**SAS**

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| **TECH VISION**  **IT TRAINING AND PLACEMENT SERVICES**  [**www.techvisionit.com**](http://www.techvisionit.com) |

**Course Duration:** 60 hours

**Sessions:** Weekdays; Weekends; Crash Course

**Course Content:**

Chapter 1: **INTRODUCTION TO SAS**

* INTRODUCTION
* NEED FOR SAS
* WHO USES SAS
* WHAT IS SAS?
* OVERVIEW OF BASE SAS SOFTWARE
* DATA MANAGEMENT FACILITY
* STRUCTURE OF SAS DATASET
* SAS PROGRAM
* PROGRAMMING LANGUAGE
* ELEMENTS OF THE SAS LANGUAGE
* RULES FOR SAS STATEMENTS
* RULES FOR MOST SAS NAMES
* SPECIAL RULES FOR VARIABLE NAMES
* TYPES OF VARIABLES
* DATA ANALYSIS AND REPORTING UTILITIES
* TRADITIONAL OUTPUT
* WAYS TO RUN SAS PROGRAMS
* SAS WINDOWING ENVIRONMENT
* NONINTERACTIVE MODE
* BATCH MODE
* INTERACTIVE LINE MODE
* RUNNING PROGRAMS IN THE SAS WINDOWING ENVIRONMENT

Chapter 2: **HOW SAS WORKS**

* WRITING YOUR FIRST SAS PROGRAM
* A SIMPLE PROGRAM TO READ RAW DATA AND PRODUCE A REPORT
* ENHANCING THE PROGRAM
* MORE ON COMMENT STATEMENTS
* INTERNAL PROCESSING IN SAS
* HOW SAS WORKS
* THE COMPILATION PHASE
* THE EXECUTION PHASE
* PROCESSING A DATA STEP: A WALKTHROUGH
* CREATING THE INPUT BUFFER AND THE PROGRAM DATA VECTOR
* WRITING AN OBSERVATION TO THE SAS DATA SET
* FOUR TYPES OF SAS LIBRARIES
* SAS LIBRARIES
* WORK LIBRARY
* SASHELP LIBRARY
* SASUSER LIBRARY

Chapter 3: **READING RAW DATA INTO SAS**

* WHAT IS RAW DATA
* DEFINITIONS
* DATA VALUES
* NUMERIC VALUE
* CHARACTER VALUE
* STANDARD DATA
* NONSTANDARD DATA
* NUMERIC DATA
* CHARACTER DATA
* CHOOSING AN INPUT STYLE
* LIST INPUT
* MODIFIED LIST INPUT
* COLUMN INPUT
* FORMATTED INPUT
* NAMED INPUT
* INSTREAM DATA
* CREATING MULTIPLE RECORDS FROM SINGLE INPUT ROW
* READING DATA FROM EXTERNAL FILES
* READING BLANK SEPARATED VALUES (LIST OR FREE FORM DATA):
* READING RAW DATA SEPARATED BY COMMAS (.CSV FILES):
* READING IN RAW DATA SEPARATED BY TABS (.TXT FILES):
* USING INFORMATS WITH LIST INPUT
* SUPPLYING AN INFORMAT STATEMENT WITH LIST INPUT
* USING LIST INPUT WITH EMBEDDED DELIMITERS
* READING RAW DATA THAT ARE ALIGNED IN COLUMNS:
* METHOD 1: COLUMN INPUT
* METHOD 2: FORMATTED INPUT
* USING MORE THAN ONE INPUT STATEMENT: THE SINGLE TRAILING @
* READING COLUMN DATA THAT IS ON MORE THAN ONE LINE
* MIXED-STYLE INPUT:
* INFILE OPTIONS FOR SPECIAL SITUATIONS
* FLOWOVER
* MISSOVER
* TRUNCOVER
* PAD
* USING LRECL TO READ VERY LONG LINES OF RAW DATA
* CHECKING YOUR DATA AFTER IT HAS BEEN READ INTO SAS

Chapter 4: **READING DATA FROM A DATASET**

* INTRODUCTION
* SET STATEMENT OVERVIEW
* AUTOMATIC VARIABLES IN SAS
* INTERLEAVE MULTIPLE SAS DATA SETS
* COMBINE MULTIPLE SAS DATA SETS
* CREATING & MODIFYING VARIABLES
* CREATING MULTIPLE DATASETS IN A SINGLE DATA-STEP
* SUBSETTING OBSERVATIONS
* CONDITIONAL SAS STATEMENTS
* LOGICAL AND SPECIAL OPERATORS
* THE SAS SUPERVISOR AND THE SET STATEMENT
* EFFICIENCY AND THE SET STATEMENT
* KNOW YOUR DATA
* SET STATEMENT DATA SET OPTIONS
* DROP AND KEEP OPTIONS
* RENAME OPTION
* FIRSTOBS AND OBS OPTIONS
* IN OPTION -
* WHERE OPTION -
* OTHER SET STATEMENT OPTIONS
* END OPTION
* KEY OPTION
* NOBS OPTION
* POINT OPTION
* DO LOOPS AND THE SET STATEMENT
* INTRODUCTION TO RETAIN STATEMENT
* CARRY OVER VALUES FROM ONE OBSERVATION TO ANOTHER
* COMPARE VALUES ACROSS OBSERVATIONS
* ASSIGN INITIAL VALUES
* DETERMINING COLUMN ORDER IN OUTPUT DATASET
* SAS SYSTEM OPTIONS

Chapter 5: **READING DATA FROM A DATASET**

* INPUT SAS DATA SET FOR EXAMPLE
* SELECTING OBSERVATIONS FOR A NEW SAS DATA SET
* DELETING OBSERVATIONS BASED ON A CONDITION
* ACCEPTING OBSERVATIONS BASED ON A CONDITION
* COMPARING THE DELETE AND SUBSETTING IF STATEMENTS
* METHODS OF CREATING NEW DATA SETS WITH A SUBSET
* SUBSETTING RECORDS FROM AN EXTERNAL FILE WITH A SUBSETTING IF STATEMENT
* SUBSETTING OBSERVATIONS IN A DATA STEP WITH A WHERE STATEMENT
* SUBSETTING OBSERVATIONS IN A PROC STEP WITH A WHERE STATEMENT
* SUBSETTING OBSERVATIONS IN PROC SQL
* DIFFERENCE BETWEEN IF AND WHERE

Chapter 6: **SAS INFORMATS AND FORMATS**

* OVERVIEW
* USING SAS INFORMATS
* INPUT STATEMENT
* INPUT FUNCTION
* INPUTN AND INPUTC FUNCTIONS
* ATTRIB AND INFORMAT STATEMENTS
* USING SAS FORMATS
* FORMAT STATEMENT IN PROCEDURES
* PUT STATEMENT
* PUT FUNCTION
* PUTN AND PUTC FUNCTIONS
* BESTw. Format
* ADDITIONAL COMMENTS

Chapter 7: **SAS FUNCTIONS**

* CATEGORIES OF FUNCTIONS
* SAS CHARACTER FUNCTIONS
* FUNCTIONS THAT CHANGE THE CASE OF CHARACTERS
* UPCASE
* LOWCASE
* PROPCASE
* FUNCTIONS THAT REMOVE CHARACTERS FROM STRINGS
* FUNCTION: COMPBL
* FUNCTION: COMPRESS
* FUNCTIONS THAT SEARCH FOR CHARACTERS
* FUNCTION: ANYALNUM
* FUNCTION: ANYALPHA
* FUNCTION: ANYDIGIT
* FUNCTION: ANYPUNCT
* FUNCTION: ANYSPACE
* FUNCTION: NOTALNUM
* FUNCTION: NOTALPHA
* FUNCTION: NOTDIGIT
* FUNCTION: NOTUPPER
* FUNCTIONS THAT SEARCH STRINGS
* FIND AND FINDC
* INDEX, INDEXC, AND INDEXW
* FUNCTIONS TO VERIFY DATA
* FUNCTION VERIFY
* FUNCTIONS THAT EXTRACT PARTS OF STRINGS
* FUNCTION: SUBSTR (ON THE LEFT-HAND SIDE OF THE EQUAL SIGN)
* FUNCTION: SUBSTRN
* FUNCTIONS THAT JOIN TWO OR MORE STRINGS TOGETHER
* FUNCTION: CAT
* FUNCTION: CATS
* FUNCTION: CATT
* FUNCTION: CATX
* FUNCTIONS THAT REMOVE BLANKS FROM STRINGS
* FUNCTION: LEFT
* FUNCTION: RIGHT
* FUNCTION: TRIM
* FUNCTION: TRIMN
* FUNCTION: STRIP
* FUNCTIONS THAT COMPARE STRINGS
* FUNCTION: COMPARE
* FUNCTIONS THAT DIVIDE STRINGS INTO "WORDS"
* FUNCTION: SCAN
* FUNCTION: SCANQ
* FUNCTIONS THAT SUBSTITUTE LETTERS OR WORDS IN STRINGS
* FUNCTION: TRANSLATE
* FUNCTION: TRANWRD
* FUNCTIONS THAT COMPUTE THE LENGTH OF STRINGS
* FUNCTION: LENGTH
* FUNCTION: LENGTHC
* FUNCTION: LENGTHM
* FUNCTION: LENGTHN
* FUNCTIONS THAT COUNT THE NUMBER OF LETTERS OR SUBSTRINGS IN A STRING
* FUNCTION: COUNT
* FUNCTION: COUNTC
* MISCELLANEOUS STRING FUNCTIONS
* FUNCTION: MISSING
* FUNCTION: REPEAT
* FUNCTION: REVERSE
* SAS DATE AND TIME FUNCTIONS
* INTRODUCTION
* WHAT IS A SAS DATE AND TIME LITERAL?
* DATE AND TIME FUNCTIONS
* FUNCTINS TO CREATE DATE AND TIME VALUES
* FUNCTIONS TO TAKIE DATETIME VALUES APART
* FUNCTIONS TO GET QUARTER ,YEAR OR DAY OF THE DATE
* FUNCTIONS THAT WORK WITH INTERVALS
* USING FORMATS FOR DATE AND TIME
* SYSTEM OPTIONS FORDATE AND TIME

Chapter 8: **AN INTRODUCTION TO ARRAYS AND ARRAY PROCESSING**

* WHY DO WE NEED ARRAYS?
* BASIC ARRAY CONCEPTS
* ARRAY STATEMENT
* ARRAY REFERENCES
* VARIABLE NAME ARRAY REFERENCE
* USING ARRAY INDEXES
* ONE DIMENSION ARRAYS
* MULTI-DIMENSION ARRAYS
* TEMPORARY ARRAYS
* SORTING ARRAYS
* Determining Array Bounds: LBOUND and HBOUND Functions
* WHEN TO USE ARRAYS
* COMMON ERRORS AND MISUNDERSTANDINGS
* INVALID INDEX RANGE
* FUNCTION NAME AS AN ARRAY NAME
* ARRAY REFERENCED IN MULTIPLE DATA STEPS, BUT DEFINED IN ONLY ONE

Chapter 9: **BY - GROUP PROCESSING**

* DEFINITIONS FOR BY-GROUP PROCESSING
* BY-GROUP PROCESSING
* BY VALUE
* BY GROUP
* FIRST.VARIABLE AND LAST.VARIABLE
* MODIFYING SAS DATA SETS: EXAMPLES.
* INVOKING BY-GROUP PROCESSING
* PREPROCESSING INPUT DATA FOR BY-GROUP PROCESSING
* SORTING OBSERVATIONS FOR BY-GROUP PROCESSING
* INDEXING FOR BY-GROUP PROCESSING
* HOW THE DATA STEP IDENTIFIES BY GROUPS
* PROCESSING OBSERVATIONS IN A BY GROUP
* HOW SAS DETERMINES FIRST.VARIABLE AND LAST.VARIABLE
* PROCESSING BY-GROUPS IN THE DATA STEP
* OVERVIEW
* PROCESSING BY-GROUPS CONDITIONALLY
* DATA NOT IN ALPHABETIC OR NUMERIC ORDER
* DATA GROUPED BY FORMATTED VALUES

Chapter 10: **OVERVIEW OF METHODS FOR COMBINING SAS DATA SETS**

* DEFINITIONS
* CONCATENATING
* INTERLEAVING
* ONE-TO- ONE READING OR ONE-TO-ONE MERGING
* MATCH-MERGING
* UPDATING
* MODIFYING
* DEFINITIONS FOR READING, COMBINING, AND MODIFYING SAS DATA SETS
* READING A SAS DATA SET
* COMBINING SAS DATA SETS
* MODIFYING SAS DATA SETS
* OVERVIEW OF TOOLS
* READING SAS DATA SETS
* READING A SINGLE SAS DATA SET
* READING FROM MULTIPLE SAS DATA SETS
* COMBINING SAS DATA SETS: BASIC CONCEPTS
* ONE-TO-ONE
* ONE-TO-MANY AND MANY-TO-ONE
* MANY-TO-MANY
* ACCESS METHODS: SEQUENTIAL VERSUS DIRECT
* SEQUENTIAL ACCESS
* DIRECT ACCESS
* ONE-TO-ONE READING
* DATA STEP PROCESSING DURING A ONE-TO-ONE READING
* ONE-TO-ONE MERGING
* MATCH-MERGING
* UPDATING WITH THE UPDATE AND THE MODIFY STATEMENTS :
* DEFINITIONS
* SYNTAX OF THE UPDATE STATEMENT
* SYNTAX OF THE MODIFY STATEMENT -
* UPDATING WITH NONMATCHED OBSERVATIONS, MISSING VALUES, AND NEW VARIABLES -
* USING AN INDEX WITH THE MODIFY STATEMENT

Chapter 11: **SAS PROCEDURES**

* INTRODUCTION
* THE ANATOMY OF A PROC
* THE PROC STATEMENT
* TITLE AND FOOTNOTE STATEMENTS
* BY STATEMENT
* LABEL STATEMENT
* FORMAT STATEMENT
* RUN OR QUIT STATEMENT
* DESCRIPTION OF DATA USED IN REPORTS
* SAS REPORTING PROCEDURES
* PROCS FOR ALL THAT DETAIL
* USING PROC PRINT
* USING PROC SQL
* PROC REPORT
* PROCS THAT SUMMARIZE
* USING PROC CHART
* USING PROC FREQ
* USING PROC MEANS
* USING PROC UNIVARIATE
* INTRODUCTION TO PROC TABULATE
* DATA MANIPULATION AND MANAGEMENT PROCEDURE
* PROC SORT
* PROC DATASETS
* PROC FORMAT
* PROC CONTENTS
* OTHER IMPORTANT PROCS
* PROC TRANSPOSE
* DEFINITIONS
* PROC PRINTTO
* COMPARE PROCEDURE
* PROC APPEND
* HOW TO IMPORT AN EXCEL FILE INTO SAS

Chapter 12: **INTRODUCTION TO PROC SQL**

* INTRODUCTION
* WHY LEARN PROC SQL?
* SELECT STATEMENT
* THE SELECT STATEMENT SYNTAX
* A SIMPLE PROC SQL
* A COMPLEX PROC SQL
* LIMITING INFORMATION ON THE SELECT
* CREATING NEW VARIABLES
* THE CALCULATED OPTION ON THE SELECT
* USING LABELS AND FORMATS
* THE CASE EXPRESSION ON THE SELECT
* ADDITIONAL SELECT STATEMENT CLAUSES
* REMERGING
* REMERGING FOR TOTALS
* CALCULATING PERCENTAGE
* SORTING THE DATA IN PROC SQL
* SORT ON NEW COLUMN
* SUBSETTING USING THE WHERE
* INCORRECT WHERE CLAUSE
* WHERE ON COMPUTED COLUMN
* SELECTION ON GROUP COLUMN
* USE HAVING CLAUSE
* CREATING NEW TABLES
* JOINING DATASETS USING PROC SQL
* INNER JOIN
* JOINING THREE OR MORE TABLES
* OUTER JOINS
* INCLUDING NONMATCHING ROWS WITH THE RIGHT OUTER JOIN
* SELECTING ALL ROWS WITH THE FULL OUTER JOIN
* CONCATENATING QUERY RESULTS

Chapter 13: **AN INTRODUCTION TO SAS MACROS**

* INTRODUCTION
* SAS MACRO OVERVIEW
* TRADITIONAL SAS PROGRAMMING
* THE SAS MACRO LANGUAGE
* MACRO LANGUAGE COMPONENTS
* MACRO VARIABLES
* MACRO STATEMENTS
* MACRO PROCESSOR FLOW
* AUTOMATIC MACRO VARIABLES
* MACRO DEBUGGING OPTIONS
* WHAT IS A MACRO?
* DEFINING AND USING MACROS
* POSITIONAL MACRO PARAMETERS
* KEYWORD MACRO PARAMETERS
* CONDITIONAL MACRO COMPILATION
* THE %DO STATEMENT
* SAS DATA STEP INTERFACES

Chapter 14: **THE OUTPUT DELIVERY SYSTEM (ODS)**

* INTRODUCTION
* CREATING VARIOUS TYPES OF REPORTS LISTING OUTPUT
* OTHER DESTINATIONS
* HTML
* PDF AND POSTSCRIPT
* RTF FILES
* MICROSOFT EXCEL
* ADDING STYLE TO YOUR REPORTS
* LOCATE EXISTING STYLES
* ODS STYLE= OPTION
* CUSTOMIZE YOUR REPORTS
* ODS SELECT; AND ODS EXCLUDE;
* OTHER CUSTOMIZATIONS
* ODS PROCLABEL= ;
* ODS PROCTITLE; AND ODS NOPROCTITLE;
* ADVANCED TECHNIQUES
* ODS DOCUMENT
* PROC TEMPLATE

Chapter 15: **INTRODUCTION TO DIAGNOSING AND AVOIDING ERRORS**

* INTRODUCTION
* UNDERSTANDING HOW THE SAS SUPERVISOR CHECKS A JOB
* UNDERSTANDING HOW SAS PROCESSES ERRORS
* DISTINGUISHING TYPES OF ERRORS .SAS RECOGNIZES FOUR KINDS OF ERRORS:
* SYNTAX ERRORS
* EXECUTION-TIME ERRORS
* DATA ERRORS
* SEMANTIC ERRORS
* DIAGNOSING ERRORS
* DIAGNOSING SYNTAX ERRORS
* DIAGNOSING DATA ERRORS
* USING A QUALITY CONTROL CHECKLIST

Chapter 16: **ADVANCE TOPICS IN SAS**

* PERFORMING ADVANCED QUERIES USING PROC SQL
* INTRODUCING MACRO VARIABLES
* CREATING AND USING MACRO PROGRAMS
* STORING MACRO PROGRAMS
* CREATING SAMPLES AND INDEXES
* USING LOOKUP TABLES TO MATCH DATA
* MODIFYING SAS DATA SETS AND TRACKING CHANGES
* INTRODUCTION TO EFFICIENT SAS PROGRAMMING