

# PUBH 6325, SECTIONS 1-2

Data Processing with PC-SAS

Fall 2019

## COURSE & CONTACT INFORMATION

**Credits:** 1 credit

**Meeting Day(s), Time, and Place:** The lectures for this course are entirely web-based, delivered via Canvas at <http://canvas.umn.edu>. Four mandatory lab sessions will be held in Mayo Bldg & Additions C381, on Wednesdays from 10:10am to 12:05pm or from 2:30pm to 4:25pm depending on the section for which you have registered.

Contact Type	Contact Information	Role	When to Contact
Instructor	Ryan Demmer, PhD MPH FAHA Associate Professor demm0009@umn.edu 612-626-8597	Primary instructor for this course	Questions or concerns about the course content, assignments, deadlines, etc.
Teaching Assistant	Bruno Bohn, MPH ferre083@umn.edu	Leads most lab sessions, grades assignments and provides individual feedback on assignments. Also available to provide student support for course related content.	Questions about assignments, deadlines, technical aspects of the CANVAS site.
Technical Support	Technical support options are available on the SPH website. <a href="https://z.umn.edu/sphquickhelp">https://z.umn.edu/sphquickhelp</a>	Troubleshoots technical issues related to the course site or course content.	Technical issues with the course site, media, quizzes or assignments.

Please save this contact information to your computer or print it. That way, you can still contact us in the event that you have difficulty connecting to the Internet or accessing the syllabus.

## Communication in Online Courses

Communication is especially important in an online course. The course site announcement forums/discussions and email will be used to communicate with students. You are responsible for reading all course-related emails sent to your University email account and contacting us in a timely manner with any questions you may have. We strongly recommend that you check your U of M email daily. Our goal is to respond to emails within 24 hours.

## COURSE DESCRIPTION

This course will introduce students to basic concepts of data processing and data manipulation using PC-SAS. The material will complement concepts learned in introductory epidemiology and biostatistics courses and is meant to serve as a bridge to more advanced epidemiology and biostatistics courses. 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.

## 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.

## COURSE GOALS & OBJECTIVES

Understand basic and moderately advanced data structures.

Discuss the pros/cons of PC-SAS.

Read nonSAS data into SAS.

Understand how to access SAS data sets via the LIBNAME statement.

Manipulate SAS data sets through printing, sorting, merging and concatenation.

Know the difference between temporary and permanent data sets.

Annotate SAS code to enhance readability and reproducibility of results.  
Understand how to create new variables with arithmetic operations and using IF/THEN statements.  
Understand how to use SAS functions and arrays.  
Understand the basic code necessary to run SAS procedures.  
Know how to use the following SAS PROCS: PRINT, CONTENTS, MEANS, UNIVARIATE, FREQ, RANK.

## METHODS OF INSTRUCTION AND WORK EXPECTATIONS

### Course Workload Expectations

PubH 6325 is a 1 credit course. The University expects that for each credit, you will spend a minimum of three hours per week attending class or comparable online activity, reading, studying, completing assignments, etc. over the course of a 15-week term. Thus, this course requires approximately 45 hours of effort spread over the term in order to earn an **average** grade. Since this course meets for only four weeks, you should expect to spend ~11 hours per week engaged in course activities. This time will be comprised of ~3 hours of on-line lectures, ~2 hours of required in-person classroom labs and ~6 hours of required readings, assignments and review in preparation for quizzes and exams.

### Technology

Students should be familiar with computing in the Windows environment.

### Learning Community

School of Public Health courses ask students to discuss frameworks, theory, policy, and more, often in the context of past and current events and policy debates. Many of our courses also ask students to work in teams or discussion groups. We do not come to our courses with identical backgrounds and experiences and building on what we already know about collaborating, listening, and engaging is critical to successful professional, academic, and scientific engagement with topics.

In this course, students are expected to engage with each other in respectful and thoughtful ways.

In group work, this can mean:

- Setting expectations with your groups about communication and response time during the first week of the semester (or as soon as groups are assigned) and contacting the TA or instructor if scheduling problems cannot be overcome.
- Setting clear deadlines and holding yourself and each other accountable.
- Determining the roles group members need to fulfill to successfully complete the project on time.
- Developing a rapport prior to beginning the project (what prior experience are you bringing to the project, what are your strengths as they apply to the project, what do you like to work on?)

In group discussion, this can mean:

- Respecting the identities and experiences of your classmates.
- Avoid broad statements and generalizations. Group discussions are another form of academic communication and responses to instructor questions in a group discussion are evaluated. Apply the same rigor to crafting discussion posts as you would for a paper.
- Consider your tone and language, especially when communicating in text format, as the lack of other cues can lead to misinterpretation.

Like other work in the course, all student to student communication is covered by the Student Conduct Code (<https://z.umn.edu/studentconduct>).

## COURSE TEXT & READINGS

The following is a required textbook:

“The Little SAS Book: A Primer”, by Lora D. Delwiche and Susan J. Slaughter, 5th Edition, Copyright 2012, SAS Institute. (ISBN 978-1-61290-343-9).

A limited number of hard copy textbooks are available at the Health Sciences Bookstore. However, the text is also available in a digital form from the Health Sciences Bookstore and the textbook is also available for purchase on-line at Amazon using the following link:

[https://www.amazon.com/Little-SAS-Book-Primer-Fifth-dp-1612903436/dp/1612903436/ref=mt\\_paperback?\\_encoding=UTF8&me=&qid=](https://www.amazon.com/Little-SAS-Book-Primer-Fifth-dp-1612903436/dp/1612903436/ref=mt_paperback?_encoding=UTF8&me=&qid=)

Additional material for the course is drawn from the following sources which are recommended but not required:

“SAS for Epidemiologists. Applications and Methods”. By Charles DiMaggio. 1st Edition. Copyright 2012. Springer. ISBN: 978-1-4614-4853-2.

“Applied Statistics and the SAS Programming Language”. Cody & Jeffrey K. Smith. 4th addition by Ronald P. Copyright 2006, Prentice-Hall Inc. (ISBN 978-0-13146-532-9).

## COURSE OUTLINE/WEEKLY SCHEDULE

This course has specific deadlines. All coursework must be submitted via the course site before the date and time specified on the site. **Note: assignments are due by 11:55pm CST unless indicated otherwise.** The on-line lectures assigned each week should be viewed prior to the Wednesday lab sessions.

Week	Topic	Readings	Activities/Assignments
<b>Week 1</b> 9/8/19 – 9/14/19	<ul style="list-style-type: none"> <li>Introduction SAS</li> <li>SAS Procedures</li> </ul>	<ul style="list-style-type: none"> <li>Delwiche and Slaughter, Chapters 1 &amp; 2</li> </ul>	<ul style="list-style-type: none"> <li>Lessons 1 - 5</li> <li>Activity: Exercise 1-2</li> <li>Lessons 2 &amp; 4 Quizzes (due by Sept 15<sup>th</sup>)</li> <li>Assignment #1 (due by Sept 15<sup>th</sup>)</li> </ul>
<b>Week 2</b> 9/15/19-9/21/19	<ul style="list-style-type: none"> <li>Data libraries</li> <li>Accessing Data Sets</li> <li>Creating SAS Data Sets</li> </ul>	<ul style="list-style-type: none"> <li>Delwiche and Slaughter, Chapters 4 &amp; 6</li> </ul>	<ul style="list-style-type: none"> <li>Lessons 5.2 - 7</li> <li>Activity: Exercises 3 - 4</li> <li>Lessons 6 &amp; 7 Quizzes (due by Sept 22<sup>nd</sup>)</li> <li>Assignment #2 (due by Sept 22<sup>nd</sup>)</li> </ul>
<b>Week 3</b> 9/22/19-9/28/19	<ul style="list-style-type: none"> <li>SAS functions and expressions</li> <li>IF-THEN statements</li> <li>Arrays</li> <li>Formats</li> </ul>	<ul style="list-style-type: none"> <li>Delwiche and Slaughter, Chapters 3 &amp; 10</li> </ul>	<ul style="list-style-type: none"> <li>Lesson 8 - 9</li> <li>Activity: Exercise 5</li> <li>Lesson 9 Quiz (due by Sept 29<sup>th</sup>)</li> <li>Assignment #3 (due by Sept 29<sup>th</sup>)</li> </ul>
<b>Week 4</b> 9/29/19 – 10/5/19	<ul style="list-style-type: none"> <li>Intro to Categorical Data Analysis in SAS</li> <li>TTESTS in SAS</li> <li>Supplemental: ANOVA and Linear Regression</li> </ul>	<ul style="list-style-type: none"> <li>Delwiche and Slaughter, Chapters 7, 8 &amp; 13</li> </ul>	<ul style="list-style-type: none"> <li>Lesson 10 - 11</li> <li>Lesson 12 &amp; 13 (supplemental, not required)</li> <li>Activity: Exercise 6</li> <li>Activity: Exercises 7 – 10 (supplemental, not required)</li> <li>Final Exam (Details provided in week 3)</li> </ul>

## LEARNING OBJECTIVES

Week 1 Learning Objectives: Understand: the SAS working environment; difference between SAS editor, log and output windows; differences between SAS editor files and SAS data sets. Introduction to the following procedures: PROC PRINT, PROC CONTENTS, PROC MEANS, PROC FREQ; OBS= and FIRSTOBS= options; WHERE statements;

Week 2 Learning Objectives: Understand: data set naming conventions; permanent vs. temporary data sets; LIBNAME statement; how to merge and/or modify SAS data sets using MERGE or SET statements; how to use PROC SORT; how to use the SAS import wizard; how to read in data using list and column formats; reading in data from internal and external sources; handling dates; INFORMATS; OPTIONS statement;

Week 3 Learning Objectives: Understand: different variables types (continuous, ordinal, nominal, binary); how to create new variables with arithmetic operations; how to use SAS functions; arrays, do loops, IF/THEN statements; PROC UNIVARIATE, PROC MEANS, PROC FREQ, PROC RANK. How to create and apply FORMATS in SAS procedures and data steps.

Week 4 Learning Objectives: Understand: how to use SAS functions; arrays, do loops, IF/THEN statements; necessary data structure for conducting Chi-Square tests and obtaining odds ratios and risk ratios using PROC FREQ; how to conduct TTESTS using PROC TTEST.

## Council on Education for Public Health (CEPH) Competencies & Learning Objectives

Competency	Learning Objectives	Assessment Strategies
<i>Interpret results of data analysis for public health research, policy or practice</i>	<ul style="list-style-type: none"> <li>Conduct basic tests of association via TTESTS, ANOVA or chi-square tests for categorical data.</li> </ul>	<ul style="list-style-type: none"> <li>Course Exercises 9 -10</li> <li>Assignment #3</li> </ul>
<i>Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate</i>	<ul style="list-style-type: none"> <li>Summarize results in a 2x2 table.</li> <li>Calculate measures of association</li> <li>Calculate measures of impact</li> <li>Operationalize raw data into an analysis data set</li> <li>Create analytical variables from raw data</li> </ul>	<ul style="list-style-type: none"> <li>Lessons 1 -7</li> <li>Assignments 1 - 3</li> </ul>

## SPH AND UNIVERSITY POLICIES & RESOURCES

The School of Public Health maintains up-to-date information about resources available to students, as well as formal course policies, on our website at [www.sph.umn.edu/student-policies/](http://www.sph.umn.edu/student-policies/). Students are expected to read and understand all policy information available at this link and are encouraged to make use of the resources available.

The University of Minnesota has official policies, including but not limited to the following:

- Grade definitions
- Scholastic dishonesty
- Makeup work for legitimate absences
- Student conduct code
- Sexual harassment, sexual assault, stalking and relationship violence
- Equity, diversity, equal employment opportunity, and affirmative action
- Disability services
- Academic freedom and responsibility

Resources available for students include:

- Confidential mental health services
- Disability accommodations
- Housing and financial instability resources
- Technology help
- Academic support

## EVALUATION & GRADING

Quizzes: There are 5 graded quizzes in this course worth a total of 10% of the final grade (2% per quiz).

Assignments: There are 3 assignments in this course worth a total of 60% of the final grade (20% each).

Final Exam: The final exam is worth 30% of the final grade.

### Grading Scale

The University uses plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following, and you can expect the grade lines to be drawn as follows:

<b>% In Class</b>	<b>Grade</b>	<b>GPA</b>
93 - 100%	A	4.000
90 - 92%	A-	3.667
87 - 89%	B+	3.333
83 - 86%	B	3.000
80 - 82%	B-	2.667
77 - 79%	C+	2.333
73 - 76%	C	2.000
70 - 72%	C-	1.667
67 - 69%	D+	1.333
63 - 66%	D	1.000
< 62%	F	

- A = achievement that is outstanding relative to the level necessary to meet course requirements.
- B = achievement that is significantly above the level necessary to meet course requirements.
- C = achievement that meets the course requirements in every respect.
- D = achievement that is worthy of credit even though it fails to meet fully the course requirements.
- F = failure because work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (Incomplete).
- S = achievement that is satisfactory, which is equivalent to a C- or better
- N = achievement that is not satisfactory and signifies that the work was either 1) completed but at a level that is not worthy of credit, or 2) not completed and there was no agreement between the instructor and student that the student would receive an I (Incomplete).

Evaluation/Grading Policy	Evaluation/Grading Policy Description
<p><b>Scholastic Dishonesty, Plagiarism, Cheating, etc.</b></p>	<p>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 (As defined in the Student Conduct Code). For additional information, please see <a href="https://z.umn.edu/dishonesty">https://z.umn.edu/dishonesty</a></p> <p>The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: <a href="https://z.umn.edu/integrity">https://z.umn.edu/integrity</a>.</p> <p>If you have additional questions, please clarify with your instructor. 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.</p> <p>Indiana University offers a clear description of plagiarism and an online quiz to check your understanding (<a href="http://z.umn.edu/iuplagiarism">http://z.umn.edu/iuplagiarism</a>).</p>
<p><b>Late Assignments</b></p>	<p>10% reduction for late assignments received &lt; 1 day late. No credit for assignments received &gt; 1 day late.</p>
<p><b>Attendance Requirements</b></p>	<p>Lab attendance required.</p>
<p><b>Makeup Work for Legitimate Reasons</b></p>	<p>If you experience an extraordinary event that prevents you from completing coursework on time and you would like to make arrangements to make up your work, contact your instructor within 24 hours of the missed deadline if an event could not have been anticipated and at least 48 hours prior if it is anticipated.</p> <p>University policy recognizes that there are a variety of legitimate circumstances in which students will miss coursework, and that accommodations for makeup work will be made. This policy applies to all course requirements, including any final examination. Students are responsible for planning their schedules to avoid excessive conflicts with course requirements.</p> <ol style="list-style-type: none"> <li>1. Instructors may not penalize students for absence during the academic term due to the following unavoidable or legitimate circumstances: illness, physical or mental, of the student or a student's dependent; medical conditions related to pregnancy; participation in intercollegiate athletic events; subpoenas; jury duty; military service; bereavement, including travel related to bereavement; religious observances; participation in formal University system governance, including the University Senate, Student Senate, and Board of Regents meetings, by students selected as representatives to those bodies; and activities sponsored by the University if identified by the senior academic officer for the campus or the officer's designee as the basis for excused absences.</li> <li>2. Voting in a regional, state, or national election is not an unavoidable or legitimate absence.</li> <li>3. Instructors are expected to accommodate students who wish to participate in party caucuses, pursuant to Board of Regents resolution (see December 2005 Board of Regents Minutes, p 147.)</li> <li>4. For circumstances not listed in (1), the instructor has primary responsibility to decide on a case-by-case basis if an absence is due to unavoidable or legitimate circumstances and grant a request for makeup work.</li> </ol> <p>Because this course is entirely online and all materials are available to students from the first day of the term, we expect students to plan accordingly if travels or access to internet will cause them to miss a deadline. Note that our deadlines are generally set for 11:55 p.m. CST, so traveling to a different time zone will require additional planning. Further, circumstances that qualify for making up missed work will be handled by the instructor on a case-by-case basis; they will always be considered but not always granted. For complete information, view the U of M's policy on Makeup Work for Legitimate Absences (<a href="http://z.umn.edu/sphmakeupwork">http://z.umn.edu/sphmakeupwork</a>).</p>
<p><b>Extra Credit</b></p>	<p>N/A</p>

<b>Saving &amp; Submitting Coursework</b>	<b>Documents that students submit are considered final;</b> students may not submit more than one version or draft of each assignment.
<b>Technical Issues with Course Materials</b>	<p>You are expected to submit all coursework on time and it is your responsibility to ensure that your work is submitted properly before the deadline.</p> <p>If you experience technical difficulties while navigating through the course site or attempting to submit coursework:</p> <ul style="list-style-type: none"><li>• Go to Quick Help: <a href="http://z.umn.edu/sphquickhelp">http://z.umn.edu/sphquickhelp</a>.</li><li>• Connect with the appropriate person or office within 30 minutes of the problem's occurrence.<ul style="list-style-type: none"><li>○ Provide as much information as possible, so the tech team can best help you as soon as possible.</li><li>○ You can expect a response within 1-2 business days to help resolve the problem.</li></ul></li></ul>