CSC311 (1 unit) R for Computational Science
T 11:00-11:55 LA 2

Instructor: Ryan Botts, Ph.D. **Phone**: 619.849.2968
Office Hours: T 8:30-11 W 10:45-12 Th 8:30-1 **Email**: rbotts@pointloma.edu
Office: Gym parking lot, Trailer #1/RS228 by 2/4/19

Required Materials
R in Action, 2nd ed. Kabacoff, Robert I. 2015. ISBN: 9781935182399
R from R-project.org
R studio from Rstudio.com

Course Description
The software R will be introduced as a tool for numerical computation, visualization, data analysis and machine learning in science-related research. Additionally, the topics of identifying the appropriate software platform or package for an application will be covered.

Prerequisites
CSC143 with a grade of C- or better.

Course Learning Outcomes
Students will be able to apply their mathematical knowledge to solve problems.
Students will be able to use technology to solve problems.
Students will be able to write correct and robust software.
Students will be able to apply their technical knowledge to solve problems.

Course Goals
Students will be able to construct a dataset, explore the data using basic numerical and visual summaries.
Students will be able to identify and implement the correct R tool for data analysis
Students will be able to find new packages and learn to implement new tools in R using the documentation.

Examinations
There will be one in class midterm and a final exam on **Tuesday April 30, 2019 10:30-1:00.**

Labs and Homework
Learning a programming language requires hands on experience, so the primary component of your grade will be from weekly labs and homework assignments, including Show and Tell assignments.

Project
Students will be responsible for working in teams to solve a real-world problem and submitting a written description along with their solution.

Grading Policies
Grades will be weighted in the following manner:
Final Project(30%), Labs and Homework (50%), Midterm (20%)

Approximate minimal percentages required to obtain a given grade are:

Grading Scale in percentages	A	B	C	D
+		(87.5, 90)	(77.5, 80)	(67.5, 70)
	[92.5, 100]	[82.5, 87.5)	[72.5, 77.5)	[62.5, 67.5)
-	[90, 92.5)	[80, 82.5)	[70, 72.5)	[60, 62.5)

- **Late work**. A written assignment or computer assignment is late if it is not received at the beginning of class on the due date. Late work will not be accepted. Make-up tests will be given only by arrangement with the instructor for reasons of documented emergency.
- **Format for Projects**. Assignments collected must be prepared in a style suitable for grading. The projects will be graded on clarity and writing quality.
    - the organization must be easy to follow
    - the work must be typed
    - complete solutions must be written for problems (not just answers); solutions must be clearly marked
    - use complete sentences to answer questions

University Mission:
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission:
The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Attendance:
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Attendance Policy in the in the Undergraduate Academic Catalog.

Class Enrollment:
It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accommodations:
While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

Academic Honesty:
Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See the catalog for definitions of kinds of academic dishonesty and for further policy information.

Final Exam: Tuesday April 30, 2019 10:30-1:00
The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that

a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Copyright Protected Materials:
Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour:
In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 1 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Week	Topic	Chapter
1	1/15/2018 Lab 1: Getting started	1
2	1/22/2018 Lab 2: Data and Data Structures	2
3	1/29/2018 Lab 3: Graphing Basics	3
4	2/5/2018 Lab 4: Working with Data, and dealing with missing data	4 & 15
5	2/12/2018 Lab 5: Loops, conditionals, functions	5
6	2/19/2018 Lab 6: Summaries and basic analysis	6 & 7
7	2/26/2018 Application Show and Tell	
8	3/12/2018 Lab 7: More exciting graphics	11
9	3/19/2018 **Exam 1**	
10	3/26/2018 Lab 8: Supervised Learning	13 & 17
11	4/2/2018 Lab 9: Unsupervised Learning	14 & 16
12	4/9/2018 Project & Graphics Demos	
13	4/16/2018 Project	
14	4/23/2018 Project	
15	4/30/2018 **Final / Project Presentation Due (10:30-1:00)**	