing your code
- Debugging your code