Introduction to Computer Programming with R- FOR 6934

1 Overview

This is an online course that will help students to gain a basic understanding of computer programming. The course will be taught using R language, so you will learn to use R. However, the programming techniques learned in this course will be easily transferable to other computer programming languages. Instead of focusing on statistical tests, this course will cover basic concepts and techniques in computer programing such as index, loops, and customized functions. This course will use a combination of lectures, programming demonstrations, and exercises to teach introductory programing skills at the graduate level.

This course is open for both on-campus and off-campus students, and targets people who have no experience in computer programing. Students will become familiar with R and achieve the ability to use R to solve their particular data analysis needs after finishing the course. This course is NOT a "go at your own pace" course. Each module must be completed in a specific week (see Course learning objectives and weekly schedule below).

- 1 Credit
- Spring 2018
- 100% Online
- http://elearning.ufl.edu/

Course Prerequisites: none

Instructor: Qing Zhao, 407 McCarty Hall C, email: qing.zhao@ufl.edu

- Please use the Canvas message/Inbox feature for fastest response.
- Office hours: available by email or phone; office visits available by appointment.

Instructor: Daijiang Li, Building 116, 2322 Mowry Road, email: dli1@ufl.edu

- Please use the Canvas message/Inbox feature for fastest response.
- Office hours: available by email or phone; office visits available by appointment.

Instructor: Denis Valle, 408 McCarty Hall C, email: drvalle@ufl.edu

- Please use the Canvas message/Inbox feature for fastest response.
- Office hours: available by email or phone; office visits available by appointment.

Textbook(s) and/or readings: There is no required text for the course. Online readings will be provided for each learning topic.

2 Learning Outcomes

At the end of this course, each student will be able to:

- Understand basic concepts such as data type and index and use them in their work
- Demonstrate use of basic functions
- Conceptualize and create loops to solve different types of problems
- Create their own customized functions
- Construct tables and figures for descriptive statistics
- Learn to understand new data sets and functions by yourself

3 Course Logistics

Learning modules consisting of recorded lectures, readings, supporting material, and weekly homework assignments are provided online for each topic. Learning modules build on previous modules so you should complete the learning modules in the order presented.

There will be a new module each week. In each module, the instructors will spend about 25 minutes explaining concepts and demonstrating programing skills. The student will have opportunities to apply these concepts and improve their programming skills by solving problems posed during lectures. Homework assignments will be assigned for each module. Students are encouraged to interact with each other for homework assignments but separate answers need to be turned in. Solutions will be posted two weeks after the deadline of each homework. Students are highly encouraged to interact with the lecturers during their office hours.

Technology Requirements:

- A computer or mobile device with high-speed internet connection.
- A headset and/or microphone and speakers; a web cam is suggested.
- Latest version of web browser. Canvas supports only the two most recent versions of any given browser. What browser am I using?

3.1 Assignments & Deliverables

Participation

Optional live web meetings via Canvas will be available for students to participate.

Homework Assignments

Homework will be assigned for each module. Students are encouraged to interact with each other for homework assignments but separate answers need to be turned in. The answers need to be turned in the week after the assignment (see the due dates below). Solutions will be posted two weeks after the assignment is due.

- Due date: homework will be due Friday at 11:59 pm.

3.2 Grades & Grading Scale

100% or 100 points homework assignment. Two homework assignments with the lowest grades will be dropped for the final grading.

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Grading Scale (%)
A 90-100
B+ 85-89.99
B 80-84.99
C+ 75-79.99
C 70-74.99
D+ 65-69.99
D 60-64.99
E < 60

4 Course Content

Week	Learning objectives
1	• Learn to use help() function • Understand data types in R (logical, numeric, etc.) • Convert data types
2	• Create, find, and remove data (vector, matrix, data frame) in R • Read external data into R (.txt, .csv) • Write R data into external files (.txt, .csv)
3	• Understand and manipulate strings (e.g. substr(), scan()) • Understand indexing of data in vectors, matrices, and data frames • Graphing techniques to visualize data selection
4	• Learn about operators (mathematics, logical, miscellaneous) • Learn about basic math functions (e.g. sum()) • Use operators and math functions on variables
5	• Learn about ifelse() function • Use ifelse() function on vectors and matrices • Use graphs to show the results
6	• Understand how loops work in R • Create your own loop for vectors • Create a series of graphs with loop functions
7	• Learn to use break and next statements in loops • Use loops to create and change data in vectors, matrices, and arrays • Use loops to create data as a list
8	• Learn about double loops • Create your own double loops for matrix • Use operators and functions in single and double loops
9	• Understand if else statement • Use if else statement for data manipulation • Compare if else statement with ifelse() function
10	• Use ifelse() function in loops • Combine loops and if else statement • Represent your results with graphs
11	• Use math functions in loops

	• Use math functions in if else statement • Show your results with graphs
12	• Understand advanced functions such as apply() and by() • Use apply() and by()to calculate descriptive statistics • Create graphs for the calculated descriptive statistics
13	• Understand customized functions • Interpret customized functions • Compare customized functions and build-in functions
14	• Understand global parameters for graphing • Understand specific parameters in graph functions • Learn different ways to save your graphs
15	• Learn to combine loops and customized functions • Learn to use customized functions in customized functions • Learn to save your functions and reuse them whenever needed

5 Policies and Requirements

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

5.1 Late Submissions & Make-up Requests

It is the responsibility of the student to access on-line lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course.

[add more if desired]

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues MUST be accompanied by the ticket number received from the Helpdesk 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 consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

5.2 Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys

will be sent out through Canvas and are not required, but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide UF with feedback on the quality of instruction in this course using a standard set of university and college criteria (UF Faculty Evaluations). These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

5.3 Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office. http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf

5.4 Academic Honesty Policy

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 assumed that you will complete all work independently in each course unless them instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct or appropriate personnel. 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 more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

5.5 University Policy on Accommodating Students with Disabilities:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

5.6 Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

6 Getting Help

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- Learning-support@ufl.edu | (352) 392-HELP - select option 2 | http://elearning.ufl.edu
- Library Help Desk support http://cms.uflib.ufl.edu/ask
- SFRC Academic Hub https://ufl.instructure.com/courses/303721

6.1 Student Life, Wellness, and Counseling Help

- Counseling and Wellness resources http://www.counseling.ufl.edu/cwc/
- U Matter, We Care http://www.umatter.ufl.edu/
- Career Resource Center http://www.crc.ufl.edu/
- Other resources are available at http://www.distance.ufl.edu/getting-help for online students.

6.2 Student Complaint Process

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: http://www.distance.ufl.edu/student-complaint-process
- Students in face-to-face courses: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf