

**Population Health Sciences/Biostatistics and Medical Informatics 650**  
**Introduction to SAS Programming for Population Health**  
**Fall 2011**

- Instructor:** Matthew Walsh, PhD, MPH  
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- Course website:** <http://www.learnuw.wisc.edu>
- Lecture:** 1:00-1:50 pm Fridays
- Monitored Computer Lab:** 2:00-4:00 pm Fridays in 150 Animal Science
- Office hours:** Tuesday and Thursday by appointment
- Course objective:** The goal of this course is to introduce students to the use of the SAS programming language for the analysis of biomedical data. Students will learn to use the SAS environment on a PC, to write programs for reading and processing data and to perform basic statistical analyses.
- Text (required):** Delwiche, Lora D. and Slaughter, Susan J. The Little SAS Book, A Primer, 4<sup>th</sup> edition, SAS Publishing, 2008.
- Software:** SAS 9.2 for Windows and Linux. Students may purchase an annual license from DoIT. There is a one time start up fee charge of \$15, item 28982 and an annual fee of \$40, item 29893 which is prorated through January 31 of each year. See [SAS Student Software](#). Installation media (5 DVDs) is sold separately and can be purchased through the DoIT Tech Store for \$25, item 57176. SAS is also available in the [CAL S InfoLab](#) in 145/149/150/204 Animal Science, the [LSS InfoLab](#) in 464 Van Hise and the [Memorial Library InfoLab](#) in 140 Memorial Library.
- Labs and Homework Assignments:** There will be 4 homework assignments and 6 lab assignments. Lab assignments are due at the end of lab session when they are assigned (via email: walsh2@wisc.edu). Homework assignments are due at 1PM Friday the week they are due. The importance of the assignments cannot be overemphasized. Much of your learning will take place while working on assignment problems. Homework assignments should be well organized and reasonably neat. Only essential SAS code and output should be turned in, and it must be accompanied by a written explanation of what the output shows.
- Exams:** There will be a midterm (closed book) and a take home final exam (open book). The final exam will be distributed at the end of lecture on 12/02 and will be due by 4pm on 12/16.
- Grading:** The course grade will be based on attendance and participation in lectures and labs (24%), homework (36%), midterm (20%), and the final exam (20%).

**Learning Objectives for PopHealth 650**  
**Introduction to SAS Programming for Population Health**

By the end of the course, students will be able to:

1. Create and execute SAS programs interactively using the SAS Windowing Environment.
2. Understand the structure of a SAS program (DATA and PROC steps).
3. Import data in various formats into SAS using the DATA step and Import Wizard.
4. Use SAS libraries to create and manage permanent SAS datasets and user-defined formats.
5. Recognize common SAS program errors and identify strategies for debugging SAS programs.
6. Create and modify data using procedural programming structures provided within the SAS DATA Step (e.g. Do, Do Until, Do While, If/Then/Else and Arrays).
7. Use SAS functions to create and/or manipulate variables in the preparation of analysis datasets..
8. Use PROC CONTENTS and PROC PRINT to explore SAS datasets.
9. Use PROC MEANS, PROC FREQ, and PROC REPORT to summarize information in SAS datasets.
10. Modify and merge datasets using SET and MERGE in the DATA step.
11. Interweave SAS procedures and data steps to manage and analyze research data.
12. Understand the basis of using Macros in SAS
13. Use arrays to aide in dataset manipulation
14. Create new datasets using OUTPUT and PROC TRANSPOSE.
15. Perform basic statistical analyses with PROC UNIVARIATE, PROC FREQ, PROC MEANS, PROC TTEST and PROC REG.

**Course Schedule for PopHealth 650**  
**Introduction to SAS Programming for Population Health**

The order of topics to be covered and the corresponding sections of the Delwiche and Slaughter textbook are given below. All lab and homework assignments must be complete at the start of lecture in the week the assignment is due. Only homework will be graded.

	<u>Topic</u>	<u>Section(s)</u>	<u>Lab</u>	<u>HW</u>
9/2	Getting Started with the SAS System: <i>Course Overview, Overview of SAS,</i>	1		
9/9 (L1), 9/16 (L2), 9/23 (H1)	Getting Data Into SAS (3 weeks) <i>SAS Programs (DATA and PROC steps), Import wizard, concatenating, and merging data sets PROC SORT, PROC CONTENTS, PROC PRINT</i>	2, 6	L1	H1
9/30 (L3), 10/7 (H3), 10/14	Programming to refine the dataset (3 weeks) <i>Cleaning data, creation of categorical variables if-then statements, numerical operators do-loops, dates, labels, formats PROC FREQ, PROC UNIVARIATE</i>	3-4	L2-L3	H2
10/21	Midterm Exam (In-class)			
10/28 (L4), 11/04 (L5), 11/11 (H3), 11/18	Programming for Analysis (4 weeks) <i>PROC FREQ, PROC MEANS, PROC TTEST PROC CORR, PROC REG, Stratified analysis, confidence intervals and odds ratios</i>	8	L4-L5	H3
11/25	Thanksgiving Break			
12/2 (L6), 12/9 (H4)	Programming Tools (2 weeks) <i>Introduction to Macros and Arrays, ODS Output</i>	7	L6	H4
12/16	Take-Home Final Due			