ANG 7496: Advanced Quantitative Methods in Anthropology

Course Syllabus

Instructor:	Dr. Sarah Freidline	**Term:**	Spring 2021
Office Location:	HPH311	**Class Meeting Days:**	Fridays
Virtual Office Hours:	Wednesdays 10:00 – 11:30 AM or by appointment	**Class Meeting Time:**	1:00 – 3:50 PM
Phone:	Anthro. Department: 407-823-2227	**Class Location:**	Psychology Building (PSY), Room 107
Email:	Sarah.Freidline@ucf.edu or Webcourses@UCF messaging	**Course Modality:**	Face to Face Instruction (P)

Course Description

Advanced quantitative methods in anthropology, including multivariate systems, assessment of reliability, and approaches for small samples.
Prerequisites: ANG 5486 and Admission to the Ph.D. in Integrative Anthropological Sciences program or C.I.

Course Overview and Goals

This is the second part of a two-part quantitative methods course. In the first part, you learned basic statistics and were introduced to the programming language and software R. In the second part of this course, you will learn about multivariate statistics and how to apply it in R. You will be introduced to the most relevant multivariate statistics in biological anthropology including multiple regression and generalized linear models, MANOVA and discriminant analysis, principal component analysis, distances and scaling, and cluster analysis. Each topic will have a lecture and practical, lab-based component, as well as in-class presentations. Some key goals of the course are to be able to build and test hypotheses, to evaluate and present research findings and to learn how to design and undertake an independent research project.

Student Learning Outcomes

Upon course completion, you should have:

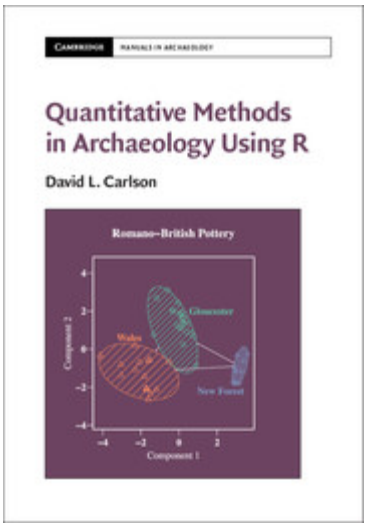
1. Knowledge and understanding of scientific research methods, including hypothesis building, methods of data collection, and research design.
2. An understanding of multivariate quantitative methods;
3. Basic programming skills in R;
4. The ability to critically evaluate research results;
5. Oral presentation skills, through in-class presentations;
6. The ability to propose, design and present a research project

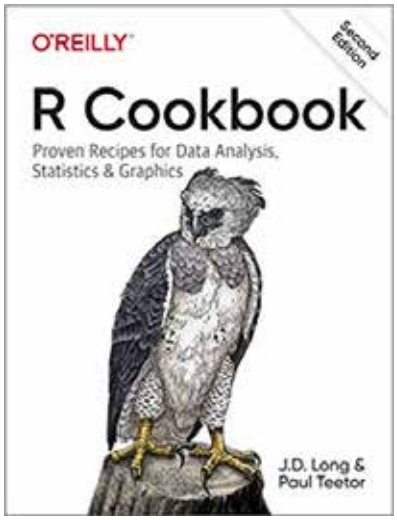
Course Materials and Resources

Required Textbooks

Carlson, D. (2017). *Quantitative Methods in Archaeology Using R* (Cambridge Manuals in Archaeology). Cambridge: Cambridge University Press. doi:10.1017/9781139628730

Long, J.D. and Teetor, P. (2019) *R Cookbook*, Second Edition. O'Reilly.





Additional Required Reading

In addition to the assigned readings from the textbooks, you will be required to read and present journal articles available in .pdf format on WebCourses. All other supplementary readings will be posted on WebCourses.

Required Software

You will be required to have access to the free software RStudio (https://rstudio.com/products/rstudio/download). Please make sure you are running the most current version.

Multivariate Data Set

Throughout the semester you will be working with a multivariate data set to complete the homework assignments and final project. You will select one data set from those that are listed on WebCourses to work with throughout the semester. Everyone will have a different data set. If you already have your own data or there is a data set that you would like to utilize instead of what is offered, then please see me.

Assessment and Grading Procedures

Class Set-Up

In general, the class will be divided into two parts. In the first half, I will lecture on the weekly multivariate statistical method and the associated R coding. The second half of the class will be the practical lab-based component, in which you will practice coding in R, and have the opportunity to work on your homework assignments for the next week and/or your final project. Every other week you will give a short presentation on your homework assignment and we will review journal articles that apply the methods that we have discussed in class.

Your grade in this course will be derived from lab participation, data and journal club presentations and your final project. See details on requirements and assignments below. There are no quizzes, tests or final exams in this course. Your grade will be calculated as follows:

Grade Category	**Weight toward final grade**	**Points**
Lab participation	15%	50
Data presentation	15%	50
Journal club leader	20%	50
Final project	50%	150
Total	100%	300

The following grading scale will be used in this course:

A	B	C	D	F
90-100%	80-89.9%	70-79.9%	60-69.9%	0-59.9%

Assignment Details

Lab participation (50 points in total): Every class will have a lab component. During this time, you will practice coding in R, and work on your in class assignments, homework assignments and final project. This is an open lab where you will have the opportunity to ask me and your fellow students for help. You will get full credit for simply attending and participating.

Homework assignments:

1) Data presentation (5 assignments, 10 points each): Every other week you will be given a homework assignment that will entail applying the statistical method introduced that week to your multivariate data set and presenting the results as a brief (~ 10 min.) PowerPoint presentation. Depending on the topic, you may present your results as figures, graphs and/or tables with the relevant statistics. What I will be grading is whether the statistic is applied correctly and how you presented the data. The goal of this exercise is to practice programming in R and to make you feel comfortable speaking about statistical methods.

2) Journal club leader (50 points): Every other week we will have a journal club, in which one of you presents a peer-reviewed journal article relevant to biological anthropology that applies a statistical method that we have discussed in class already. I will choose the article and make it available to you as a .pdf on WebCourses. However, if you have an alternative article that you would like to discuss that fits the criteria then please speak to me. Each of you will lead the journal club once during the semester. As a leader you will give a PowerPoint presentation summarizing the article and in particular evaluating the application and presentation of the methods used in the paper. What are the methods? Is the methodology sound? Is it the appropriate

method for the research question? Are the necessary statistics, figures and tables included? The assignment is to not only summarize the article but to also lead the discussion.

Final project (150 points in total): For your final project you will design a research project based on the multivariate data set that you have chosen to work with throughout the semester. However, if there is another data set that you would like to work with then please speak to me first. The goal of this assignment it to learn how to design and undertake an independent research project. The final project will consist of three parts:

1) Title and Abstract (25 points): a 250-word summary including research question, materials and methods, and results.
2) Poster (75 points): a conference style poster that (1) defines the problem or states the central question being addressed; (2) indicates its importance; (3) describes methods; (4) provides supporting figures, tables and/or graphs; (4) states the results; and (5) considers the broader implications of the findings. It does not need to be printed, but saved as a .pdf so that it can be viewed on the projector.
3) Final presentation (75 points): an oral presentation of the poster (~ 15 min.). In this presentation you will walk us through the poster, describing your research question, methods, and all figures, tables and results.

2021 Coronavirus Policies

University-Wide Face Covering Policy for Common Spaces and Face-to-Face Classes

To protect members of our community, everyone is required to wear a facial covering inside all common spaces including classrooms (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf. Students who choose not to wear facial coverings will be asked to leave the classroom by the instructor. If they refuse to leave the classroom or put on a facial covering, they may be considered disruptive (please see the Golden Rule for student behavior expectations). Faculty have the right to cancel class if the safety and well-being of class members are in jeopardy. Students will be responsible for the material that would have been covered in class as provided by the instructor.

Notifications in Case of Changes to Course Modality

Depending on the course of the pandemic during the semester, the university may make changes to the way classes are offered. If that happens, please look for announcements or messages in Webcourses@UCF or Knights email about changes specific to this course.

COVID-19 and Illness Notification

Students who believe they may have a COVID-19 diagnosis should contact UCF Student Health Services (407-823-2509) so proper contact tracing procedures can take place.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19, have tested positive for COVID, or if anyone living in their residence has tested positive or is sick with COVID-19 symptoms. CDC guidance for COVID-19 symptoms is located here: (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)

Students should contact their instructor(s) as soon as possible if they miss class for any illness reason to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) before missing class.

In Case of Faculty Illness

Please look for announcements or mail in Webcourses@UCF or Knights email for any alterations to this course in case of faculty illness.

Course Accessibility and Disability COVID-19 Supplemental Statement

Accommodations may need to be added or adjusted should this course shift from an on-campus to a remote format. Students with disabilities should speak with their instructor and should contact sas@ucf.edu to discuss specific accommodations for this or other courses.

Technology Access – This course might need to shift to remote or fully online instruction based on medical guidance. This could require access to additional technology. If students do not have proper access to technology, including a computer and reliable Wi-Fi, please let the instructor know as soon as possible. Information about technology lending can be found at https://it.ucf.edu/techcommons/ and https://library.ucf.edu/libtech.

Resources:

https://www.ucf.edu/coronavirus/

Policy Statements

Rules of Conduct Statement
Electronic devices must be turned off during class. This includes phones, radios, headphones, and any other gadgets you may have that may distract me or your classmates. Failure to comply may result in your removal from the class.

The point of working in the computer lab is to allow you to open R, handouts, and PDFs as needed. Please do not surf the internet or do things not related to this course during class time. Failure to comply may result in your removal from the class.

Unauthorized Use of Class Materials or Class Notes Statement
Course materials are the intellectual property of instructors, the university, or publishers and may not be distributed without prior authorization. Students who engage in such activity are in violation of academic conduct standards and may face penalties. I give you permission to download course handouts and PDFs and save them. I expect that these materials will be useful to you throughout the course and beyond.

Academic Integrity Statement
Students should familiarize themselves with UCF's Rules of Conduct at <http://osc.sdes.ucf.edu/process/roc>. According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.
3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student's own academic work.
5. Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.

For more information about Academic Integrity, students may consult The Center for Academic Integrity <https://academicintegrity.org/>. For more information about plagiarism and misuse of sources, see "Defining and Avoiding Plagiarism: The WPA Statement on Best Practices" <http://wpacouncil.org/node/9>.

Responses to Academic Dishonesty, Plagiarism, or Cheating
Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, *The Golden Rule* <https://goldenrule.sdes.ucf.edu/>. UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to academic misconduct. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z Designation" on a student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see <https://goldenrule.sdes.ucf.edu/zgrade/>.

Course Accessibility Statement
The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need disability-related access in this course should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <http://sas.sdes.ucf.edu/> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <http://emergency.ucf.edu/emergency_guide.html>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <http://www.ehs.ucf.edu/workplacesafety.html> (click on link from menu on left).
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <my.ucf.edu> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<https://youtu.be/NIKYajEx4pk>).

Make-Up Assignments for Authorized University Events or Co-Curricular Activities

Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at: < https://policies.ucf.edu/documents/4-401.2MakeUpAssignmentsorAuthUnivEventsorCocurricularActivities.pdf)>

Religious Observances

Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at: <https://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>.

Deployed Active Duty Military Students Statement

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

Important Dates

Please consult the Academic Calendar (http://calendar.ucf.edu) to keep yourself informed of holidays, special events, etc.

Schedule

Week	Date	Topics	Weekly Readings Carlson (C) Long & Teetor (L&T)	Assignment(s) Due
1	Jan. 15	· Introduction to course and syllabus · Scientific Method · Reviewing R and basic statistics	C: 2-9; L&T: 2-5	
2	Jan. 22	· Reviewing R and basic statistics; · How to read a scientific paper	C: 2-9; L&T: 2-5	
3	Jan. 29	· Matrix Operations in R · Multiple Regression, Generalized Linear Models · How to present results	C: 10; L&T: 5.14-5.17, 11, 13.7	
4	Feb. 5	· Multiple Regression, Generalized Linear Models; · Research design & scientific writing – the research question	C: 10; L&T: 11, 13.7	Data Presentation 1; Journal Club
5	Feb. 12	· MANOVA and Discriminant Analysis	C:11; L&T: 11.21-11.25	
6	Feb. 19	· MANOVA and Discriminant Analysis · Scientific writing – materials & methods, statistical analysis & results	C:11; L&T: 11.21-11.25	Data Presentation 2; Journal Club
7	Feb. 26	· Principal Component Analysis; Between-group PCA	C:12; L&T: 13.3-13.5	
8	Mar. 5	· Principal Component Analysis; Between-group PCA · How to make a poster	C:12; L&T: 13.3-13.5	Data Presentation 3; Journal Club
9	Mar. 12	· Correspondence Analysis	C:13	
10	Mar. 19	· Distances and Scaling	C:14 L&T: 13.6	
11	Mar. 26	· Distances and Scaling · Scientific writing – discussion & conclusion	L&T: 13.6	Data Presentation 4; Journal Club

12	Apr. 2	· Cluster Analysis	C:15 L&T: 13.6	Abstracts Due
13	Apr. 9	· Cluster Analysis	C:15 L&T: 13.6	Data Presentation 5; Journal Club
14	Apr. 16	No Class – Spring Break		
15	Apr. 23	· Review · Presentations		Posters Due
16	Apr. 30	Finals Week · Review		