

University of Florida
College of Public Health & Health Professions Syllabus
Spring 2015 PHC 6055: Biostatistical Computing Using R (1-credit)

Section: 1G02 – HPNP G111 – Tuesday 6th period (12:50-1:40)

Delivery Format: Blended Learning Model

Course Specific Content and Assessments in E-Learning using CANVAS: <https://lss.at.ufl.edu/>

Open Course Materials: <http://bolt.mph.ufl.edu/software/r-phc-6055/>

Starting the Course: Read this syllabus. Review the E-Learning home page and weekly schedule. Additional guidance for getting started is provided in the E-learning site in CANVAS.



As an instructor, my primary goal is for each of you to learn as much as possible during the semester!



Instructor Name: Dr. Amy Cantrell (<http://users.php.ufl.edu/acantrell/>)

Office: CTRB 5213

Phone Number: 352-294-5927

Email Address: acantrell@ufl.edu

Office Hours: by appointment

Preferred Course Communications:

- Ask about issues of a personal nature by email through E-Learning
- Ask anything (except personal questions) on the discussion board
- Ask or Comment Anonymously through [Qualtrix Survey](#) (Password: spring.2015)

Note: In the E-Learning system a cut-off time of 10:00pm means that at 10:00:01pm you are late. Computers are very literal and do not recognize seconds after a given time as “on time.” Please plan your work accordingly and do not wait until this cut-off time to complete your assignments in the system.

Prerequisite: PHC 6053: Regression Methods for the Health and Life Sciences (or equivalent). Students must also have access to a laptop running R for in-class use.

PURPOSE AND OUTCOME

Course Overview: This is a one credit course which covers using the statistical software R to process public health data. Students will learn how to input, store, modify, display, and analyze data using R. Students will develop basic R programming skills including working with vectors, lists, arrays, and matrices, writing functions and using R to simulate data.

Relation to Program Outcomes: This is a required concentration core course for MPH Biostatistics students and covers the following competencies.

- Describe the role of biostatistics in public health research.
- Use appropriate statistical methodology to address public health problems.
- Develop presentations based on statistical methods and analyses for both public health professionals and educated lay audiences.
- Apply software to conduct statistical analyses.

Course Objectives and/or Goals

1. Input, store, modify, display, and analyze public health data using R.
2. Develop user-defined functions in R.
3. Plan and implement simulations using R.
4. Plan and implement data analysis using R and present the results.

Instructional Methods: This course is presented using a blended learning model. There will be no formal in-class lectures. Students will review videos and readings outside of class. During class sessions, students will have the opportunity to ask questions of the instructor and work with each other to create solutions to assignments and work on the final presentation. Students can also receive feedback and assistance via the course discussion board or email in E-Learning. In this course, you will need to take responsibility for your own learning and request assistance from the instructor and other students as needed. The instructor can also provide advice and answer questions related to how each student can effectively and efficiently utilize the resources provided to their best advantage.

DESCRIPTION OF COURSE CONTENT, COURSE MATERIALS, AND TECHNOLOGY

Topical Outline/Course Schedule

Week	Class Meeting	Assignments Due (Wednesday 10 PM)	In-Class Activity	R-Script and Videos	Reading Assignment
1	1/06	Install R	Orientation and Introductions	First R Session and R Basics Parts 1 and 2	Syllabus; Sections 1.1-1.4, 1.6-1.11, Chapter 2
2	1/13	Assignment 1	Work on Assignments 1 & 2	R Basics Parts 3-5	Chapters 3-4, Sections 5.1, 5.8-5.10, Chapter 6
3	1/20	Assignment 2	Finish Assignment 2 Begin Assignment 3	Working with Data - All Parts	Sections 5.1, 5.8-5.10, Chapters 6-7
4	1/27		Work on Assignment 3	Review videos and scripts as needed	Review Chapters 1-7 as needed
5	2/3	Assignment 3	Finish Assignment 3 Begin Assignment 4	Distributions and Programing Skills - All Parts	Chapters 8-9, Sections 10.1, 10.3-10.5, 10.7-10.9
6	2/10		Work on Assignment 4	Models, Packages, & Graphics - Sets 1 and 2 - All Parts	Chapters 11-13
7	2/17		Work on Assignment 4	Models, Packages, & Graphics - Set 3 - All Parts	Review Chapters 1-13 as needed
8	2/24	Assignment 4	Finish Assignment 4	Discussion of Sample Presentation	Review Chapters 1-13 as needed
9	3/3	No Class - Spring Break			
10	3/10		Work on Presentations	Review videos and scripts as needed	Reread Chapters 1-7
11	3/17		Work on Presentations	Review videos and scripts as needed	Reread Chapters 11-13
12	3/24	Student Presentations	Finish Presentations	Review Distributions and Programing Skills - All Parts	CAREFULLY Reread Chapters 8-10
13	3/31		Deliver Presentations	Simulation Example – One Population Variance	CAREFULLY Reread Chapters 8-10
14	4/7		Deliver Presentations	Review videos and scripts as needed	Review Chapters 1-13 as needed
15	4/14		Deliver Presentations	Review videos and scripts as needed	Review Chapters 1-13 as needed
16	4/21	Assignment 5	Deliver Presentations	None	None
Finals Week	4/28	Final Revisions to Student Presentations			

Topics: Specific topics covered in the course are listed below. EVERY assignment requires understanding and application of multiple topics.

- **Introduction**
 - What is R?
 - Installing R
 - The R Environment and R Console
 - Working Directory, Workspace, History
 - Help and Documentation
 - Using Scripts
- **R Basics**
 - Creating and using vectors
 - Types of vectors in R
 - Generating regular sequences
 - Index vectors; selecting and modifying subsets of a vector
 - Objects, their modes and attributes
 - Factors in R
 - Arrays, matrices, lists, and data frames
 - tapply, functions, plots, and regression
 - Sink and pdf to output text and graphics
- **Working with Data**
 - Using datasets available in R
 - Writing data to text file
 - Reading data from text files
 - Changing variable names in data frame
 - Accessing portions of a data frame
 - Using dim and length functions
 - Using rbind and cbind
 - Creating data frames
 - Using quantile and cut
 - Creating frequency and two-way tables
 - Attaching a data frame
- **Probability Distributions and Programming Concepts**
 - Probability distributions
 - Grouping, loops, conditional execution
 - Writing your own functions
- **Models, Packages and Graphics**
 - Specifying statistical models in R
 - Displaying additional model information
 - Basic logistic regression in R
 - Loading and using the survival package
 - Uses of plot
 - Other plotting commands
 - Loading and using scatterplot3d package
 - Changing graphical parameters
 - Adding legends and text to plots
 - Adding points or lines to plots
 - Modifying plot axes
 - Multi-figure environment

Course Materials: Our “Textbook” will consist of materials from the Comprehensive R Archive Network. In particular, the document “An Introduction to R” will be used as the main textbook for readings in this course. These materials can be found at <http://cran.r-project.org/manuals.html>, however, direct links will also be provided in E-Learning and the open course materials site.

Open Course Materials: Course videos, R scripts, and other R resources are available at <http://bolt.mph.ufl.edu/software/r-phc-6055/>. These will be linked as assigned in our E-learning site.

Videos and R-Scripts: There are numerous R-scripts with video illustrations which were created specifically for this course. It is extremely important to review this content as this will be the primary form of instruction on the concepts in the assigned readings. Most videos presented in the course materials are stored in YouTube. If the text in the video is too blurry, try increasing the quality of the YouTube video using the small gear icon which appears at the bottom of the video when it is playing. If you want to view the video faster or slower, you can adjust the speed using the gear icon. Many videos have closed captions and/or transcripts available.

E-Learning: An E-Learning site will be available for the course using CANVAS. The Weekly Schedule and all course materials are available online through this site including grades, assignments, discussion boards, and other course information. E-learning is accessible at lss.at.ufl.edu or through my.ufl.edu. You must have a valid Gatorlink ID and password. For assistance, call the UF Help Desk at 392-HELP.

For technical difficulties with E-learning please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

Browser Recommendations: <https://wiki.helpdesk.ufl.edu/FAQs/SupportedBrowsersForUFWebsites#elearning>

Technology: A computer for in class use running a recent version of R software (<http://cran.r-project.org/>)

Non-R Technical Help: On the sign-in site for E-Learning, <http://lss.at.ufl.edu>, there are multiple tutorials and help to aid students in navigating through the system. There is a link to Student Help in our course site. Please familiarize yourself with the information in each of these help tools. If you need help logging onto E-Learning, password issues, etc., please contact the UF Help Desk at 352-392-HELP(4357) or helpdesk@ufl.edu. If you need (non-R related) technical help in the course, please post your questions on the discussion board. You may find the answer to your issue from other student postings. This can often be the quickest way to get help.

Response Time: If I can, I will address your questions immediately. During the week I will do my best to address all questions completely within 24 hours. Generally I will respond to questions as soon as possible each morning Monday-Thursday. I have class on Monday, Tuesday, and Wednesday afternoons during which I will be unavailable. For questions asked on Friday, Saturday, or Sunday, I may not be able to respond until early the following week.

Announcements: Class Announcements will be sent via CANVAS. You are responsible for all information in these announcements. As a student of the University of Florida, it is very important to check your UFL email address regularly. In this class, you should check this account at least once every few days. An easy way to access your account is at <https://webmail.ufl.edu/>.

Discussion Boards: Reviewing the discussion posts of other students and asking your own can be very helpful.

ACADEMIC REQUIREMENTS AND GRADING

Note: Although you can never be awarded negative points for an assignment, if you do not follow the directions given in this syllabus and in the actual assignment, additional points can be deducted even if the assignment is otherwise correct.

Assignments: All assignments must be submitted via E-Learning by the due date

- **Assignments:** There will be 5 assignments worth 20 points each which will require independent R programming to complete a specified task.
- **Presentation:** Each student will prepare a presentation during the semester for which students will work with their chosen dataset to illustrate certain programming skills and statistical analyses using R. Each student will deliver their presentation to the class at the end of the semester. Students must provide a complete draft of their presentation by the deadline but will be allowed to revise their submission based upon comments provided during their presentation and based upon ideas generated from other student presentations.

Reading Assignments: The reading assignments should be completed during the week assigned in the schedule. Understanding of the sections listed is very important to becoming comfortable with R. Any questions you have regarding the material presented in the text should be clarified by either asking your question in class or posting your question on the course discussion board. You should investigate the code presented in the textbook and our R-scripts and on your own by trying the code and using help to investigate further. **YOU ARE RESPONSIBLE FOR ALL MATERIAL IN THE READING ASSIGNMENTS. The assignments and presentation will require in depth understanding of the readings.**

Attendance: Attendance will be taken during each class session. Students who are on-time to class will receive 3 points; students who are less than 10 minutes late will receive 2 points; and students who are more than 10 minutes late will receive 1 point. Students who are not in attendance will receive 0 points.

Grading

Requirement	Due date	% of final grade
Assignment 1	January 14 th by 10 PM	10%
Assignment 2	January 21 st by 10 PM	10%
Assignment 3	February 4 th by 10 PM	10%
Assignment 4	February 25 th by 10 PM	10%
Presentation	Completed Draft: March 25 th by 10 PM Final Revisions: April 29 th by 10 PM	40%
Assignment 5	April 22 nd by 10 PM	10%
Attendance	-----	10%

Point system used (i.e., how do final course averages translate into letter grades).

Final Average	94-100	90-93	85-89	80-84	77-79	74-76	70-73	67-69	64-66	60-63	57-59	Below 57
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

Please be aware that a C- is not an acceptable grade for graduate students. A grade of C counts toward a graduate degree only if an equal number of credits in courses numbered 5000 or higher have been earned with an A.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I	NG	S-U
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0	0.0	0.0	0.0	0.0

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at: <http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Grade Response Times: The time to receive your grade on assignments will vary depending on the type and length of the assignment. The instructor and TAs will always strive to return your graded work as soon as possible.

Policy Related to Make up Exams or Other Work: Students are allowed to make up work ONLY as the result of illness or other unanticipated circumstances warranting a medical excuse and resulting in the student missing an assignment deadline, consistent with College policy. Documentation from a health care provider is required. Work missed for any other reason will receive a grade of zero. Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance: Class attendance is mandatory. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays), and should be communicated to the instructor prior to the missed class day when possible. UF rules require attendance during the first two course sessions. Regardless of attendance, students are responsible for all material presented in class and meeting the scheduled due dates for class assignments. Finally, students should read the assigned readings prior to the class meetings, and be prepared to discuss the material.

Please note all faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy see the Registrar website for additional details: [http://www.registrar.ufl.edu/catalogarchive/01-02-catalog/academic_regulations/academic_regulations_013 .htm](http://www.registrar.ufl.edu/catalogarchive/01-02-catalog/academic_regulations/academic_regulations_013.htm)

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Communication Guidelines: Questions about course material should be posted on course discussion boards in E-Learning. Questions or issues of a personal nature should be sent by email through E-Learning. Please review the Netiquette Guidelines: <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>.

Online Faculty Course Evaluation Process: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. I value your comments and honest review of this course and consistently work to improve the course based upon the results of these evaluations and other methods of feedback. Course evaluations are also an important part of the faculty promotion process. Evaluations are typically open during the last two or three weeks of the semester, but you will be notified of specific times when the evaluations are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>

Academic Integrity: Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

- <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>
- <http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

ADVICE FROM DR. CANTRELL

As you will hear me say numerous times, all I can ask is that you do the best you can with the materials that are made available to you and ask when you need more direction or explanation.

It is expected that you will spend approximately 2-4 hours per week on this course outside of class. Scheduling your time wisely and working efficiently will minimize the need for extra work in this course.

Generally I advise students to break this time up into blocks of 1-2 hours split over a few days of the week given your schedule. Working on too much material in one sitting is more likely to cause frustration and does not allow for time for understanding to develop or for questions to be answered.

Learn to use the materials to your greatest advantage. If you go through the content as directed, you will learn the skills you need to succeed in the course as well as build a foundation of R skills.

Read the assigned materials and watch the videos provided carefully, they are expressly designed to provide the instruction needed for the assignments. Work along with tutorials and readings, testing your understanding of the code presented. Do not allow yourself to waste time working in the software, if you are having issues, let us know immediately and we will help as soon as possible. Try to make sure as much of your time as possible in the software is productive.

We have tried to make it as easy as possible to follow along with the tutorials. Watching the videos at a slower speed can help. Viewing the R-scripts and transcripts while you watch or work in the software may also help. Whenever possible, many students find it helpful to have the videos playing in one window, monitor, or other device while working in the software in another, pausing as needed to work through the process on your own.

Be sure to ask when you don't understand and work hard to stay on-track with the material. Getting behind can be difficult to fix in any course. Let the instructor know as soon as possible if you feel you are falling behind.

SUPPORT SERVICES

Accommodations for Students with Disabilities: If you require classroom accommodation because of a disability, you must register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class. The Dean of Students Office will provide documentation to you, which you then give to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health: Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from:
Alachua County Crisis Center: (352) 264-6789
<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

BUT – Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Week	Class Meeting	Assignments Due (Wednesday 10 PM)	In-Class Activity	R-Script and Videos	Reading Assignment
1	1/06	Install R	Orientation and Introductions	First R Session and R Basics Parts 1 and 2	Syllabus; Sections 1.1-1.4, 1.6-1.11, Chapter 2
2	1/13	Assignment 1	Work on Assignments 1 & 2	R Basics Parts 3-5	Chapters 3-4, Sections 5.1, 5.8-5.10, Chapter 6
3	1/20	Assignment 2	Finish Assignment 2 Begin Assignment 3	Working with Data - All Parts	Sections 5.1, 5.8-5.10, Chapters 6-7
4	1/27		Work on Assignment 3	Review videos and scripts as needed	Review Chapters 1-7 as needed
5	2/3	Assignment 3	Finish Assignment 3 Begin Assignment 4	Distributions and Programing Skills - All Parts	Chapters 8-9, Sections 10.1, 10.3-10.5, 10.7-10.9
6	2/10		Work on Assignment 4	Models, Packages, & Graphics - Sets 1 and 2 - All Parts	Chapters 11-13
7	2/17		Work on Assignment 4	Models, Packages, & Graphics - Set 3 - All Parts	Review Chapters 1-13 as needed
8	2/24	Assignment 4	Finish Assignment 4	Discussion of Sample Presentation	Review Chapters 1-13 as needed
9	3/3	No Class - Spring Break			
10	3/10		Work on Presentations	Review videos and scripts as needed	Reread Chapters 1-7
11	3/17		Work on Presentations	Review videos and scripts as needed	Reread Chapters 11-13
12	3/24	Student Presentations	Finish Presentations	Review Distributions and Programing Skills - All Parts	CAREFULLY Reread Chapters 8-10
13	3/31		Deliver Presentations	Simulation Example – One Population Variance	CAREFULLY Reread Chapters 8-10
14	4/7		Deliver Presentations	Review videos and scripts as needed	Review Chapters 1-13 as needed
15	4/14		Deliver Presentations	Review videos and scripts as needed	Review Chapters 1-13 as needed
16	4/21	Assignment 5	Deliver Presentations	None	None
Finals Week	4/28	Final Revisions to Student Presentations			