**CUNY School of Public Health at Hunter College**

**Silberman Campus**

Introduction to SAS for Data Management and Analysis (1 credit)

EPI 70N07-01

Tuesdays and Thursdays 6:00 PM – 8:00 PM

July 19 – August 9, 2016

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COURSE DESCRIPTION

This 1 credit course is a brief, hands-on introduction to data management, manipulation and basic data analyses using SAS. Topics covered will include importing data from other formats (e.g. Excel and Access) into SAS, creating new variables and manipulating existing ones, converting character and numeric information, sorting and summarizing data, merging data sets, displaying data, and documenting programs. The course will emphasize practical applications rather than teaching statistical concepts.

COURSE LEARNING OBJECTIVES

At the end of this course, participants will be able to

* Describe the basic components of SAS programs, like procedure steps and data steps,
* Create a new data set based on an existing SAS data set,
* Create new variables with values that depend upon the values of existing variables,
* Apply formats to variable values to alter their appearance,
* Import and export SAS data sets,
* Retrieve information (summary or detail) from a SAS data set using a procedure step (such as proc print, proc freq, proc means, proc summary or proc univariate),
* Produce Excel spreadsheets that contain summary or detail data from SAS data sets,
* Manipulate data using SAS functions,
* Sort and combine SAS data sets, and
* Use sample code provided to write their own code.

STUDENT GRADING AND ASSESSMENT

Student grades will be based on:

Attendance (15%)

Quizzes (20%)

Exercises (65%)

Attendance and class participation:

This is a hands-on class in which lectures are followed by the opportunity for participants to write and execute code with the help of the instructor and teaching assistant. Attendance is necessary in order to absorb the material presented. Class participation – particularly asking questions during the sessions – is highly encouraged and will result in a better class for all students.

Quizzes:

Brief quizzes covering material from the current session as well as previous sessions will periodically be given.

Exercises:

In order for material to be retained, one must actually write and execute code. The more a student can write code without looking at the examples, the more information will stick, but writing code while looking at examples fosters absorbing material more than just listening.

Troubleshooting SAS code is a necessary component of working with the program. Students will not be expected to write code perfectly the first time. Although students should work on exercises individually, exercises will be done at the end of each class so that the instructor and teaching assistant can help answer questions. If students help each other, those providing assistance must make sure that help is wanted before providing clues – when someone is stuck sometimes they just need a little more time to see the answer.

The final course grade will be determined using the School’s letter grade system. Grades are: **A, B, C**, with **+** and **–** as applicable. Grades are defined as follows:

A+ Excellent - exceptional achievement.

A Excellent - outstanding achievement.

A- Superb - close to outstanding.

B+ Very good. Solid achievement expected of most graduate students.

B Good. Acceptable achievement.

B- Acceptable achievement, but below what is generally expected of graduate students.

C+ Fair achievement, above minimally acceptable level.

C Fair achievement, but only minimally acceptable.

C- Very low performance.

F Failure.

#### OFFICE HOURS

Office hours are ½ an hour before class. Other appointment times can be arranged upon request.

RECOMMENDED TEXTS

There is no required text for this class. Students may be interested in the following books as resources:

**The Little SAS Book: A Primer, Fifth Edition** by Lora Delwiche and Susan Slaughter. SAS Press, copyright 2012. 350 pages, listed at SAS Bookstore at $54.95. ISBN 978-1-61290-343-9 https://support.sas.com/pubscat/bookdetails.jsp?catid=1&pc=65423

From the SAS bookstore website:

A classic that just keeps getting better, The Little SAS Book is essential for anyone learning SAS programming. Lora Delwiche and Susan Slaughter offer a user-friendly approach so readers can quickly and easily learn the most commonly used features of the SAS language. Each topic is presented in a self-contained two-page layout complete with examples and graphics.

The fifth edition has been completely updated to reflect the new default output introduced with SAS 9.3. In addition, there is a now a full chapter devoted to ODS Graphics including the SGPLOT and SGPANEL procedures. Other changes include expanded coverage of linguistic sorting and a new section on concatenating macro variables with other text.

This title belongs on every SAS programmer’s bookshelf. It’s a resource not just to get you started, but one you’ll return to as you continue to improve your programming skills. Each topic is presented in a self-contained two-page layout complete with examples and graphics. This clear and concise format enables new users to get up and running quickly, while the examples allow readers to type in the program and see it work!

New topics in the fourth edition include ODS Graphics for statistical procedures, PROC SGPLOT for graphics, creating new variables in PROC REPORT with a COMPUTE block, WHERE= data set option, SORTSEQ=LINGUISTIC option in PROC SORT, and more functions, including ANYALPHA, CAT, and PROPCASE.

**SAS Certification Prep Guide: Base Programming for SAS 9, Third Edition.** SAS Publishing, copyright date July 2011. 808 pages, listed at SAS Bookstore at $129.00. ISBN 978-1-60764-924-3 <https://support.sas.com/pubscat/bookdetails.jsp?catid=1&pc=63049>

From the SAS bookstore website:

New and experienced SAS users who want to prepare for the Base Programming for SAS 9 exam will find the *SAS Certification Prep Guide: Base Programming for SAS 9* to be an invaluable, convenient, and comprehensive resource that covers all of the objectives tested on the exam. Major topics include importing and exporting raw data files, creating and modifying SAS data sets, and identifying and correcting data syntax and programming logic errors. You will also become familiar with the enhancements and new functionality that are available in SAS 9.

Each chapter includes a quiz on the chapter's contents. This guide provides you with a solid study resource as well as a go-to reference for your library.

**Learning SAS by Example: A Programmer’s Guide** by Ron Cody. SAS Press, copyright date March 2007. 664 pages, listed at SAS Bookstore at $69.95. ISBN 978-1-59994-165-3

<https://support.sas.com/pubscat/bookdetails.jsp?catid=1&pc=60864>

From the SAS bookstore website:

Learn to program SAS by example!

If you like learning by example, then Learning SAS by Example: A Programmer's Guide makes it easy to learn SAS programming. In an instructive and conversational tone, author Ron Cody clearly explains each programming technique and then illustrates it with one or more real-life examples, followed by a detailed description of how the program works. The text is divided into four major sections: Getting Started; DATA Step Processing; Presenting and Summarizing Your Data; and Advanced Topics. Subjects addressed include:

* Reading data from external sources
* Learning details of DATA step programming
* Subsetting and combining SAS data sets
* Understanding SAS functions and working with arrays
* Creating reports with PROC REPORT and PROC TABULATE
* Learning to use the SAS Output Delivery System
* Getting started with the SAS macro language
* Introducing PROC SQL

You can test your knowledge and hone your skills by solving the problems at the end of each chapter. (Solutions to odd-numbered problems are located at the back of this book. Solutions to all problems are available to instructors by visiting Ron Cody's author page for details.) This book is intended for beginners and intermediate users. Readers should know how to enter and submit a SAS program from their operating system.

COURSE SCHEDULE

| **Date** | **Topics** | **Assessment material** |
| --- | --- | --- |
| Tuesday July 19th 2016: Session 1 | Basic concepts  SAS libraries  Navigating the SAS workspace  Proc contents | Exercise |
| Thursday July 21st, 2016: Session 2 | Permanent vs. temporary data sets  Libname statements  More proc print  Data step statement options  Data vs. set statements  Drop and keep options and statements  Where option and statement  If statement  Creating new variables  If/then/else statements | Exercise and quiz |
| Tuesday July 26th, 2016: Session 3 | More data step:  Variable lengths  Label statements  Attribute statements  Rename option and statement  Comment statements/annotation  Proc print (more options)  Titles and footnotes | Exercise |
| Thursday July 28th, 2016: Session 4 | Proc freq  Proc means  Proc format and format statements  Basic ODS | Exercise and quiz |
| Tuesday August 2nd, 2016: Session 5 | Overview of functions  Date functions:  Month, day, year  MDY  Datepart  Intck  Numeric functions:  Rounding  Sum  Min  Max  Mean  Calculating age  Conversion functions:  Put  Input | Exercise |
| Thursday August 4th, 2016: Session 6 | Proc import  Proc export  Proc tabulate | Exercise and quiz |
| Tuesday August 9th, 2016: Session 7 | Proc sort  Combining data sets:  Concatenating data sets  Match merges  Summarizing values within the data step:  First. and last.  Retain statement | Exercise |
| Thursday August 11th 2016: Session 8 (**ONLINE**) | Arrays and do loops  Proc summary  Proc univariate  Macros | Exercise and quiz |