



## SAS (Statistical Analysis Software/System)

### SAS Analytics:-

#### Learning SAS:

##### **Getting Started with SAS**

- Basic overview about SAS software
- Basic about programming

##### **Working with SAS syntax**

- Fundamental concepts
- Characteristics of SAS statements
- Explain SAS syntax rules

##### **Getting Familiar with SAS dataset**

- Descriptor & Data portions
- Accessing SAS libraries

##### **Reading SAS datasets**

- How to read data in SAS
- SAS data as input
- Observations & variables

##### **Reading SAS datasets**

- Descriptor & Data portions

##### **Reading Excel worksheets**

- Overview about importing Excel file

##### **Reading Delimited Raw data files**

- How to read raw data
- Compilation & Execution phases of Data step

##### **Validating and cleaning data**

- Procedures for validating data
- Techniques for cleaning data

##### **Manipulating data**

- Variable creation
- Sub setting Observation

##### **Combining SAS Datasets**

- Appending, concatenating dataset
- Merging the SAS dataset

##### **Enhancing Report (ODS systems)**

- Global statements
- Format & Label Statement
- User Defined formats
- Sending output to external files (HTML,PDF,RTF)

##### **Summary Reports**

- FREQ Procedure
- MEANS Procedure

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- How to use procedures in Clinical trials

#### **Controlling Input and Output**

- Outputting multiple Observation
- Writing to Multiple SAS Datasets
- Selecting Variables & Observations

#### **Summarizing Data**

- Creating an Accumulating Total variable

#### **Reading Raw Data Files**

#### **Data Transformations**

- Manipulating character & numeric variables
- Converting Variable type

#### **Processing Data iteratively**

- Do loop processing
- SAS Arrays

#### **Restructuring a Data set**

#### **TRANSPPOSE Procedure**

### **Learning Excel:**

#### **The Basics**

- Creating a New Workbook
- Navigating in Excel
- Moving the Cell Pointer
- Using Excel Menus
- Using Excel Toolbars: Hiding, Displaying, and Moving Toolbars
- Entering Values in a Worksheet and Selecting a Cell Range
- Previewing and Printing a Worksheet
- Getting Help from the Office Assistant
- Saving a Workbook & Re-opening a saved workbook

#### **Formatting a Worksheet**

- Creating Headers, Footers, and Page Numbers
- Adjusting Page Margins and Orientation
- Adding Print Titles and Gridlines, rows to repeat at top of each page
- Formatting Fonts & Values
- Adjusting Row Height and Column Width
- Changing Cell Alignment
- Adding Borders
- Applying Colors and Patterns
- Using the Format Painter
- Using AutoFormat
- Merging Cells, Rotating Text, and using AutoFit
- Using AutoFill

#### **Managing your workbooks**

- Switching Between Sheets in a Workbook
- Inserting and Deleting Worksheets
- Renaming and Moving Worksheets
- Protecting a Workbook
- Hiding Columns, Rows and Sheets
- Splitting and Freezing a Window

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- Inserting Page Breaks
- Advanced Printing Options

#### **Editing a Workbook**

- Entering Date Values and using AutoComplete
- Editing, Clearing, and Replacing Cell Contents
- Cutting, Copying, and Pasting Cells
- Moving and Copying Cells with Drag and Drop
- Collecting and Pasting Multiple Items
- Using the Paste Special Command
- Inserting and Deleting Cells, Rows, and Columns
- Using Undo, Redo, and Repeat
- Checking Your Spelling
- Finding and Replacing Information
- Inserting Cell Comments

#### **Formulas**

- Creating a basic Formula
- Calculating Value Totals with AutoSum
- Editing & Copying Formulas
- Fixing Errors in Your Formulas
- Formulas with Several Operators and Cell Ranges

#### **Working with the Forms Menu**

- Sorting, Subtotaling & Filtering Data
- Copy & Paste Filtered Records
- Using Data Validation

#### **Creating & Working with Charts**

- Creating a Chart
- Moving and Resizing a Chart
- Formatting and Editing Objects in a Chart
- Changing a Chart's Source Data
- Changing a Chart Type and Working with Pie Charts
- Adding Titles, Gridlines, and a Data Table
- Formatting a Data Series and Chart Axis
- Annotating a Chart
- Working with 3-D Charts
- Selecting and Saving a Custom Chart
- Using Fill Effects
- Mapping Data
- Modifying a Map

#### **Data Analysis & Pivot Tables**

- Creating a PivotTable
- Specifying the Data a PivotTable Analysis
- Changing a PivotTable's Calculation
- Selecting What Appears in a PivotTable
- Grouping Dates in a PivotTable
- Updating a PivotTable
- Formatting and Charting a PivotTable

#### **Lookup table**

- Lookup()

- Vlookup()
- Hlookup()
- Application of exact match and approximate match
- Creating an order form using vlookup function

#### **Statistics with Excel**

- Annova: Single Factor
- Annova: Two Factor with Replication
- Annova: Two Factor without Replication
- Correlation
- Covariance
- Descriptive Statistics
- Exponential Smoothing
- F-Test Two-sample for variances
- Fourier analysis
- Histogram
- Moving Average
- Random Number generation
- Rank and Percentile
- Regression
- Sampling
- T-test: paired two sample for means
- T-test: two-sample assuming equal variances
- T-test: two-sample assuming equal variances
- Z-test: two-sample for means

#### **SQL Procedure:**

##### **Introduction to SQL procedure**

- What is SQL and components of SQL?

##### **Basic Queries**

- Overview of the SQL procedure
- Specifying Columns & Rows

##### **Displaying Query Results**

- Presenting Data
- Summarizing Data

##### **Sub queries**

- Correlated Queries
- Non correlated Queries

##### **SQL Joins**

- Introduction to SQL joins

##### **Set Operators**

- EXCEPT Operator
- INTERSECT Operator
- UNION Operator
- OUTER UNION Operator

##### **Creating Tables and views**

- Creating view with SQL procedure

##### **Interfacing SQL with Macro Language**

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**Managing Tables****Use of SQL in Clinical Trials****Macro language (SAS Macro):****Macro Variables**

- Introduction to Macro Variables
- Automatic macro variables
- Macro variable References
- User Defined Macro variables
- Macro Functions

**Macro definitions**

- Defining and Calling a macro
- Macro parameters & Storage

**Data Step and SQL Procedure**

- Creating Macro variables in the Data step
- Indirect References to Macro Variables
- Creating Macro Variables in SQL

**Macro Programs**

- Conditional processing
- Global and Local macro variables

**Use of Macro language****Advanced Techniques and Efficiencies (optional):**

- Measuring Efficiencies
- Controlling I/O Processing and Memory
- Accessing Observation
- Using DATA Step Arrays
- Using DATA Step Hash and Hiter Objects
- Combining Data Horizontally
- Expert Programmer Techniques

**Optional SAS Global Certification**

- Guidance on SAS Certification

**Analytics Theory**

- Variables, Graphs & Frequency Distribution
- Measures of Central Tendency
- Measures of Dispersion
- Moments, Skewness and Kurtosis
- Probability
- Probability distributions
- Elementary sampling theory
- Estimation
- Testing Hypothesis – One Sample Tests & Two Sample Tests
- Chi Square Analysis
- Analysis of Variance

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- Simple Regression & Correlation
- Multiple Regression