

**University of Florida College of Public Health and Health Professions  
PHC xxxx : Biostatistical Computing Using R**

**Instructor:**

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**Class meeting time:** (1 period)

**Office hours:** TBA

**Prerequisites:** PHC 6053: Regression Methods for the Health and Life Sciences (or equivalent). Students must also have access to a laptop for in-class use. (Other computing requirements are found at <http://www.mph.ufl.edu/students/onlinecomputer.htm>.)

**Description:** This is a one credit course which covers using 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.

**Course Objectives:** Upon completion of this course, students will

- Be familiar with programming using R.
- Be able to input, store, modify, display and analyze public health data using R.
- Be able to write new functions in R.
- Be able to use the mathematical capabilities of R to simulate data.

**Textbook:** Materials from the Comprehensive R Archive Network will be used for reading assignments and instruction. These materials can be found at <http://cran.r-project.org/manuals.html>. Other materials used will be distributed to students during the semester.

**E-Learning:** An E-Learning site will be available for the course. Grades, discussion boards, and possibly other information will be available in the E-Learning system. E-learning is accessible at [lss.at.ufl.edu](http://lss.at.ufl.edu) or through [my.ufl.edu](http://my.ufl.edu). You must have a valid Gatorlink ID and password. For assistance, call the UF Help Desk at 392-HELP

**Grading:** Your grade in this course will be based on exams, homework, and class participation. Total points earned will be based on the following:

- Class Participation (20%)
  - In Class Assignments (30%)
  - Homework (50%)
- Class participation assessment will include attendance/tardiness, preparation for class, and participation in discussions.
  - In class assignments will consist of small programming tasks designed to illustrate new concepts in R which can be completed during class time.
  - Homework will consist of assignments which will require independent R programming to complete a specified task. Some class time may be utilized for these assignments; however, most of the assignment will be completed outside of class.

The grading scale for this course consists of the standard scale, including minus grades, below. The

conversion factors for grade point values assigned to each grade are also included (in parentheses):

93% - 100% = A (4.00)	73% - 76% = C (2.00)
90% - 92% = A- (3.67)	70% - 72% = C- (1.67)
87% - 89% = B+ (3.33)	67% - 69% = D+ (1.33)
83% - 86% = B (3.00)	63% - 66% = D (1.00)
80% - 82% = B- (2.67)	60% - 62% = D- (0.67)
77% - 79% = C+ (2.33)	Below 60% = E (0.00)

**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 except for the first class session.

**Classroom etiquette:** Please come to class on time and be prepared to stay until the time scheduled as the end of class. Pagers and cell phones should not be used in class. The use of cell phones, text messaging, and pagers is a common complaint from students. Please turn them off. Or, if you expect urgent calls, set them to “vibrate.” Another common complaint is “side” conversations among students. Please consider that your conversation may interrupt the attention of someone seated near you. Generally, you should be speaking to the class as a whole or participating in group discussions as directed by the instructor. I welcome in-class questions. Your question will nearly always be one that other students also have.

**Policy on Make-Up 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 a homework or project 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.

**Academic Integrity:** At the University of Florida, each student is bound by the academic honesty guidelines of the University and the student conduct code printed in the Student Guide and on the University website. The Honor Code states: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” Cheating or plagiarism in any form is unacceptable and inexcusable behavior.

**My personal expectations and comments regarding academic integrity:** Students will often be encouraged to discuss the material with other members of the class on homework and other assignments. I believe we learn best when individual learning and group cooperation are present. However, I expect that no student will ever do any of the following:

- Have another person complete any assignment in this course
- Copy another student’s work on any assignment in this course
- Use materials provided by a previous student in the course for any purpose
  - Do not seek to obtain or accept offers of such materials (delete any materials you obtained prior to the beginning of the course)
  - I will often provide exactly the same information (unless I have changed it for the better)
  - I will provide any information from past semesters that I feel will help you

I believe that one of the reasons academic integrity is becoming a large issue in colleges and universities is that, for whatever reason(s), students tend to be more concerned about the grade they will obtain in the

course than they are interested in learning the material. I want to stress that in this class, if you focus on learning the material and worry less about the grade you will receive, you will be rewarded with knowledge that will be much more useful to you in the future than the difference between an A, B, or even C in this class.

**Course Outline:** Each session will be designed to do one or more of the following

- Instruct students on concepts regarding programming using R. This usually involves discussing example R code and output. This can also involve presentations of material via power-point or online video.
- Discussion of R concepts among the members of the class as a whole or in groups. This can be an impromptu discussion generated by a question or a planned discussion to facilitate learning of specific material.
- Allow students time to practice R programming on assignments. Many sessions will be spent on R programming. For homework assignments, students must create their own R code; however, discussion of topics among students is encouraged.

**Topics:** Specific topics covered in the course are listed below. Lectures and discussions are designed to introduce a single topic or group of related topics. EVERY assignment requires understanding and application of multiple topics.

- **Introduction**
  - What is R?
  - Data files
  - Inputting data
  - Seeing your data in R
  - What data are loaded?
  - Removing data sets
  - Help and Documentation
- **R: Concepts and Tools**
  - Using vectors
  - Generating regular sequences
  - Index vectors; selecting and modifying subsets of a data set
  - Objects, their modes and attributes
  - Ordered and unordered factors
  - Arrays and matrices
  - Lists and data frames
  - Probability distributions
  - Grouping, loops and conditional execution
  - Writing your own functions
  - Using packages
- **Data**
  - Creating Data, Types of Data
  - Combine command
  - Reading data from files
  - Variables within data
  - Transposing data
  - Stacking and un-stacking data
  - Selecting and naming columns
  - Simulating data
- **Statistical Analysis**
  - Basic Descriptive Statistics
  - T-test
  - Chi Squared test
  - Correlation and Regression
- **Graphs**
  - Bar charts and Histograms
  - Boxplots
  - Scatter plots
  - Stem-Leaf plots
  - Pie charts
  - Line Plots
  - Advanced graphics topics

**Schedule:** Adjustments to this schedule are possible during the semester. The instructor will strive to be informative and fair regarding any changes.

<b>Week</b>	<b>Activity</b>	<b>Major Topics</b>
1	Lecture & Discussion	Introduction to course; Syllabus; Introduction to R
2	In Class Assignment 1	Introduction to R
3	Homework 1	Introduction to R
4	Lecture & Discussion	R: Concepts and Tools
5	In Class Assignment 2	R: Concepts and Tools
6	Homework 2	R: Concepts and Tools
7	Lecture & Discussion	Data
8	In Class Assignment 3	Data
9	Homework 3	Data
10	Lecture & Discussion	Statistical Analysis
11	In Class Assignment 4	Statistical Analysis
12	Homework 4	Statistical Analysis
13	Lecture & Discussion	Graphs
14	In Class Assignment 5	Graphs
15	Homework 5	Graphs

**Accommodations for Students with Disabilities:** Students requiring accommodations must first register with the Dean of Students' Office. The Dean of Students' Office will provide documentation to the student who must then provide this documentation to the faculty member when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework. We all learn differently; however, if you have experienced problems in university classes with writing, in-class exams, understanding or concentrating in class; please talk to us or access a learning or education testing resource at the University or in another professional setting. For your assistance, should you need them, please consider either of the following:

University Counseling Services

<http://www.counsel.ufl.edu/services.asp>

P301 Peabody Hall – 392-1575

Student Mental Health Services in the Student Health Care Center

<http://www.health.ufl.edu/shcc>

Room 245, Infirmary Bldg.- 392-1171