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|  | STA4163.0002: Statistical Methods II*Department of Statistics and Data Science, College of Sciences*Credit Hours: 3 |

# Course Syllabus

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| Instructor: | Nathaniel Simone  | Term: | Spring 2024 |
| Office Location: | Technology Commons II (TC2) 211B | Class Meeting Days: | Tuesday/Thursday |
| Office Hours: | Monday/Wednesday: 3:00pm-5:00pmTuesday/Thursday: 3:00pm-4:30pm | Class Meeting Time: | 9:00am-10:20am |
| Phone: | (407) 823-2289 (Department of Statistics) | Class Location: | CB1 105 |
| Email: | nathaniel.simone@ucf.edu (include STA4163 in subject line)  | Course Modality: | Face to Face (P) |
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| GTA: | Shahab Abbaspour Tazehkand | Email: | shaha8@ucf.edu |
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## Weekly Help Hours

TBD

## Course Description

Undergraduate Catalog Description: Analyzing data, statistical models, estimation, tests of hypotheses, regression & correlation, introduction analysis of variance, chi-square, & nonparametric methods.

This course is a continuation of STA2023 and provides expanded ideas on hypothesis testing through working with real data and applied statistical methods. Students will learn the process and assumptions for confidence intervals and hypothesis tests for variance, commonly used is quality control or checking the validity of other hypothesis testing. Hypothesis tests for comparing multiple means will be demonstrated through different types of ANOVAs. Equivalent nonparametric tests will be shown for other tests if assumptions are not met. Hypothesis testing and analysis for categorical data will also be addressed. Finally, topics in simple linear regression will be expanded upon, and multiple linear regression will be introduced.

Students will utilize software (R, SPSS, Excel, and/or SAS) to conduct analysis using a variety of datasets and data types. While not the primary goal of the course, students will have to learn to use statistical software to conduct analysis.

## Student Learning Outcomes

By the end of this course, students will be able to demonstrate the following.

Through assignments, exams, and quizzes:

* Solve problems involving hypothesis testing and estimation of one or two population variances.
* Identify and conduct the appropriate analysis for comparing at least 2 means using different types of ANOVAs.
* Identify when a nonparametric test should be utilized instead of a parametric test, as well as executed the selected nonparametric test.
* Identify if a variable is categorical and conduct the appropriate hypothesis test, such as a goodness of fit test, on the variable of interest.
* Solve problems using simple linear regression, including fitting the model, stating and testing assumptions, assessing the usefulness of the model, identifying and interpreting the coefficient of correlation and determination, and using the model for estimation and prediction.
* Solve problems using multiple linear regression, including fitting the model, stating and testing assumptions, assessing the usefulness of the model, identifying and interpreting the coefficient of correlation and determination, and using the model for estimation and prediction.

Through mini projects:

* Use real-world data to apply the correct methodology using the software of choice by the student.
* Communicate findings of a statistical model in plain language without jargon.

This course relates to the following from the Department of Statistics and Data Science:

* Students will identify and carry out statistical procedures such as regression analysis and analysis of variance.

## Course Materials and Resources

* MyLab Access (see MyLab Access section) – includes an eText.
* Calculator (scientific or graphing calculator, needed for exams).
* Computer with a reliable internet connection.

## Enrollment Requirements

Prerequisite: STA2023 or STA3032

Recommended Prerequisite Knowledge: Students should be familiar with the basics of confidence intervals and hypothesis testing, as both of those topics will be used regularly throughout the course. Familiarity with simple linear regression is also recommended.

## Course Expectations

Participation/Attendance

* Attendance and participation are expected from every student.
* Each class will contain in-class examples which the student is expected to follow along. Certain practice problems will also be solved, and students are expected to solve the practice problems and potentially share their solution with others or to the class.
* While in class, students should be respectful and turn their cell phones off and pay attention to the lecture. Students may be asked to leave if they are being disruptive to the rest of the class.

Other Expectations

* Students should have access to Webcourses and check the site regularly for updates and announcements.
* Standard practice is 2 hours of studying per 1 in class, so for a 3-credit hours class, 6 hours of studying per week is expected. If math is not a strong suit, additional time may be needed.

### Important Dates

* Add/Drop/Swap Deadline – January 12th
* Martin Luther King Jr. Day (No classes) – January 15th
* Spring Break (No classes) – March 18th – March 23rd
* Withdrawal Deadline – March 29th
* Study Day (No classes) – April 23rd

### Exam and Project Dates (Tentatively)

* Exam #1 – February 22nd
* Exam #2 – April 25th

### Pacing Schedule

A more detailed pacing schedule with tentative classes will be posted as an Excel document in Webcourses. Here is when each chapter/topic will be gone over, in general.

* Week 1: Review and Start Variance
* Week 2: Finish Variance and Start ANOVAs
* Week 3: ANOVAs
* Week 4: Finish ANOVAs
* Week 5: Start Nonparametric Methods
* Week 6: Finish Nonparametric Methods
* Week 7: Exam #1
* Week 8: Categorical Data Analysis
* Week 9: Start Simple Linear Regression
* Week 10: Simple Linear Regression
* Week 11: Spring Break
* Week 12: Finish Simple Linear Regression
* Week 13: Start Multiple Linear Regression
* Week 14: Multiple Linear Regression
* Week 15: Finish Multiple Linear Regression
* Week 16: Exam #2

### Communication

While I usually respond faster, please allow a minimum of 2 business days (Monday-Friday, 9am-5pm) for a response via email. Communication outside that timeframe is likely, though not guaranteed.

If you have a question solely about the content of the course (such as not understanding a concept), please address them to the GTA.

## *MyLab Access*

* MyLab Homework and Chapter Quizzes
	+ Homework and chapter quizzes will be administered through MyLab. The registration process is briefly described below. You can always access MyLab through the “Access Pearson” tab on Webcourses.

### Final Exam

According to UCF policy, all courses should have a final examination or assessment and should meet during their designated final exam period. Exam #2 will meet during the final exam period.

Time/Date: Thursday, April 25th, 7:00am-9:50am

## Assessment and Grading Procedures

### Grading Methods

The following grading scheme will be used to convert the overall course percentage to a letter grade. Final grades are rounded to two decimal places that compared to the scheme below.

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| A | A- | B+ | B | B- | C+ | C | D | F |
| ≥90% | ≥88%-90% | ≥86%-88% | ≥80%-86% | ≥78%-80% | ≥76%-78% | ≥70%-76% | ≥60%-70% | <60% |

The overall grade will be made up of the following:

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| --- | --- | --- |
| **Category** | **Description** | **Weight** |
| MyLab Homework | There will be 1 homework assignment for each topic, making for a total of 6 assignments. All 6 homework assignments will count towards the final grade.The homework assignments are on MyLab. Problems are graded for accuracy, but each problem has unlimited attempts. Suggested homework problems will also be provided but will not be graded. | 20% |
| MyLab Chapter Quizzes | There will be 1 chapter quiz for each topic, making for a total of 6 quizzes. The lowest quiz score will be dropped. The quizzes are on MyLab. Students will have 2 attempts for each quiz. Quizzes should be done alone. There will be unlimited time for each attempt, but each attempt should be done in a single session.  | 10% |
| In-Class Quizzes | * Tentatively, 6 will be given, with 2 quizzes dropped.
* Quizzes may be announced or unannounced.
* Open note, graded for effort and accuracy.
 | 10% |
| Exams | Exam 1: Variance (7.6, 8.8, 9.6), ANOVAs (chapter 10), and Nonparametric methods (chapter 14)Exam 2: Categorical Data Analysis (chapter 13), Simple Linear Regression (chapter 11), and Multiple Linear Regression (chapter 12) | 30% |
| Mini-Projects | * A total of 3 projects will be conducted.
	+ Mini-Project 1: Variance and ANOVAs.
	+ Mini-Project 2: Nonparametric Methods and Categorical Data Analysis.
	+ Mini-Project 3: Simple Linear Regression and Multiple Linear Regression.
* Students will work individually on each project.
* Projects will consist of a report answering a set of questions on a selected dataset.
* All analysis may be done in R, SPSS, or Excel. Other software is acceptable, but examples will not be shown using other software.
 | 30% |

* Homework
	+ Collaboration is allowed and encouraged. However, you are expected to turn in your own work.
	+ You may use the internet to access resources for finding information about a topic, but you may not use internet resources to find solutions to specific problems (i.e. Chegg, Quizlet, etc.).
	+ Homework may be submitted late at a flat 25% penalty (note that the 25% penalty will only apply to unsolved problems).
	+ Due dates will not be extended unless there are exceptional circumstances.
	+ Graded for accuracy, but each question will have unlimited attempts.
* MyLab Quizzes
	+ Collaboration is not allowed. Each student should take the quiz independently. The quizzes are open note. Other than webcourses, no other internet resources should be used.
	+ Late quizzes may be submitted for a 25% penalty.
	+ Two attempts may be made. The best attempt will be recorded in the grade book.
* In-Class Quizzes
	+ May be announced or unannounced.
	+ Since this is a way to check attendance, a student will earn 70% credit for simply attempting the quiz. The remaining 30% comes from accuracy.
	+ In-Class quizzes may not be made up. Two quizzes get dropped for any reason you may have to not attend class.
* Exams
	+ Graded 100% for accuracy.
	+ One single sheet of paper (standard sized printer paper, 8.5” x 11” or smaller), front and back, handwritten only, may be brought to each exam. No access to the internet, the textbook, or other notes are allowed. No collaboration with others is permitted.
	+ If statistical tables are needed, the instructor will provide them.
	+ In general, please arrive at least 5 minutes early so that everyone can receive the full time allotted for the exam.
	+ Cell phones should be turned off and out of sight (in a backpack, purse, bag, etc.). This does not include pockets on your person. Nothing should be on the desk other than the exam, note sheet, writing utensil, and a calculator.
	+ A scientific or graphing calculator will be needed for each exam.
* Mini Projects
	+ A dataset will be provided to each student based on last name.
	+ Students are allowed to collaborate ideas and concepts, but may not collaborate on specific tasks of the mini projects (for example, you could ask a classmate “What is the null hypothesis for an ANOVA, in general?” but may not ask “What is the null hypothesis for this dataset?”)
	+ Students will have a set of questions to answer based on their dataset. Each student is expected to conduct the appropriate analysis using their choice of software. R, Excel, and SPSS will be shown in class, but other software choices will be allowed.
	+ Students should submit a single document including all answers and relevant output. The appropriate file with the analysis should also be provided.

Academic Integrity/Breaking of Rules

* Homework
	+ If you are caught breaking any of the rules above, some potential consequences (depending on the severity of the situation) could be:
		- Receiving a 0 for the homework assignment.
		- Receiving a 0 for the homework grade weight.
		- Receiving an F in the course.
		- Being reported to the Office of Student Conduct and Academic Integrity.
* Exams/Quizzes
	+ If you are caught breaking any of the rules above, some potential consequences (depending on the severity of the situation) could be:
		- Receiving a 0 for the exam/quiz.
		- Receiving a 0 for the exam/quiz grade weights.
		- Receiving an F in the course.
		- Getting reported to the Office of Student Conduct and Academic Integrity.
* Projects
	+ If you are caught breaking any of the rules above, some potential consequences (depending on the severity of the situation) could be:
		- 0 for the mini project.
		- 0 for the mini project grade weight.
		- Receiving an F in the course.
		- Getting reported to the Office of Student Conduct and Academic Integrity.

### Missing an Assignment or Mini Project

Unless the student and instructor previously worked something out, only documented excuses may be used for an extension on a homework assignment or mini project. An extension must be requested 24 hours prior to the deadline. The following is a non-exhaustive list of what constitutes a documented excuse:

* University-Sponsored Events
* Religious Observations (see below)
* Illness (doctor’s note must be provided)
* Serious family emergencies (death or extreme illness of an immediate family member).
* Jury Duty

If a student misses a homework assignment, there will be a flat 25% penalty, up to 2 weeks. After 2 weeks, the homework assignment will be closed.

If a student misses a mini project, there will be a 10% penalty, up to 5 days (maximum 50% deduction). After 2 weeks, the mini project will be closed an cannot be submitted.

### Missing an Exam

If you are expected to miss an exam, please let me know as soon as possible. You must notify me at least 24 hours in advance unless the emergency happens within 24 hours of class.

* A documented excuse allows the student to make-up a quiz/exam, provided the documentation is provided in a timely manner.
* It is up to the discretion of the instructor whether an unexcused absence can be used to make up a quiz or exam.

The following constitutes an excused absence:

* Illness
* Family Emergency (death of an immediate family member)
* Personal Emergency (such as a car accident)
* Religious Observance (see below)
* Military Obligations
* University Activities (see below)
* Severe Weather Conditions

If a student has an excused absence or an accepted unexcused absence, the exam may be made-up.

### AI Tools

* This class will make use of Artificial Intelligence (AI) in various ways. You are permitted to use AI only in the manner and means described in the assignments. Any attempt to represent AI output inappropriately as your own work will be treated as plagiarism.
* AI should be used as a tool to assist you in learning – not doing the work for you. If you decide to use AI for any part of any assignment or the project, please *cite which parts you received assistance from AI, and how you used it (i.e., list the prompt and output).* Interpretations, calculations, and code should all be your own with no AI assistance, but using AI for things such as debugging or looking up concepts will be allowed.

### Extra Credit

* Extra credit may be available on certain exams. If bonus questions are available, a student may get more than a 100% on an exam, meaning that a student may achieve higher than a 100% in the course overall.
* Other extra credit opportunities may be presented but are expected to be extremely limited.

### Regrades

* Any regrades or grade complaints must be made within 48 hours of receiving the feedback to the instructor (not the GTA). Exam and quiz feedback may be seen during office hours. Homework feedback will be posted online. If this request is not made within 48 hours, then that grade will be treated as final and cannot be changed.

### Grade Dissemination

To comply with the Family Educational Rights and Privacy Act (FERPA), grades must not be released to third parties, which includes posting grades by name, SSN, or UCFID. This section can indicate how you will return graded assignments to the individual student. To ensure students have prompt feedback, and knowledge of their progress, faculty members must record all grades in Webcourses@UCF and follow student data classification and security standards.

## Policy Statements

This section should include the required core policy statements and any policies that relate to your course. The standardized core policies are included below. Common additional policy statements are available on the [Faculty Center website](https://fctl.ucf.edu/teaching-resources/course-design/syllabus-statements/) for verbatim use or modification.

**Academic Integrity**

Students should familiarize themselves with UCF’s Rules of Conduct at <https://scai.sdes.ucf.edu/student-rules-of-conduct/>. 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.
8. Soliciting assistance with academic coursework and/or degree requirements.

**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 respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an “F” letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a “Z” designation on one’s transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let’s avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

**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 access to course content due to course design limitations 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). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and 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. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

**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 <https://centralflorida-prod.modolabs.net/student/safety/index>.
* 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 <https://ehs.ucf.edu/automated-external-defibrillator-aed-locations>.
* To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to [www.getrave.com/login/ucf](http://www.getrave.com/login/ucf) and logging in. On the “My Account” tab, fill out the information, including e-mail address and cell phone number.
* 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>).

**Campus Safety Statement for Students in Online-Only Courses (In case we need to pivot to online)**

Though most emergency situations are primarily relevant to courses that meet in person, such incidents can also impact online students, either when they are on or near campus to participate in other courses or activities or when their course work is affected by off-campus emergencies. The following policies apply to courses in online modalities.

* To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to [www.getrave.com/login/ucf](http://www.getrave.com/login/ucf) and logging in. On the “My Account” tab, fill out the information, including e-mail address and cell phone number.
* Students with special needs related to emergency situations should speak with their instructors outside of class.

**Deployed Active Duty Military Students**

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.

**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.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 <http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>.

**Title IX policy**

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can find resources available to support the victim, including confidential resources and information concerning reporting options at <https://letsbeclear.ucf.edu> and <http://cares.sdes.ucf.edu/>.

**This syllabus is subject to change and all changes will be announced in class or through Webcourses.**