# Advanced Quantitative Methods in Anthropology

Department of Anthropology
The College of Sciences
University of Central Florida

## Course Information

**Course name:** Advanced Quantitative Methods in Anthropology (ANG 7496-0001)
**Class Number:** 19497
**Course number ID:** 046358
**Dates:** 1/7/2019 - 4/30/2019
**Course type:** Face to Face Instruction (P)
**Class Notes:** Computer, WWW access, browser, e-mail required.
**Credit hours:** 3.0
**Semester/year:** Spring 2019
**Location:** Health & Public Affairs (HPA1) Room O104
**Day/Time:** Thursdays 12:00PM - 2:50PM (see schedule below)

## Professor Information

**Professor:** John M. Starbuck, Ph.D.
**Office:** Howard Phillips Hall, Room 409J
**Office Hours:** 9:45 a.m. -11:45 a.m. Thursdays, before class (please check in with desk attendant in HPH 309 first)
**Phone:** 407-823-2124
**E-mail:** Webcourses or john.starbuck@ucf.edu

## University Course Catalog 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 Description

This course is designed to increase your univariate and multivariate statistical skillsets by building upon the topics you previously learned in ANG 5486, which includes:

- Types of variables, scales of measurement, ways of representing data using graphs and tables, percentiles, statistical notation, measures of central tendency, measures of dispersion, probability and sampling theory, fallacious probability ideas (gambler's fallacy, birthday fallacy), calculating probability under a curve, one-tailed vs. two-tailed tests, null vs alternative hypotheses, Type I and II decision errors, alpha and beta values, intra- and inter-observer error, a priori and post-hoc power and interpretations, parametric vs. non-parametric inferential tests, effect size measures, p-values and assessing statistical significance, confidence intervals, statistical vs. practical significance, how to assess assumptions of normality, independence, and homoscedasticity for parametric tests.
- Standardized z-tests, one-sample t-tests, independent t-tests, dependent t-tests, Welch t-tests, Mann-Whitney U. tests, Wilcoxon tests.
- How to interpret SPSS output and write up statistical results.

***Students should review these topics before the first Spring 2019 class meeting***

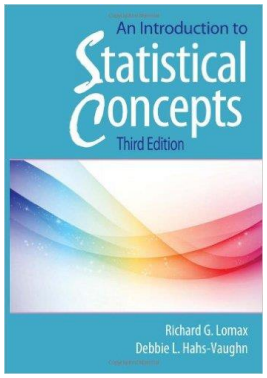
## Course Goals and Learning Outcomes

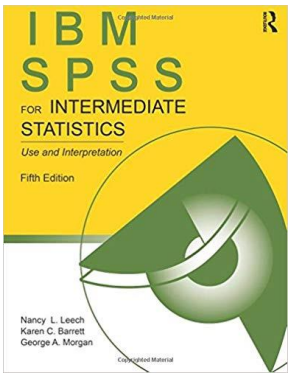
The goal of this course is for students to learn additional statistical principles and techniques for analyzing quantitative data and to become more familiar with IBM SPSS Statistics software and output. Students will learn how to apply various types of analyses to sample datasets. Specifically, students will learn different statistical methods for:

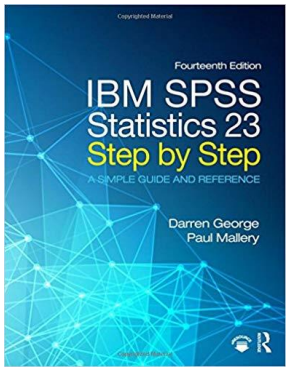
- Inferences about proportions ($\chi^2$ tests), inferences about variances (Levene's test and others), bivariate measures of association (Pearson, Spearman's Rho, Kendall's Tau, and Phi correlation types), ANOVA, multiple comparison procedures (Tukey, Sheffe, and others), ANCOVA (one or more factors), simple linear regression, multiple linear regression, logistic regression, MANOVA (one or more factors), discriminant function analysis, factor analysis, principle components analysis
- Please note that the schedule and course topics listed are only a plan. If certain topics require more time than is listed, the schedule will be adjusted accordingly.

## Required Textbooks

1. An Introduction to Statistical Concepts (3rd edition) by Richard G. Lomax and Debbie L. Hahs-Vaughn.
2. IBM SPSS for Intermediate Statistics: Use and Interpretation (5th edition) by Nancy Leech, Karen Barrett, George Morgan.
3. IBM SPSS Statistics 23 Step by Step: A Simple Guide and Reference (14th edition) by Darren George and Paul Mallery.








**I highly recommend you keep these books beyond this course for future reference.*

## Additional Required Reading

One additional PDF will be provided through Webcourses.

## Required Software

You are required to have access to IBM SPSS Statistics software. The program is available on the computers in the lab where we will meet. It is also available here: https://my.apps.ucf.edu/vpn/index.html for use outside of the lab. When accessing SPSS through my.apps you should Login, select Stat & Data Analysis, and then IBM SPSS Statistics to use the software. Please note that the cloud version is not as functional as the full version.

## Attendance Policy

You can miss one day of class per semester (no excuse needed). For each unexcused day beyond the first that you miss you will be permanently penalized 10% of your final grade.

## Organization and Course Requirements

This class is organized around lectures, labs, quizzes, homework assignments, exams, and two separate dataset analyses. To earn your grade in this course you need to: 1) complete all reading assignments, 2) attend lectures and actively participate in labs, 3) individually complete quizzes (includes scheduled quizzes and pop quizzes), 4) individually complete homework assignments, 5) individually complete exams, 6) complete a thorough dataset analysis in a group followed by a class presentation and written assignment, and 7) complete a thorough dataset analysis individually followed by a class presentation and written assignment. Your goal for the dataset analyses is to show that you have mastered course content while also preparing yourself for qualifying exams.

## Grading

Grades will be posted on Webcourses. Your final grade will be based on the following activities and associated percentages:

1. Syllabus quiz (required, but ungraded)
2. Lab participation (5%)
3. Homework assignments (5%)
4. Scheduled and pop quizzes (15%)
5. Exams (25%)

6. Group dataset analysis presentation (5%)
7. Group dataset analysis write-up (15%)
8. Individual dataset analysis presentation (10% of grade)
9. Individual dataset analysis write-up (20% of grade)

## Grading Scale

The following grading scale will be used in this course:

| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 94-100% | 90-93% | 87-89% | 84-86% | 80-83% | 77-79% | 74-76% | 70-73% | 67-69% | 64-66% | 61-63% | 0-60% |

## Study Requirements Statement

You should attend all lectures, complete all reading assignments, and take notes on course material. You should expect to spend 6-9 hours per week working on class material outside of class time. Your background knowledge/experience or lack thereof and other variables may require you to reread reading material or spend additional time studying.

## Webcourses Statement

We are using an online learning management system called Webcourses (https://webcourses.ucf.edu/). Webcourses is an online course management system (accessed through my.ucf.edu and then the "Online Course Tools" tab). If you are new to Webcourses, please review the following link: http://online.ucf.edu/support/webcourses/other/student-tour/. I will use Webcourses to e-mail you and post class announcements. You will use Webcourses to access the syllabus, homework assignments, and other content using the “Files” link. I recommendation you check Webcourses daily for updates.

## Advice for Course Readings

As you read assigned materials, there are several questions that you should ask yourself. For example, what tests were introduced? When might you use them? What are the assumptions associated with each test? How do you know if a particular dataset satisfies the associated assumptions? What is the null and alternative hypothesis associated with each test? If there are several testing options, how do you determine which one to use? When you have to input information into SPSS to run a test, where do you get that information? Are their non-parametric alternatives? Think of each method as a tool on your toolbelt and identify when you would use it. Aside from understanding the null and alternative hypotheses, which look like equations sometimes, do not focus on the math too much (unless you are in to that). Try to understand the bigger picture and how to interpret the results.

## Lectures and Labs

Each week there will be a lecture or lectures geared towards the application of the methods learned to datasets. In some instances, video examples and explanations will be shown. Lectures will be followed by laboratories where you apply the analysis or analyses introduced to a dataset. Depending on the number of topics and methods introduced each week, the class may be broken

up into more than one lecture-lab combo. Datasets will be input manually during the lab or made available through Webcourses.

## Homework Description and Requirements

Homework assignments are designed to reinforce course concepts, are cumulative, and can be found on Webcourses under the "Files" link. Students must turn in a printed copy of the homework assignment at the beginning of class on the due date listed in the schedule.

## Quizzes

Some quizzes will be scheduled as listed below, but others will be pop quizzes. Quizzes are cumulative and timed (typically 15-30 minutes, depending on the difficulty level). Paper quizzes will be provided by Dr. Starbuck, but some quizzes will involve downloading a document from Webcourses, completing the questions (e.g., copying and pasting SPSS output into the file), and e-mailing the document to Dr. Starbuck either via Webcourses or his e-mail address. For digital documents, I highly recommend you save your quiz elsewhere just in case there is a problem with e-mail. In my experience, Webcourses sometimes drops attachments.

## Exams

Students will complete two in-class cumulative exams. On exam days, students will have the entire course time to complete the exam. Questions may take any format and are highly likely to require you to run analyses, interpret output, and write up results. You may also have to paste output into the exam document. When finished, exam documents must be e-mailed to Dr. Starbuck, either directly or through Webcourses. The recommendations above apply here too: backup your file.

## Datasets Analysis and Class Presentations

You will analyze datasets on two occasions: once in a group and once individually. I will supply you with the dataset, dataset history and/or scenario, and analytical goals. You will give a 20-minute presentation of your analysis results to the class and will be expected to answer at least 3 minutes of questions afterwards. During the presentation, you will share background information about your dataset and the goals of your analysis with the rest of us. Next, you will discuss the issues you assessed to determine which statistical analyses to conduct. For example, what assumptions did you test? How did that influence the tests you chose to use? Then, you will present your results using figures, tables, etc. Your job during this presentation is to walk us through every part of the analysis, including all details of the figures and tables. Do not assume that we know anything. If you point to a part of a table with a particular statistic in it, you should explain what that statistic means and why it is important to the analyses conducted. You should point out where relevant p-values are or are not significant, and what exactly that means with respect to the tests conducted. This is important, as many students fail to explain the results thoroughly. You need to convince me that you can do more than just follow the steps to run the analysis. I want to see that you understand when to use the analysis and what the results mean. Finally, you will conclude by summarizing the results of your analyses and what these results mean relative to your original questions. What have you learned from the analyses you performed? I recommend that you practice your presentation several times to get timing correct and to have a smooth presentation. You must e-mail your presentation to me before or immediately after class.

## Final Written Analysis of a Dataset

Finally, you will write up a report describing the statistical choices that you made throughout the analysis of the dataset provided including types of statistical tests conducted, why those tests were appropriate based on your data, and a written description of results from the tests that you chose to conduct based on the statistical results writing styles and templates taught during this course and illustrated in reading material. Your final written analysis should essentially be the written version of what you presented to the class. The written analysis should take into account any critiques that came up during your presentation. If you chose to alter some of your statistical choices after the presentation, you should explain why this change was necessary in the written report. You will submit a group report for the group project and an individual report for the individual project. Your reports must use the format of a peer-reviewed manuscript (abstract, introduction, materials and methods, results, discussion, conclusion). There is no page minimum or maximum, as that would be influenced by the analysis choices you make and figures or tables provided. Make sure each table and figure are captioned. Figure captions go below figures. Table captions go above tables. All tables and figures must be referenced somewhere in the body of the report (e.g., table 1, figure 4, etc.). I will evaluate the written assignments based on whether you were thorough, made the best statistical choices, and your writing quality.

## Late Policy

You will be docked 10% per day the assignment is late. In some instances, I may be willing to excuse your tardiness, especially if you are on important university business. Check with me in advance as needed.

## Instructions to Save and Load datasets:

Most datasets for this course are uploaded to the UCF Apps Sample Files L: drive (L: → SPSS → ANG 5486 – Starbuck folder) and to Webcourses (under "Files" link). To access files from the L: drive you will need to login to my.apps.ucf.edu/, open SPSS, and then open files from the L: drive. You can also download the files from Webcourses and save them to your Knight Drive (K:) or OneDrive for Business (O:) using the instructions below. These files can then be accessed after opening SPSS from my.apps.ucf.edu/.

Unfortunately, it is not very easy to simply load your own datasets in SPSS through MyApps. In order to do so you will need to have a Knights e-mail address. One should have been assigned to you upon enrollment, but if that is not the case please follow the instructions here: https://extranet.cst.ucf.edu/KMailSelfSvc/Images/Knights%20Email%20Creation.pdf. Once you have your Knights e-mail, go through step 2 listed at the following link to set up your OneDrive account for use on UCF apps: http://apps.ucf.edu/get-help/#files. After OneDrive is set up, go to my.apps.ucf.edu/ and login. If everything is set up correctly, you should now be able to save and load files from the OneDrive for Business (O:). You also should be able to save and load files from the Knight Drive (K:).

There are a couple of ways to get your file onto OneDrive. One option is to login to https://portal.office.com, click the OneDrive icon on the bar shown, and then simply drag the file into OneDrive. The instructions here may be helpful: http://www.cst.ucf.edu/wp-content/uploads/OneDrive-in-Office-365.pdf. The other option is to open the Excel file and then open Excel through MyApps. Next, copy and paste the data from the file into the open Excel

sheet though MyApps and then save it to the O: and/or K: drive. Next, open SPSS through MyApps, locate the file through the O: or K: drive and open it (file → open → data; use drop down arrow and adjust "Files of Type" to Excel). You can also save any SPSS files (sav.) that you generate to either of these drives for future use.

If you require technical assistance, please use the following link: https://online.ucf.edu/support/.

## Financial Aid Requirement

UCF must comply with a federal financial aid regulation that states that in order to receive federal aid, students must be actively academically engaged (according to a federal definition) in each course in which they are enrolled. Without verification of this engagement, students will not receive their aid. Webcourses@UCF will analyze all student activity to determine which students have met the federal standard, and that information will be sent to the Office of Student Financial Aid for processing. **After reviewing this syllabus, students must complete the "Syllabus Quiz" on Webcourses by 5pm EST on Friday of the first week of classes.**

## Ethics Statement

As reflected in the UCF creed, integrity and scholarship are core values that should guide our conduct and decisions as members of the UCF community. Plagiarism and cheating contradict these values and are very serious academic offenses. Penalties can include a failing grade in an assignment or in the course, or suspension or expulsion from the university. Students are expected to familiarize themselves with and follow the University's Rules of Conduct (see http://www.osc.sdes.ucf.edu/).

## 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, consult the International Center for Academic Integrity <http://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* <http://goldenrule.sdes.ucf.edu/docs/goldenrule.pdf>. 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 <http://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/AEDlocations-UCF> (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 <https://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>).

## 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.

## Rules of Conduct Statement

1. Aside from lab computers, 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.
2. The point of working in the computer lab is to allow you to open SPSS and datasets to do analyses. 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.

## Important Dates

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

## Schedule

| Date | Topics | Assigned Reading | Assignment(s) Due |
|---|---|---|---|
| **1/10/2019** | Introduction to Course and Syllabus. | Review Lomax Chapters 6 and 7 (covered in ANG5486). | • Complete "Syllabus Quiz" on Canvas by January 11th, 5pm EST to verify academic engagement.<br>• **Scheduled Quiz #1.** |
| **1/17/2019** | Inferences About Proportions | Lomax Chapter 8. George chapter 8. | • **Scheduled Quiz #2.** |
| **1/24/2019** | Inferences About Variances | Lomax Chapter 9. | • **HW #1** due at beginning of class.<br>• **Scheduled Quiz #3.** |
| **1/31/2019** | Bivariate Measures of Association | Lomax Chapter 10. George chapter 10. | • **HW #2** due at beginning of class.<br>• **Scheduled Quiz #4.** |
| **2/7/2019** | ANOVA, Multiple Comparison Procedures. | Lomax Chapters 11 and 12. George chapter 12. | • **HW #3** due at beginning of class. |

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|---|---|---|---|
| **2/14/2019** | Nonparametric Alternative Test (Kruskal-Wallis). Multi-Factorial ANOVAs. | Handout: Kruskal-Wallis. Lomax Chapter 13. Leech Sections 9.1, 9.2. George chapters 13 and 14. | • **HW #4** due at beginning of class.<br>• **Scheduled Quiz #5.** |
| **2/21/2019** | ANCOVA | Lomax Chapter 14. Leech section 9.3. | • **HW #5** due at beginning of class. |
| **2/28/2019** | *n/a* | *n/a* | • **Exam 1.** |
| **3/7/2019** | Simple Linear Regression, Multiple Linear Regression | Lomax Chapters 17 and 18. Leech chapter 6. George chapters 15 and 16. | • **HW #6** due at beginning of class. |
| *3/14/2019* | *Spring break.* | *Spring break.* | *Spring break.* |
| **3/21/2019** | Logistic Regression | Lomax Chapter 19. Leech section 8.1. George chapter 25. | • **Group presentations of analysis of dataset**<br>• **Scheduled Quiz #6.** |
| **3/28/2019** | One-Factor, Two-Factor, and Mixed MANOVAs | Leech chapter 11. George chapter 23. | • **Group written analysis of dataset due at beginning of class.** |
| **4/4/2019** | Discriminant Function Analysis. Factor Analysis. Principal Components Analysis. | Leech sections 8.3, 4.1, 4.2. George chapters 20 and 22. | • **HW #7** due at beginning of class. |
| **4/11/2019** | *n/a* | *n/a* | • **Exam 2.** |
| **4/18/2019** | *n/a* | *n/a* | • **Individual presentations of analysis of dataset** |
| **4/25/2019** | *Finals Week.* | | • **Individual written analysis of dataset due by 12pm (e-mail to Dr. Starbuck).** |