**R Programming Bootcamp**

This self-directed course is intended to introduce the novice programmer to the basics of R programming. The emphasis of this course is on useful R programming skills including loading and manipulating data within R, and secondarily simple visualization, data QC, and statistics. The structure of this course is meant to introduce you to data structures in R such as vectors, lists, matrices, and data frames along with immediate tasks to learn how they work and how to manipulate them.

This course is self-paced. You may begin it at any time and proceed at any pace as long as you complete modules in order. For more sophisticated programmers, each module contains a self-evaluation problem and quiz in order to assess whether you need to complete a module or not.

**Prerequisites:**

An introductory programming course and familiarity with basic programming concepts such as if/then and for/while loops and simple data structures such as arrays.

**Instructor/Course Director**: Ted Laderas, PhD

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**Required Reference Text:**

Introduction to R. This is the text where I learned the basics of R programming. It is freely available with every R distribution, but also can be downloaded for free at <http://cran.r-project.org/doc/manuals/R-intro.pdf>

**Suggested Textbooks for Further Study:**

*Introductory Statistics using R*. Because the focus of this course is on programming and not statistics, this book will introduce you to using basic statistical procedures, such as ANOVA and regression in R. You should be able to get through most of the introductory stat course using this and Introduction to R. However, you should know that some of the output in the later stats courses have Stata specific output.

*R Cookbook*. As you start to work on projects, this is a useful source for ‘recipes’, or programming patterns that solve particular problems. You shouldn’t feel bad using recipes as long as you understand how they work and how to modify them for your problem at hand.

**Grading:**

This course is completely self-evaluated. Each module has an assignment to complete and a test your knowledge quiz. However, these are not evaluated by the instructor, nor will you receive a grade in this course. They are available purely to test your skills in R.

**Computing Requirements:**

In order to write and run R scripts, the student will be required to have a computer with the R language downloaded (from <http://cran.r-project.org>). Use of an IDE such as RStudio is highly recommended.

**Drop in Sessions:**

Although the course will be self paced, I will be available for drop in sessions weekly in BICC … Feel free to work through a module and ask questions during these sessions as you work through a module. A good use of your time and mine will be to bring questions beforehand.

**Contacting the Instructor for Help:**

I will be available for questions by email. I will attempt to be as timely as possible in response and respond within 24 hrs. If you are having problems getting started (i.e. setting up R), please send me an email and we can schedule an appointment to set you up.

**Goals/Organization of course modules:**

By the end of this course, you should have acquired the following skills in R.

|  |  |  |
| --- | --- | --- |
| **Module Name** | **Skill** | **Introduction to R Chapter** |
| 1. Loading/Saving/ Data QC/Scripting/ Getting Help | Loading | Ch 7 |
|  | Workspaces/ Working Directory | Ch 1, 14 |
|  | Saving/Exporting Data |  |
|  | Data QC/QA |  |
|  | Scripting | Appendix B |
|  | Getting help |  |
| 2. Vectors/Data Frames/Subsetting/ Filtering | Vectors | Ch 2 |
|  | Data Frames | Ch 6.3 |
|  | Subsetting | Ch 2.7 |
|  | Filtering | Ch 2.7 |
| 3. Matrices/Iterate/ Apply/Decide/Functions | Matrices | Ch 5 |
|  | Iterate | Ch 9 |
|  | Decide | Ch 9 |
|  | Apply | ?apply, ?tapply, ?lapply |
|  | Functions | Ch 10 |
| 4. Lists/Manipulating/ Merging/Storing Results | Lists | Ch 6.1 |
|  | Manipulating |  |
|  | Merging | ?merge, ?join |
|  | Storing Results | Ch 6.1 |
| 5. Query/Extract/ Visualize/ Further Directions | Query/Extract | help("RODBC"), <http://cran.r-project.org/web/packages/RODBC/vignettes/RODBC.pdf> |
|  | Visualize | Ch, Quick-R: <http://www.statmethods.net/stats/index.html> |
|  | Further Directions | Ch 13 |

**Professional Conduct Policy**:

While discussion between students and use of external resources are important learning tools, all homework assignments and the exam are expected to be the work of the enrolled student only. Any violation will result in zero points for that homework assignment or exam. Students enrolled the certificate, BMI, or MS program should review the professional conduct policy of the Graduate Studies Program, which can be found on the enrolled student website at

<http://www.ohsu.edu/ohsuedu/academic/som/dmice/students.cfm>