

University of Wisconsin - Madison
Population Health Sciences/Biostatistics and Medical Informatics 451
Introduction to SAS Programming for Population Health
2 credits
Fall 2021

Instructor: John Hampton, MS
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Virtual office hours: Monday afternoons by appointment or Wednesday mornings by appointment

Course website: UW Canvas at <https://canvas.wisc.edu/courses/271779>

Lecture: 9:30-11:25 Fridays

Computer Lab: 11:30-12:30 Fridays

Lectures/labs will be in Health Sciences Learning Center room 1244.

This two-credit class meets for a two academic-hour class lecture period each week on Fridays from 9:30-11:25 a.m. (includes short breaks) over the fall semester and carries the expectation that students will work on course learning activities (computer lab, reading, homework assignments, studying, etc.) out of classroom for about 4 hours each week. The syllabus and weekly schedule includes additional information about meeting times and expectations for student work.

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: Delwiche, Lora D. and Slaughter, Susan J. The Little SAS Book, A Primer, 6th edition, SAS Publishing, 2019. The required readings for the course are included in the weekly schedule.

Software: We will use SAS OnDemand for Academics for our classroom work and homework. SAS OnDemand for Academics is a cloud-based solution for all computer operating systems (Window, Linux, Mac) using a web browser. There are no software downloads required to run SAS OnDemand for Academics.

<https://odamid.oda.sas.com>

https://www.sas.com/en_us/software/on-demand-for-academics/references/getting-started-with-sas-ondemand-for-academics-studio.html

Do **NOT** use SAS OnDemand for Academics for your research work!!!

Possible access to SAS outside of our classroom:

** All the (InfoLab) iMac student workstations (dual boot) should have SAS installed. SAS is part of the standard (Windows OS) software deployed to all of the campus InfoLab computers.

SAS 9.4 for Windows and Linux (SAS windowing environment) is available to UW employees for free from the Campus Software Library. It may be used by UW employees on any UW-owned or personally-owned devices.

- Labs and Homework Assignments:** There will be 6 lab assignments and 4 homework assignments. Lab assignments are due at the end of lab session when they are assigned (via Canvas). Homework assignments are due at 9:30 AM 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 **uploaded to the Canvas** course website.
- Ungraded Quizzes:** Ungraded quizzes in Canvas will be used to evaluate class progress during lectures.
- Exams:** There will be an **in-class midterm exam (no book, no notes, no PC)** and a take-home final project (open book). The final project will be distributed at the end of lecture on 12/10 and will be due by 4:45 pm on Friday 12/17.
- Grading:** The course grade will be based on attendance (in-person) and participation in lectures and labs (10%), homework (40%), midterm (25%), and the final project (25%). A: 90 to 100; AB: 85 to <90; B:80 to <85; BC: 75 to <80; C: 70 to <75; D: 60 to <70. Academic integrity is critical to the mission of this University and all students are expected to follow all UW rules of academic conduct.

Learning Objectives for PopHealth 451

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.
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 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 aid 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.
16. Start to understand how coding decisions when modelling influence research in population health.

PRIVACY OF STUDENT RECORDS and the USAGE of AUDIO RECORDED LECTURES

See information about [privacy of student records and the usage of audio-recorded lectures](#).

Usage of Audio Recorded Lectures Statement

Lecture materials and recordings for PHS/BMI 451 are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

RESOURCE LINKS TO OTHER CAMPUS SERVICES

- [University Health Services](#)
- [Undergraduate Academic Advising and Career Services](#)
- [Office of the Registrar](#)
- [Office of Student Financial Aid](#)
- [Dean of Students Office](#)

STUDENTS' RULES, [RIGHTS & RESPONSIBILITIES](#)

COURSE EVALUATIONS

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.

Digital Course Evaluation (AEFIS)

UW-Madison now uses an online course evaluation survey tool, [AEFIS](#). In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously. Your participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.

ACADEMIC CALENDAR & RELIGIOUS OBSERVANCES

- See: <https://secfac.wisc.edu/academic-calendar/>

ACADEMIC INTEGRITY STATEMENT

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES STATEMENT

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy ([UW-855](#)) require the university to provide reasonable accommodations to students with disabilities to access and participate in its academic programs and educational services. Faculty and students share responsibility in the accommodation process. Students are expected to inform faculty [me] of their need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to provide reasonable instructional and course-related accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: [McBurney Disability Resource Center](#))

DIVERSITY & INCLUSION STATEMENT

[Diversity](#) is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.