Syllabus Introduction to SAS for Public Policy

Heinz 94-827 (Section A4 & B4)

Basic Info

• Time:
  – B4: 10:30 am to 11:50 am
  – A4: 1:30 pm to 2:50 pm

• Location: Room HBH 239

• Instructor: Mary Slaughter
  – email: slaughter@cmu.edu
  – Office hours: TBD

• TA’s:
  – B4:
    • Yuyue Jiang
    • yuyuej@andrew.cmu.edu
    • Office hours: TBD
  – A4:
    • Jiangyan Lui
    • jianyual@andrew.cmu.edu
    • Office hours: TBD

• Recommended Text: *The Little SAS Book: A Primer* by Delwiche & Slaughter.

Course Description

Many government agencies, corporations, and think tanks use SAS for analysis and reporting. New employees and summer interns are often asked to modify existing programs or to create new ones. This course provides an introduction to the SAS programming language with examples from real world policy analysis. We will focus primarily on data step programming and some basic SAS procedures, though we will also cover simple statistical
procedures like PROC REG and PROC LOGISTIC.

Topics covered will include conditional processing, arrays and loops, combining files, macro programming, and best programming practices. We will use SAS procedures to explore data and identify important characteristics and possible errors in the data. By the end of the class students should be able to pick up an existing SAS program and understand what it is doing or create an original SAS program.

Students will learn by doing, and all sessions will be taught in the lab with hands on programming.

**Objectives:**

Upon completion of the course, students should be able to:

- use SAS procedures to explore data and identify important characteristics and possible errors in the data.
- read an existing SAS program and understand what it is doing.
- create an original SAS program.
- generate basic statistical analyses in SAS (e.g. ttests, OLS and logistic regressions).
- import, merge, and export data in a variety of formats into and out of SAS.
- explain how SAS fits into their research and professional development plans.
- create a final project using SAS

**Grades**

Grades will be based on a combination of weekly homework assignments (60%), and a final exam (40%).

For assignments, students will be asked to create SAS programs or interpret existing programs. Assignments are to be submitted electronically (just the SAS program unless otherwise stated on the assignment) on Blackboard. Weekly assignments will be posted Monday evening and will be due the following Tuesday at 10 am. See course policies for late assignments.
The final exam will be a take home exam and is due on Tues, May 9th at 12 noon (submitted via Blackboard). It will involve using SAS techniques covered in this course to analyze a dataset and create a professional report of the results. It will also involve interpreting SAS code. The final should reflect a student’s individual ideas and work.

**Course Policies**

- **Use of technology in the classroom:** Research on learning shows that unexpected noises and movement divert people’s attention, which means you are affecting your colleagues’ learning experience if you are using your computers for random personal activities.
- **Late homework policy:** If for some substantial reason you cannot turn in your homework on the due date, you should contact me prior to the due date. You will only be eligible for 85% of the total points if the homework is one day late, 70% if the homework is two days late. No homeworks will be accepted two days after the due date.
- **Discussion among individual students about assignments is permitted and encouraged.** If you work with other students on the homework, list the names of the students at the top of your turned in homework (SAS program). It is important to remember though that the completed assignment must be your own work. Code and other answers should not be copied from another person or any other source. While coding problems are often very specific, the exact details of how the program was written will vary from student to student. The same applies to the presentation and interpretation of statistical results. Submissions where these details are identical or nearly identical, either among students or with another source, will be regarded as cheating. The minimum sanction for copying or other forms of cheating on a homework assignment is the loss of credit equal to two assignments, and sanctions may range up to the termination of your enrollment at CMU. All suspected incidents will be recorded with Heinz College administration at the same time the student is notified.

**Schedule**

For each class session I will give a lecture at the beginning of the class. Following this, time will be spent practicing programming and if time allows, working on homework assignments. The TA’s and I will be available throughout the class period to answer questions as they come up.
The schedule of topics listed below is subject to change based on how we progress. I may need to spend more time on certain topics and less on others.

Week 1: Introduction to SAS. Data steps: Structure and basic syntax; SAS Libraries; Temporary vs. permanent datasets; Procedures vs. Data Steps. PROC IMPORT. SAS variables. Basic data description procedures: CONTENTS, PRINT, MEANS, UNIVARIATE, FREQ, TABULATE. Data set options: drop, keep, where, rename, in.

Week 2: Conditional processing(if…then…else), IFN(), IFC(). SAS functions. String processing (substr, scan, index); Dates (mdy, intck); Recasting (input, put); Date formats in SAS. PROC FORMAT. Handling missing observations.

Week 3: Arrays. Loops. DO blocks. PROC TRANSPOSE. PROC SORT SAS automatic variables: (first., last., _N_). RETAIN statement. ODS output (pdf, rtf, excel).

Week 4: Working with multiple datasets. Merging. Stacking. IN= flags. PROC SQL.

Week 5: Basic statistical procedures: TTEST, LOGISTIC, correlations, OLS regression in SAS. Output datasets from procedures.

Week 6: Overview of advanced statistical procedures. SGPLOTS.

Week 7: Macros, Call routines.