PubH 6325-Sections 001-003
Data Processing with PC-SAS
Fall/2018

Credits:	**1**
Meeting Days:	**Four Saturdays (September 8, 15, 22, 29)**
Meeting Time:	Lecture: Sec. 001 – online
	Labs: Sec. 002 – 9:00-11:00 am
	Sec. 003 – 12:00-2:00 pm
Meeting Place:	Lecture: Mayo 3-125 Lab: Mayo C381
Instructor:	J. Michael Oakes, PhD
Office Address:	431 West Bank Office Building (WBOB)
Office Phone:	612-624-6855 (email is preferred)
E-mail:	oakes007@umn.edu
Office Hours:	by appointment

I.   Course Description

To introduce School of Public Health (SPH) students to methods for transferring and processing existing data sources. This time-intensive short course emphasizes hands-on and otherwise practical approaches to *pre-statistical data processing* and analysis with PC-SAS statistical software on an PC with a MS Windows operating system. The intended audience is public health masters and doctoral students.

Because of the overlap between this course and PubH 6420, if Division of Epidemiology students take both courses they can only use one towards their degree requirements, including electives. Students in other SPH programs will have to check with their Chair/DGS to see if they can count both or only one course toward a degree requirement.

II.   Course Prerequisites

Prospective students must be matriculated graduate or professional students. Students should have passed a (bio)statistics course. Prior experience with SAS and/or STATA is helpful but not required. The Instructor may waive prerequisites for special circumstances.

III. Course Goals and Objectives

Upon completion of this course the student should be able to:

- Understand basic and moderately advanced data structures, including rudiments of the binary number system, flat-files, relational and hierarchical data resources;

- Discuss the benefits and limitations of the PC-SAS interface;

- Deal with raw and non-SAS data;

- Know how to find, understand, and exploit SAS help-files, online resources, and texts;

- Write moderately complex "data steps" for manipulating data sets of any size, including the ability to (1) write professional SAS programs and interpret related conventia; (2) sort, merge, append, and collapse data sets; (2) generate new variables, especially with functions and formats; (3) label variables and data sets; (4) produce simple graphs; (5) write code for cleaning data and detecting missing values; (6) write simple macros for efficiency, be familiar with SAS's ODS or graphics subroutines.

- Understand the essential *syntax* and commands for SAS analysis procedures (proc steps), such as tabulate, means, and regression. Interpretation of such methods is beyond the scope of this course.

IV. Methods of Instruction and Work Expectations

Class sessions will be held in both a lecture hall and a computer-lab. Lectures will introduce ideas and issues to students. Labs will permit hands-on training, group discussions, and interactive computer exercises. Homework will be readings and related internet access tasks (e.g., tutorials). The course is a time-intensive short course that meets approximately 4 hours per day for 4 days.

This is a time-intensive 1-credit short course. Since 1 credit is roughly equal to 3 hours of effort per week, and there are 15 weeks in a typical semester, you should expect to devote about 45 hours of effort to this short course. Subtracting both in-class and in-lab time, there are 25 hours for homework, or a *maximum* of 6.5 hours per each of four days of this class. The typical student should allow 1-2 hours of homework each week.

Students must complete all of the following to earn a passing grade in the course:

A. *Satisfactory completion of all assigned readings:* Readings are critical to useful class discussions. (20% of total grade)

B. *Satisfactory completion of computer in-lab homework assignments:* Such assignments will include essential programming and data manipulation techniques. Assignments will be given and must be completed in lab time (second hour of lab). Late homework will not be accepted. Homework must be presented in a neat and careful manner, as one would present a professional report. Detailed directions will be offered. (20% of total grade)

C. Completion of an in-lab final exam on the last day of class. (60% of total grade)

V. Course Text and Readings

a) Two texts are <u>recommended but not required</u>, others are recommended for HPM students or those interested in such data. You may purchase these from SAS.com or other places such as Amazon.com. The instructor has not ordered them through the UMN Bookstore.

SAS Programming by Example **(Recommended for all)**
By: Ron Cody and Ray Pass
List price: $42.95
360 pages
SAS Order No: 55126
ISBN: 1-55544-681-7
Year: 1995

Professional SAS Programmer's Pocket Reference, 5th ed. **(Recommended for all)**
By: Rick Aster
List price: $17.95
239 pages
SAS Order No: 58128
ISBN: 1-891957-12-4 0
Year: 2000

Health Care Data and the SAS System **(Recommended for HPM students)**
By: Marge Scerbo, Craig Dickstein, and Alan Wilson
List price: $37.95
300 pages
SAS Order No: 57638
ISBN: 1-58025-865-4
Year: 2001

Longitudinal Data and SAS: A Programmer's Guide **(Recommended for the interested)**
By: Ron Cody
List Price: $29.95
208 pages
SAS Order No: 58176
ISBN: 1-58025-924-3
Year: 2001

(b) Standard UMN Internet access to online SAS help files, and the internet more generally. All students should automatically have this access.

VI. Course Outline/Weekly Schedule

DAY 1: BACKGROUND; DATA AND DATABASES; PC-SAS INTERFACE AND HELP

The computer (binary) number system; Character representation; Numeric and String representations; ASCII and EBCDIC

Databases; Flat files (fixed, delimited, freeform); Binary files; Hierarchical Data; Relational Data; Append, Collapse and Merge (conceptually)

The PC-SAS Interface, and its relation to the Windows OS (libname, system options; external files)

Navigating SAS Help: Native help files, online resources, texts

Introduction to the Program Data Vector and Data Step Processing

Ethics of Secondary Data Analysis

DAY 2: DATA STEP AND PROGRAMMING BASICS; SIMPLE PROCEDURES;

Professional programming conventia, including comments and system options

Reading simple SAS data

Subsetting – keep, drop; obs, nobs

Introduction to Boolean Logic and SAS Operators (if, where, by, in. or, and, not)

Simple manipulation: variable assignment, rename, label, title

Basic Procedures: Proc Contents (simple), Proc Print, Proc Freq, Proc Means

DAY 3: DATA SET MANIPULATION; FUNCTIONS; FORMATS; DATES

Sorting; Appending; Merging; Collapsing

Random sampling/Subsetting

String and Numeric Functions

Formats / Informats

Dates, Date formats, and intervals

DAY 4: TRANSFERRING DATA BETWEEN PROGRAMS RETAIN; ARRAYS; MACROS; ODS GRAPHS

Reading and Writing ASCII data

Importing Excel data; Stat/Transfer & DBMS Copy

Retain

Arrays and do loops

Macro Basics

ODS

SAS Graph Basics

VII. Homework/Readings

The instructor will offer notes/data and other such materials for each session via email and websites.

DAY 1: BACKGROUND; DATA AND DATABASES; PC-SAS INTERFACE; HELP; ETHICS

Surf **Error! Hyperlink reference not valid.**

Surf SAS online help documents

Explore UCLA site **Error! Hyperlink reference not valid.**

Study 'Concepts' (chaps: 1-3 basics)

Study 'Concepts' (chaps 18-19 Windows stuff))

Skim   Oakes, J. Michael. 2002. "Risks and Wrongs in Social Science Research: An Evaluator's Guide to the IRB." *Evaluation Review* 26:443-478.

DAY 2: DATA STEP AND PROGRAMMING BASICS; SIMPLE PROCEDURES;

Study 'Concepts' (chaps: 7 Expressions; 20 Data step processing)

Read 'Advanced Data Step Topics' PDF

Study 'Procedures' (chaps: 3-2 Freq Procedure; 2-29 Means)

Study online help for Proc Contents

UCLA SAS Module for Subsetting Data

UCLA SAS Module for Common system options

UCLA SAS Module for Creating Variables

UCLA SAS Module for Labeling data and variables

DAY 3: DATA SET MANIPULATION; FUNCTIONS; FORMATS; DATES

Study 'Concepts' (chaps: 23 Modifying data sets)

Study 'Concepts' (chaps: 8 Dates)

Study 'Dictionary' (chaps: 3 Formats; 5 Informats)

UCLA SAS Module for Functions

Review www.stattransfer.com

UCLA SAS Module for inputting data

VIII. Evaluation and Grading

Letter grades and associated points are awarded in this course as follows below. These will appear in the student's official transcript.

Pass/Fail Grading: An alternative to traditional A-F scale grades is the S/N grading scale. The "S" grade does not carry points but credit will count toward completion of student's degree if permitted by college or program. An "N" is given for student's exercising the S/N grading option but who fail to meet minimum course requirements. Students may change grading options without written permission as specified by the University and without penalty during the initial registration period or during the first two days of the class (since the course is a short-course). The grading option may not be changed after the second class.

Grades will not be normed within the class; it is possible for all students to receive an "A."

Grade Mapping			
Class Points	Letter Grade	Grade Points	Interpretation (relative to requirements)
>94	A	4.00	Outstanding
90-94	A-	3.67	
87-89	B+	3.33	
83-86	B	3.00	Significantly Above
80-82	B-	2.67	
77-79	C+	2.33	
73-76	C	2.00	Satisfactory
70-72	C-	1.67	Less than Satisfactory
70+	S	-	At Least Satisfactory
-	N/F	-	Not Satisfactory, No Credit
-	I	-	Incomplete

The maximum number of points a student can earn is 100. **Class participation, including lab attendance,** demonstrating comprehension of assigned readings and notes will account for **20 points (20%)** of the final grade. **Three in-lab assignments** demonstrating knowledge and ability to perform required tasks will account for **30 points (30%)** of the final grade. Each assignment will be worth equal amounts. **A final in-lab programming exam will account for 50 point (50%)** of your final grade. Numeric grades will map to letter grades as per the table above.

Course Evaluation
The SPH will collect student course evaluations electronically using a software system called CoursEval: www.sph.umn.edu/courseval. The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade in SPHGrades: www.sph.umn.edu/grades. All students will have access to their final grades through OneStop two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are an important means for improving our work. Please take the time to complete a course evaluation for each of the courses for which you are registered.

Incomplete Contracts

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an "I" requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student's college). For more information and to initiate an incomplete contract, students should go to SPHGrades at: www.sph.umn.edu/grades.

University of Minnesota Uniform Grading and Transcript Policy

A link to the policy can be found at onestop.umn.edu.

VIII. Other Course Information and Policies

Grade Option Change (if applicable):

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

Course Withdrawal:

Students should refer to the Refund and Drop/Add Deadlines for the particular term at 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 Office of Admissions and Student Resources at sph-ssc@umn.edu for further information.

Student Conduct Code:

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: *Student Conduct Code*. To review the Student Conduct Code, please see: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Use of Personal Electronic Devices in the Classroom:

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Scholastic Dishonesty:

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means 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; altering, forging, or misusing a University academic record; or fabricating or falsifying data,

research procedures, or data analysis. (Student Conduct Code: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html.

The Office for Community Standards has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty https://communitystandards.umn.edu. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Makeup Work for Legitimate Absences:
Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html.

Appropriate Student Use of Class Notes and Course Materials:
Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Sexual Harassment:
"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf

Equity, Diversity, Equal Opportunity, and Affirmative Action:
The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf.

Disability Accommodations:
The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center Student Services is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DRC at 612-626-1333 or drc@umn.edu to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DS website, https://diversity.umn.edu/disability/.

Mental Health and Stress Management:

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.

The Office of Student Affairs at the University of Minnesota:
The Office for Student Affairs provides services, programs, and facilities that advance student success, inspire students to make life-long positive contributions to society, promote an inclusive environment, and enrich the University of Minnesota community.

Units within the Office for Student Affairs include, the Aurora Center for Advocacy & Education, Boynton Health Service, Central Career Initiatives (CCE, CDes, CFANS), Leadership Education and Development – Undergraduate Programs (LEAD-UP), the Office for Fraternity and Sorority Life, the Office for Community Standards, the Office for Student Engagement, the Parent Program, Recreational Sports, Student and Community Relations, the Student Conflict Resolution Center, the Student Parent HELP Center, Student Unions & Activities, University Counseling & Consulting Services, and University Student Legal Service.

For more information, please see the Office of Student Affairs at https://osa.umn.edu/.

Academic Freedom and Responsibility: *for courses that do <u>not</u> involve students in research:*
Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

* Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".

Student Academic Success Services (SASS): http://www.sass.umn.ed<u>u</u>:
Students who wish to improve their academic performance may find assistance from Student Academic Support Services.   While tutoring and advising are not offered, SASS provides resources such as individual consultations, workshops, and self-help materials.

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