Introduction to (Statistical) Programming with R [Online]
(U20 Math 124)

Instructor Information
Mark Pedigo, PhD
Department of Mathematics
Email: mpedigo@wustl.edu

Course Description
In this online course, students learn how to work with data using R, a computer language that is often used for statistical analysis and computations. This course is self-contained. Although the course will draw from basic statistical concepts (mean, median and frequency, for example), it is not a statistics course per se, and all terms will be explained. No prior programming or statistics is required, although both/either would be helpful. This is a fully online course, but optional on-campus meetings will be held periodically for students who would like face-to-face interactions with the instructor and fellow students. Only University College students receive credit for fully online courses. Prereq(s): College algebra.

Prerequisite Details
This is an online course. Access to a computer (Mac, Windows, or Linux), on which new programs can be downloaded and installed is required. Students will be expected to be online several times each week. Students must be comfortable with using technology such as web browsers and Blackboard. Previous knowledge of programming is not required.

Course Materials
Lectures and Assignments
Course materials and assignments will be posted online each week. Typically, there will be assigned readings, lectures on the week’s topics, an online quiz, and a programming assignment.

Text
There are any number of sources for learning R, both in book form and as online tutorials. The textbook we will use for this course is Learning R, Richard Cotton (O’Reilly), available through Washington University library online (Go to http://library.wustl.edu/ and search for “Learning R”).
Software
We will be using the R statistical package and R Studio. (Actually, you’re free to use whatever Integrated Development Environment (IDE) you want. I will use R Studio.) Downloading and installing this software will be covered in the first week of the course.

Grading
The grading scheme is as follows.

- Online discussion (20%)
- Online quizzes (10%)
- Programming Assignments (40%)
- Final Project (30%)

Class participation is required. Students will be graded on the basis of participation in online discussions on the Blackboard classroom website.

There will be programming assignments every week. No late submissions will be accepted, for any reason. However, since life does happen, one programming assignment will be dropped, no questions asked. Please note no discussions or quizzes will be dropped, so do not wait until the due date to work on an assignment.

A semester project is required, and will count as 30% of the final grade.

Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
</tr>
<tr>
<td>D</td>
<td>63-66</td>
</tr>
<tr>
<td>D-</td>
<td>60-62</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
</tbody>
</table>

Course Outline

- Week 1. Introduction. Class policies and syllabus, Blackboard. Installing necessary software, basic syntax, basic operations, vectors.
- Week 2. Data Types. Vectors, Matrices, Arrays, Data Frames.
- Week 3. Environments, Functions.
- Week 4. Strings
- Week 5. Flow Control and Loops. if statements, for/while loops, apply
- Week 8. Projects. Show off what you’ve learned to the rest of the class in a YouTube video.

Assignment Overview

Readings
Readings should be completed prior to submitting assignments or taking quizzes for the week.
Discussions
Each week will include a relevant discussion question. Students will be required to post an original response to the question, and then respond to at least two other students. Points will be awarded on the quality of both the original and follow-up posts. Students will be encouraged to remain actively engaged in the discussion throughout the week. Some questions will require students to defend a personal opinion, while others will require a factual response or to report on an activity.

Quizzes
Each weekly module will include a quiz (mostly multiple choice or multiple answer) covering the weeks material. The quizzes will be open-book, open-note, open-internet and only a single attempt will be allowed.

Programming Assignments
Programming assignments are to be completed weekly (but hopefully, not weakly). These assignments are the heart of the course, so take your time and do them correctly.

Final Project
A final project will be required regarding the R language. These projects serve as the final exam. All projects require approval from the instructor. Each student will create a ten minute YouTube video (there are free software tools made to do this; details covered later in the course). The final session of the course will be spent watching these videos and discussing them.

Time Requirements
Each weekly learning module will become available at 12:01 am on Monday morning, and will remain open till midnight of the following Sunday. At the end of each week the quiz and forum exercise for that week will no longer be available.

Technical Support
This is a fully online, technology-based course. Because computers are, well, computers, expect to have technical difficulties at least once during the term. For Blackboard difficulties, send an email to blackboardhelp@wustl.edu. For additional Blackboard resources and assistance, visit the Blackboard Answers & Support page on the University College Website. Technological issues related to R and R Studio will be dealt with in class. Please try the discussion board first. If that does not yield answers, email the instructor. Students are responsible for resolving any other technical issues with their own computers such as outdated software, permissions etc.

Course Policies
Netiquette Statement on Internet Communications

- Remember your audience. If you would not say something in a face-to-face classroom, do not say it in the online discussions either. Consider what you write, as it is a permanent record and can be easily retrieved. Use courtesy and common sense in all your electronic communications.

- Write in complete sentences and check spelling before you post anything in class.

- Do not type in ALL CAPS. This is hard to read and considered shouting.
- Respect the opinions of others and be sensitive to the diverse nature or people in the class. Keep in mind that although you cannot see your classmates, you can still show respect for individual differences. Diversity issues may include the following: race, ethnicity, religion, disabilities, gender, sexual orientation, age, social class, marital status, urban v. rural dwellers and others.

- No profanity is allowed, including writing in punctuation (e.g., &*#&!). Also, inappropriate language expressed in acronyms is not acceptable.

**Expectations for Student Attendance**

You are expected to have an active presence within Blackboard (our online classroom). The class is not self-paced because there are specific due dates for all assignments. However, you are free to work on the course at your own convenience within those parameters.

**Email**

If you have difficulties with the assignments, please post to the discussion board before emailing me. Fellow students are likely to have encountered the same issues and have useful advice for you. If that fails, feel free to email me and I will try to respond within 48 hours. Please note, though, that I have a separate day job, so I am unlikely to see your email before evening.

**Academic Honesty**

Students are bound by the University College policy on academic integrity in all aspects of this course. All references to ideas and texts other than the students’ own must be so indicated through appropriate footnotes, whether the source is a book, an online site, the professor, etc. All students are responsible for following the rules outlined in the document regarding the university academic integrity policy: http://ucollege.wustl.edu/faculty/academic_integrity.

**Student Accommodations**

Washington University is committed to providing equal opportunity for students with disabilities. The Disability Resource Center (DRC) assists students with disabilities by providing services and arranging for reasonable accommodations to ensure equal access and equal academic opportunities. Students wishing to request services or accommodations must register and provide appropriate documentation to the DRC at cornerstone.wustl.edu. The DRC serves as a resource and advisor to students with disabilities and welcomes opportunities to consult with students, families, faculty, and staff.