FPH 7350: Programming for Public Health Practice
Winter Semester, 2017
2 Credit Hours
242 Medical Education Commons (M.E.C.), 320 E. Canfield
Thursdays – Lecture/Lab 5:30 – 7:10PM

Instructor: Erin B. Ware, Ph.D., M.P.H., M.A.
Email: ewar@med.wayne.edu or GC1872@wayne.edu
Please include “SAS Programming” or “FPH7350” in the subject line of your emails
Phone: 734-647-5490

Office Hours: Students should utilize e-mail for private discussion with the instructor or the discussion board feature of Blackboard for class discussion. In-person office hours are available by appointment.

Required software:
SAS is available through the computing website for students (https://commerce.wayne.edu/helpdesk)

“Required” Reference Textbook:

OR


Recommended Reference Textbook:

Course Description, Goals and Objectives
Introduction:
Welcome to FPH 7350, Programming for Public Health Practice. In this course you will become familiar with data management using the SAS language and data situations that one might find in public health. We will discuss programming skills and error checking, how to read in and create data and work with SAS data files, how to use SAS tools for coding and formatting variables, as well as how to write reports and draw basic graphs.

Instructional Philosophy and Course Prerequisites:
This course will be taught with an emphasis on the practical use of SAS for data management. The instructional methods will emphasize good programming practices and real world application in public health. This is not a course in statistical analysis, but an understanding of basic statistical concepts and terminology is expected (e.g. frequencies, measures of center and spread, etc). We recommend that FPH 7015: Biostatistics I be completed prior to taking this class. No prior experience with SAS is required; however, basic PC computer skills and familiarity with the Windows operating system are required. Students not already possessing these skills should contact the course instructors.
This course is recorded as two credit hours of work. You will be required to view recorded lecture/"how-to" videos BEFORE the start of class. In class time will be used to work through computer exercises and troubleshoot.

**Grading and Homework:**
The course grades will be determined by attendance, weekly mini-assignments, a midterm exam, and a final exam. The content of exams and homework assignments will be based on lectures, labs, and readings from the textbooks. Mini-assignments will be a combination of book problems and programming tasks. Mini-assignments will be submitted electronically through Blackboard, including code for the programming tasks which will be tested on independent data sets. No credit will be given for a mini-assignment that is late (i.e., not submitted to Blackboard by the recorded deadline). To start off, you have the option of working with a small team (no more than 3 people) on your mini-assignment. I HIGHLY suggest if you choose to do your mini-assignments as a team that you do these mostly independently and use your team as a resource. Do not rely on your other teammates to do the heavy lifting and assume you know the material.

The midterm will be given in class and will be entirely on paper. There will be no ‘live programming’ on this exam.

The final exam will be a take home exam with submission electronically through Blackboard. It will be a cumulative programming task reflecting a real world data challenge. The exam will be assigned at the end of the last class (Thursday, April 20) and is due by 9 p.m. on Thursday, April 27. If you know that you will have conflict with this exam period due to attendance at an academic conference (or for some other legitimate reason), it is your responsibility to notify the instructor in advance to make other arrangements.

Attendance will count for 10% of your final grade, the midterm exam will count for 15% of your final grade, the combined scores for mini-assignments will account for 50% of your final course grade, and the final exam will count for 25% of your final grade. Students who do not officially withdraw from the course before the drop date will receive a final grade based on their work performed in the class. The following scoring will be used for assigning final grades.

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<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>A</td>
<td>93-100</td>
<td>B-</td>
<td>80-82.9</td>
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<tr>
<td>A-</td>
<td>10-92.9</td>
<td>C+</td>
<td>77-79.9</td>
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<tr>
<td>B+</td>
<td>87-89.9</td>
<td>C</td>
<td>70-76.9</td>
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<tr>
<td>B</td>
<td>83-86.9</td>
<td>F</td>
<td>0-69.9</td>
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<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>10%</td>
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<tr>
<td>Mini-Assignments</td>
<td>50%</td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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**Class Attendance:**
Students are expected to attend all lecture/labs. Attendance and participation are important for learning the course material, as much of the material taught in this course is only covered in class, not the readings, including some that is not included in course slides.

Materials for FPH7350 will be provided mostly through the Blackboard course site. This will require you to sign into Blackboard/Academica using your AccessID and password. These resources will be:

- Links to lecture videos
- Companion lecture slides
- Lab material
- Mini-assignments
- Review materials

**Lectures:** Since our face-to-face time is short, and programming is learned by doing, lectures will be done in short videos (<15 minutes) and will be available for each topic covered in the course to allow for
flexibility in watching the material. These videos should be viewed on a computer, tablets, or smartphone. You likely will want to work along with the lecture when the lecture contains a “how-to” example.

**Mini-Assigments:** Mini-assignments, which will be available on BlackBoard, MUST BE TURNED IN via BlackBoard. Mini-assignments will be turned in individually though you may work with a group. If it becomes evident that partner homework is not conducive to learning the material, we will convert to individual assignments.

**In-Class:** During class, a variety of in-class worksheets and practice problems will be provided to allow for hands-on learning and opportunities to apply programming principles to realistic situations. These will be partner exercises that integrate both the reading and lectures. Attendance/Participation (active learning/participation with your partner) counts for a portion of the grade and will be graded as +/- rather than correct answers. If you are not actively participating in the group, you will not get the attendance/participation credit. Additionally, **you will be allowed 1 absence from the in-class work for illness/conference travel/personal issues/interviews.** Every additional absence will be unexcused and will result in the loss of 2 percentages points off your final grade. Late arrival to class or early departure from class of more than 20 minutes will result in an absence.

**Exams:** There will be two exams: one in-class, one take home. You will have the entire class period to finish your in-class exam and an entire week to finish your take-home exam. Questions may include multiple choice, short answer, completion, matching, and will cover material from the lectures, mini-assignments, and labs.

**Computer Software:**

Your homework assignments will require the use of the base SAS statistical software. You should bring your laptop to each class and have SAS loaded onto your laptop preferably before the first class.

**Mac users:** Note, that you will not be able to run SAS on a Mac OS. You will need to have a partitioned hard drive capable of running PC software. This may require the purchase of additional software for your computer.

**Prior to Class:**

You are expected to have completed the readings, viewed the lecture material, and kept up with homework so that you will be prepared to complete the lab exercises when you arrive.

**Grade Point Average Requirements (Family Medicine, MPH program):**

A grade of B- or lower is considered unacceptable work by the Graduate School and graduate students must maintain a GPA of 3.00 to remain in good standing. Students can balance a B- or lower grade in a non-core course with an A- or higher grade in another course, thus maintaining a 3.00 or higher overall GPA. However, Family Medicine students who receive a B- or lower in a course will be asked to meet with their advisor to insure that they are aware of the Graduate School requirements and to determine if any remedial aid is required. Failure to maintain a GPA of at least 3.00 after such counseling will result in dismissal from the MPH program.

**Expectations for Academic Integrity**

Students are expected to represent their own work honestly and acknowledge the work of others according to accepted academic conventions. Violations of academic integrity include cheating and the use of unauthorized material on examinations, fabrications of written information and sources, improper assistance, and plagiarism. When evidence of academic dishonesty is discovered, it will be handled according to university policies and procedures. **IF YOU CHEAT ON THE FINAL, YOU WILL FAIL THE COURSE – There is NO excuse for cheating on the final exam. If you feel unprepared, request an incomplete.**
Academic Dishonesty -- All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the MPH Student Handbook and the WSU Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts (cheating, fabrication, plagiarism, etc.) are subject to downgrading (failing grade on the test, paper, or other course-related activity, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

- Cheating: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student’s test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a “cheat sheet” during an exam.
- Fabrication: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.
- Plagiarism: To take and use another’s words or ideas as one’s own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.
- Other forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student’s access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

Statement of Student Accommodation:

If a student has a documented disability that requires accommodations, they will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located in the Adamany Undergraduate Library. The SDS telephone number is 313-577-1851 or 313-202-4216 (Videophone use only). Once the accommodation is in place, students will meet with instructor privately to discuss needs.

Students who are registered with Student Disability Services should present the required test permit to the professor at least one week in advance of the final exam. Federal law requires that students registered with SDS are entitled to the reasonable accommodations specified in the student’s accommodation letter.

Religious Holidays

Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

Course Drops and Withdrawals

In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and
beyond will receive a grade. Because withdrawing from courses may have negative academic and
financial consequences, students considering course withdrawal should make sure they fully understand
all the consequences before taking this step. More information on this can be found at:
http://reg.wayne.edu/pdf-policies/students.pdf

Student Services
- *The Academic Success Center* (1600 Undergraduate Library) assists students with content in select
courses and in strengthening study skills. Visit [www.success.wayne.edu](http://www.success.wayne.edu) for schedules and information
on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level
courses).
- The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual
tutoring consultations free of charge. Visit [http://clasweb.clas.wayne.edu/writing](http://clasweb.clas.wayne.edu/writing) to obtain information
on tutors, appointments, and the type of help they can provide.

Learning Objectives
Upon successful completion of this course you should be able to:
1. Read data into SAS from external sources (text files, Excel workbooks, and SAS libraries)
2. Understand the details of DATA step programming
3. Create new variables, formats, and labels
4. Use conditional programming logic and work with arrays
5. Subset and combine SAS data sets
6. Understand and apply SAS functions
7. Summarize data with PROC MEANS, PROC FREQ, PROC CORR, and PROC UNIVARIATE
8. Create reports with PROC REPORT and PROC TABULATE
9. Create basic graphs
10. Use the SAS Output Delivery System (ODS) to output graphics, datasets, tables, & reports
11. Know how to define and use global and local macro variables
12. Be able to write and call macro functions
13. Understand how SAS can be used to perform statistical modelling
14. Learn good programming hygiene
15. Know where to get help!

Master’s of Public Health Competencies
The Association of Schools of Public Health (ASPH) has compiled a series of competencies that should
be met by all Master’s of Public Health programs. Successful completion of this elective course satisfies
three competencies from the biostatistics core and one in the interdisciplinary area of communication and
informatics.

**A.0 Biostatistics** is the development and application of statistical reasoning and methods in addressing,
analyzing and solving problems in public health; health care; and biomedical, clinical and population-
based research.

**A.5** Apply descriptive techniques commonly used to summarize public health data

**A.8** Apply basic informatics techniques with vital statistics and public health records in the description of
public health characteristics and in public health research and evaluation.

**A.10** Develop written and oral presentations based on statistical analyses for both public health
professionals and educated lay audiences.

**F.0 Communication and Informatics** The ability to collect, *manage and organize data to produce
information and meaning that is exchanged by use of signs and symbols*; to gather, process, and present
information to different audiences in-person, through information technologies, or through media
channels; and to strategically design the information and knowledge exchange process to achieve specific
objectives.

**F.8** Use information technology to access, evaluate, and interpret public health data.
## Course Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Session Topic</th>
<th>Readings</th>
<th>Competency</th>
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<tbody>
<tr>
<td>1/12/2017</td>
<td><strong>Introduction to SAS: Introductory topics</strong></td>
<td>Ch 1, 2</td>
<td>1, 2, 3</td>
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<tr>
<td></td>
<td><em>MA 1 assigned – due 1/19</em></td>
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<td>F.8</td>
</tr>
<tr>
<td>1/19/2017</td>
<td><strong>Reading and exporting data files. Dates.</strong></td>
<td>Ch 1, 2, 3</td>
<td>1, 2, 3</td>
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<tr>
<td></td>
<td><em>MA 2 assigned – due 1/26</em></td>
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<td>F.8</td>
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<tr>
<td>1/26/2017</td>
<td><strong>Creating new variables; Basics</strong></td>
<td>Ch 3</td>
<td>2, 3, 4, 6</td>
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<tr>
<td></td>
<td><em>MA 3 assigned – due 2/2</em></td>
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<td>F.0</td>
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<tr>
<td>2/2/2017</td>
<td><strong>Creating new variables; Numeric and character functions</strong></td>
<td>Ch 3</td>
<td>2, 3, 4, 6</td>
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<tr>
<td></td>
<td><em>MA 4 assigned – due 2/9</em></td>
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<td>F.0</td>
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<tr>
<td>2/9/2017</td>
<td><strong>Conditional and iterative processing</strong></td>
<td>Ch 3</td>
<td>2, 3, 4, 6</td>
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<td></td>
<td><em>MA 5 assigned – due 2/16</em></td>
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<td>F.0</td>
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<tr>
<td>2/16/2017</td>
<td><strong>Array processing, variable shortcuts, and formatting variables.</strong></td>
<td>Ch 3, 4</td>
<td>2, 3, 4, 6</td>
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<td></td>
<td><em>MA 6 assigned – due 2/23</em></td>
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<td>F.0</td>
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<tr>
<td>2/23/2017</td>
<td><strong>Merging, subsetting, and transposing files with one observation per subject</strong></td>
<td>Ch 2, 6</td>
<td>1, 2, 5</td>
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<tr>
<td></td>
<td><em>MA 7 assigned – due 3/2</em></td>
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<td>F.0, F.8</td>
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<tr>
<td>3/2/2017</td>
<td><strong>Merging, subsetting, and transposing files with multiple observations per subject</strong></td>
<td>Ch 2, 6</td>
<td>1, 2, 5</td>
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<td></td>
<td></td>
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<td>F.0, F.8</td>
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<tr>
<td>3/9/2017</td>
<td><strong>In class mid-term</strong></td>
<td>All previous</td>
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<td>3/16/2017</td>
<td><strong>Spring Break – No class</strong></td>
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<tr>
<td>3/23/2017</td>
<td><strong>Simple statistics using MEANS, FREQ, CORR, and UNIVARIATE</strong></td>
<td>Ch 4</td>
<td>3, 7</td>
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<td><em>MA 8 assigned – due 3/20</em></td>
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<td>A.5, A.8, F.0</td>
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<tr>
<td>3/30/2017</td>
<td><strong>Quantifying data: reporting using TABULATE and REPORT</strong></td>
<td>Ch 4</td>
<td>3, 8</td>
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<td><em>MA 9 assigned – due 4/6</em></td>
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<td>A.8, F.0, F.8</td>
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<tr>
<td>4/6/2017</td>
<td><strong>Visualizing data: creating charts and graphs for data summary and display (using ODS)</strong></td>
<td>Ch 8, 5</td>
<td>3, 9, 10</td>
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<td><em>MA 10 assigned – due 4/13</em></td>
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<td>A.5, A.8, F.0, F.8</td>
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<tr>
<td>4/13/2017</td>
<td><strong>Linear regression (PROC REG), ANOVA (PROC GLM), and logistic regression (PROC LOGISTIC) modeling</strong></td>
<td>Ch 9, 7</td>
<td>10, 11, 12, 13</td>
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<td><em>MA 11 assigned – due 4/20</em></td>
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<td>A.0, A.8, A.10, F.0, F.8</td>
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<tr>
<td>4/20/2017</td>
<td><strong>Introduction to the SAS macro language. Use global macro variables and create and call macro functions</strong></td>
<td>Ch 9, 7</td>
<td>11, 12</td>
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<td><em>Final Exam assigned at the end of class</em></td>
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<td>A.8, F.0, F.8</td>
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<tr>
<td>4/27/2017</td>
<td><strong>Final Exam Due</strong></td>
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<td>All</td>
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