

**COURSE SYLLABUS**

**PubH 6420, Introduction to SAS Programming  
Summer Session 2009**

**Credits: 1.0**

Course meeting times:	June 15 – August 7, 2009 ( <a href="http://webvista.umn.edu">http://webvista.umn.edu</a> )
Instructor:	Greg Grandits
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Teaching Assistants	Stefanie Schussler

**I. Course Description**

This class is an introduction to the use of the SAS programming language for the analysis of biomedical data. After an introduction to the SAS environment on a PC, SAS will be used to write programs for reading and processing data, and for performing descriptive and basic statistical analyses.

**II. Course Prerequisites**

Health sciences graduate student or instructor consent

**III. Course Goals and Objectives**

By the end of the course, students should be able to write SAS programs for data management, presentation, and analyses.

- Run SAS programs on a PC .
- Read raw input files in various formats and create SAS datasets.
- Create new variables from other data.
- Use basic SAS procedures to describe data numerically and graphically.
- Annotate SAS output with informative titles, labels, and formats.
- Work with SAS datasets: sort, subset, merge, and re-format SAS datasets
- Use SAS procedures for basic statistical inference: Chi-square tests, T-Tests, ANOVA, Regression, etc.
- Export SAS data and output to other computers and software

**IV. Methods of Instruction and Work Expectations**

This course will consist of 12 online lessons, text readings, self tests, 6 programming assignments, and 1 exam.

## **V. Course Text and Readings**

Textbooks are available at the U of MN Bookstore in Coffman Union on the Minneapolis Campus (<http://www.bookstores.umn.edu/shopping/textbooks.html>) or via on-line services such as Barnes and Noble (<http://www.bn.com>) and Amazon (<http://www.amazon.com>). Be sure to check for the best prices, as sometimes these services and others will offer the book used.

### **Required Textbooks:**

- Cody and Smith: Applied Statistics and the SAS Programming Language, 5th Edition.
- Downloadable course packet (Available on course website)

### **Supplemental Texts:**

- Delwiche and Slaughter: The Little SAS Book, 4<sup>th</sup> edition (3<sup>rd</sup> edition acceptable)

**Required Software:** SAS version 9.2 (other 9.X versions acceptable)

## **VI. Course Outline and Schedule (See end of syllabus)**

## **VII. Evaluation and Grading**

### **Grading Criteria:**

Evaluations: Total points will be assigned based on 1 exam and assignments with the following weightings.

Assignments: 60% (10% each of six assignments)

Exam: 40%

Grades will be assigned as follows:

88-100%	A
75-87%	B
65-74%	C
< 65%	No credit

Grading options are A-F or S-N. At least a 65% score is needed to receive a grade of S. Exam is open book and open notes.

### **Incomplete Grade**

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances, the student was prevented from completing the work of the course on time. The assignment of an incomplete requires a written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements. In no event may any such written agreement allow a period of longer than one year to complete the course requirements.

## University of Minnesota Uniform Grading and Transcript Policy

A link to the policy can be found at [onestop.umn.edu](http://onestop.umn.edu).

### VIII. Other Course Information and Policies

#### **Grade Option Change** (if applicable)

For full-semester courses, students may change their grad option, if applicable, through the second week of the semester. Grade option change deadlines for other terms (i.e. summer and half-semester) can be found at [onestop.umn.edu](http://onestop.umn.edu).

#### **Course Withdrawal**

Students should refer to the Refund and Drop/Add Deadlines for the particular term at [onestop.umn.edu](http://onestop.umn.edu) for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Student Services Center at [sph-ssc@umn.edu](mailto:sph-ssc@umn.edu) for further information

#### **Student Conduct, Scholastic Dishonesty and Sexual Harassment Policies**

Students are responsible for knowing the University of Minnesota, Board of Regents' policy on Student Conduct and Sexual Harassment found at [www.umn.edu/regents/polindex.html](http://www.umn.edu/regents/polindex.html). Students are responsible for maintaining scholastic honesty in their work at all times.

Students engaged in scholastic dishonesty will be penalized, and offenses will be reported to the Office of Student Academic Integrity (OSAI, [www.osai.umn.edu](http://www.osai.umn.edu)).

The University's Student Conduct Code defines scholastic dishonesty as "plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis."

Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in a grade of "F" or "N" for the entire course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity: <http://writing.umn.edu/tww/plagiarism/>.

Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to <http://tutorial.lib.umn.edu/> and click on "Citing Sources".

In addition, original work is expected in this course. It is unacceptable to hand in assignments for this course for which you receive credit in another course unless by prior agreement with the instructor. Building on a line of work begun in another course or leading to a thesis, dissertation, or final project is acceptable.

If you have any questions, consult the instructor.

#### **Disability Statement**

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have a documented disability (e.g., physical, learning,

psychiatric, vision, hearing, or systemic) that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact Disability Services to have a confidential discussion of their individual needs for accommodations. Disability Services is located in Suite 180 McNamara Alumni Center, 200 Oak Street. Staff can be reached by calling 612/626-1333 (voice or TTY).

## Course Outline/Weekly Schedule

Date	Lesson	Reading	Assignments: Due Date
6/15- 6/18	1 – Introduction to SAS This lesson will cover some of the basics of using SAS: - structure of data, types of data (numeric, character) - reading in and displaying data - rules for SAS statements - running a SAS program, generating log and output files	Cody and Smith (C&S), Chapter 1	Practice exercises (not turned in)
6/19- 6/22	2 – Reading in Data - list input, comma and tab delimited data, data from Excel, column input, informats - reading data from external file - problems in reading data	C&S Chapter 12, A-F, I, J; C&S Chapter 13: A-D, G Programs 1,2	<b>Assignment 1 Due:</b>  <b>6/24</b>
6/23- 6/26	3 – Describing Data I - PROC PRINT, MEANS, UNIVARIATE - summary statistics, frequency distributions, graphical displays - controlling the output generated	C&S Chapter 2 Program 3	
6/27- 6/30	4 – Describing Data II - PROC FREQ, (G)CHART, (G)PLOT, CORR, REG - correlation, simple regression - using options in PROCs	C&S Chapter 5: A-F, H C&S Chapter 3: G Program 4	<b>Assignment 2 Due:</b>  <b>7/2</b>
7/1- 7/4	5 – Formatting Output/Creating Variables - PROC FORMAT, labels, titles, FORMAT statement - computing new variables; if, then, else statements - creating tables for Word or for the Web	C&S Chapter 3: A-F, H Programs 5,6,7	
7/5- 7/8	6 – More Data-step Programming - Working with dates - Arithmetic functions in the data-step - Use of arrays - Character functions in the data-step	C&S Chapter 4: A-C C&S Chapter 17: A-D C&S Chapter 18: A-O Programs 8,9,10	<b>Assignment 3 Due:</b>  <b>7/10</b>
7/9- 7/12	7 – Working with SAS Datasets - Creating and using a permanent SAS data-set - Displaying information about a SAS data-set - Sub-setting and merging SAS data-sets	C&S Chapter 13, H-J C&S Chapter 14: A-D Programs 11-14	
7/13- 7/16	8 – Creating SAS Datasets from PROCs/Restructuring SAS datasets I	C&S Chapter 4: D-E, G-J Programs 15,16	<b>Assignment 4 Due:</b>

	<ul style="list-style-type: none"> <li>- use of OUTPUT statements on PROC MEANS, UNIVARIATE</li> <li>- working with PROC created datasets</li> <li>- creating 1-observation/patient dataset from multiple observation/patient dataset</li> </ul>		<b>7/18</b>
7/17-7/20	<ul style="list-style-type: none"> <li>9 – Restructuring SAS Datasets II</li> <li>- using PROC RANK to compute equal cut-points for variables</li> <li>- creating multiple observation/patient dataset from 1-observation/patient dataset</li> <li>- Computing frequency distributions for multiple responses</li> </ul>	C&S Chapter 16: A-C, E Programs 17,18,19	
7/21-7/24	<ul style="list-style-type: none"> <li>10 – Statistical Testing I</li> <li>- Chi-square, T-Tests, ANOVA, Non-parametric tests</li> <li>- Reading in frequency counts as raw data</li> </ul>	C&S Chapter 6: A-B, D-F C&S Chapter 7: A-C C&S Chapter 3: G-O Programs 20,21	<b>Assignment 5 Due:</b>  <b>7/26</b>
7/25-7/28	<ul style="list-style-type: none"> <li>11 – Statistical Testing II</li> <li>- Introduction to time-to-event analyses</li> </ul>	C&S Chapter 9: G Programs 22,23	
7/29-8/1	<ul style="list-style-type: none"> <li>12 – Special Topics</li> <li>- Generating data to graph functions</li> <li>- Macro variables</li> <li>- Introduction to PROC TABULATE</li> <li>- Exporting from SAS to Excel (PROC EXPORT)</li> <li>- Comparing two datasets (PROC COMPARE)</li> <li>- Sending SAS data sets to different computers</li> </ul>	C&S Chapter 11: D C&S Chapter 19: E, A-C Programs 24-27	<b>Assignment 6 Due:</b>  <b>8/3</b>
7/30	Exam		<b>Due 8/7</b>