

## **CSC 152**

### **SAS**

#### **COURSE DESCRIPTION:**

Prerequisites: None

Corequisites: None

This course introduces the fundamentals of SAS programming. Emphasis is placed on learning basic SAS commands and statements for solving a variety of data processing applications. Upon completion, students should be able to use SAS data and procedure steps to create SAS data sets, do statistical analysis, and create general customized reports. Course Hours Per Week: Class, 2. Lab, 3. Semester Hours Credit, 3.

#### **LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

- a) Know the capabilities of the SAS language.
- b) Use the DATA and PROC steps.
- c) Design and code a SAS program to solve data problems.
- d) Create SAS data sets by reading in-stream raw data.
- e) Generate reports using SAS procedures PRINT, SORT.
- f) Use SAS procedures MEANS, IMPORT, FREQ and TABULATE to produce reports of descriptive statistics from SAS data sets.
- g) Distinguish permanent and temporary SAS data sets.
- h) Update SAS existing data sets.
- i) Create new SAS data set by manipulating data from existing data sets using SAS expressions.
- j) Create new SAS data set by combining existing data sets.
- k) Create, store and use SAS labels and formats to generate customized reports.
- l) Print contents of SAS libraries and data sets.

#### **OUTLINE OF INSTRUCTION:**

- I. Getting Started Using SAS Software
  - A. The SAS Language
  - B. SAS Data Sets
  - C. The Two Parts of a SAS Program
  - D. The DATA Step's Built-in Loop
  - E. Choosing a Mode for Submitting SAS Programs
  - F. Windows and Commands in the SAS Windowing Environment
  - G. Submitting a Program in the SAS Windowing Environment
  - H. Reading the SAS Log
  - I. Viewing Your Results in the Output Window
  - J. SAS Data Libraries
  - K. Viewing Data Sets with SAS Explorer
  - L. SAS Data Libraries
  - M. Viewing Data Sets with SAS Explorer
  - N. Using SAS System Options

## II. Getting data into SAS

- A. Methods for Getting Your Data into SAS
- B. Entering Data with the Viewtable Window
- C. Reading Files with the Import Wizard
- D. Telling SAS Where to Find Your Raw Data
- E. Reading Raw Data Separated by Spaces
- F. Reading Raw Data Arranged in Columns
- G. Reading Raw Data Not in Standard Format
- H. Selected Informats
- I. Mixing Input Styles
- J. Reading Messy Raw Data
- K. Reading Multiple Lines of Raw Data per Observation
- L. Reading Multiple Observations per Line of Raw Data
- M. Reading Part of a Raw Data File
- N. Controlling Input with Options in the INFILE Statement
- O. Reading Delimited Files with the DATA Step
- P. Reading Delimited Files with the IMPORT Procedure
- Q. Reading PC Files with the IMPORT Procedure
- R. Temporary versus Permanent SAS Data Sets
- S. Using Permanent SAS Data Sets with LIBNAME Statements
- T. Using Permanent SAS Data Sets by Direct Referencing
- U. Listing the Contents of a SAS Data Set

## III. Working with data

- A. Creating and Redefining Variables
- B. Using SAS Functions
- C. Selected SAS Functions
- D. Using IF-THEN Statements
- E. Grouping Observations with IF-THEN/ELSE Statements
- F. Subsetting Your Data
- G. Working with SAS Dates
- H. Selected Date Informats, Functions, and Formats
- I. Using the RETAIN and Sum Statements
- J. Simplifying Programs with Arrays
- K. Using Shortcuts for Lists of Variable Names

## IV. Debugging SAS Programs

- A. Writing SAS Programs That Work
- B. Fixing Programs That Don't Work
- C. Searching for the Missing Semicolon
- D. INPUT Statement Reached Past the End of the Line
- E. Lost Card
- F. Invalid Data
- G. Missing Values Were Generated
- H. Numeric Values Have Been Converted to Character (or Vice Versa)
- I. DATA Step Produces Wrong Results but No Error Message

## V. Sorting, Printing, and Summarizing Your Data

- A. Using SAS Procedures
- B. Subsetting in Procedures with the WHERE Statement
- C. Sorting Your Data with PROC SORT
- D. Printing Your Data with PROC PRINT
- E. Changing the Appearance of Printed Values with Formats
- F. Selected Standard Formats
- G. Creating Your Own Formats Using PROC FORMAT
- H. Writing Simple Custom Reports
- I. Summarizing Your Data Using PROC MEANS
- J. Writing Summary Statistics to a SAS Data Set
- K. Counting Your Data with PROC FREQ
- L. Producing Tabular Reports with PROC TABULATE
- M. Adding Statistics to PROC TABULATE Output
- N. Enhancing the Appearance of PROC TABULATE Output
- O. Changing Headers in PROC TABULATE Output
- P. Specifying Multiple Formats for Data Cells in PROC TABULATE Output

## VI. Modifying and Combining SAS Data Sets

- A. Modifying a Data Set Using the SET Statement
- B. Stacking Data Sets Using the SET Statement
- C. Interleaving Data Sets Using the SET Statement
- D. Combining Data Sets Using a One-to-One Match Merge
- E. Combining Data Sets Using a One-to-Many Match Merge
- F. Merging Summary Statistics with the Original Data
- G. Combining a Grand Total with the Original Data
- H. Updating a Master Data Set with Transactions
- I. Using SAS Data Set Options
- J. Tracking and Selecting Observations with the IN= Option
- K. Writing Multiple Data Sets Using the OUTPUT Statement
- L. Making Several Observations from One Using the OUTPUT Statement
- M. Changing Observations to Variables Using PROC TRANSPOSE
- N. Using SAS Automatic Variables

## **REQUIRED TEXTBOOK AND MATERIALS:**

Text to be assigned by the instructor each semester