QMB-6304-001
Analytical Methods for Business
Spring, 2023

USF Muma College of Business
Department of Information Systems Decision Sciences
UNIVERSITY of SOUTH FLORIDA

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Office: CIS 2054
Office Hours: Regular hours will be announced via Canvas.
All office hours will be held via Microsoft Teams.
E-mail: rsatterf@usf.edu (The Canvas email function is cumbersome. Please email your professor directly at this address rather than going through Canvas.)

Course Description

This course will give you a background in fundamental statistics and introduce you to statistical programming in R. We will begin with a review of basic concepts, measures of central tendency and dispersion, and probability distributions. Afterward the course will concentrate on confidence intervals, hypothesis tests, regression, correlation, logistic regression, analysis of variance, and fundamentals of mathematical optimization. The emphasis will be on applications, concepts and interpretation of results, rather than derivations and calculations.

This course is offered on a blended-model basis. For most weekly sessions students will be asked to view an introductory lecture video on the week's topic prior to the live class session. Live sessions will assume students are familiar with the video and will concentrate on 1) the use of software to conduct statistical analyses, and 2) completion of individual in-class assignments which will be due at the end of the scheduled class time. Full instructions for completing assignments will be given in class.

Statistical Data Mining

The strongest recommendation is given that students NOT take this course in combination with Statistical Data Mining (ISM-6137). Statistical Data Mining takes principles taught in this course and extends them. Therefore, a student attempting to take both courses simultaneously would be greatly handicapped in successfully completing Statistical Data Mining by not having important foundation knowledge.

Textbooks

Basic Statistics: An Introduction with R, Tenko Raykov and George A. Marcoulides, Rowman & Littlefield Publishers, Inc., 2012.

A First Course in Statistical Programming with R, W. John Braun and Duncan J. Murdoch, Cambridge University Press, 2011. This book is one of two selected for this course to serve as a good general reference for R and R programming. As experience with R and general programming will be varied within the group use of this resource is left to students' judgment.

Beginning R: The Statistical Programming Language, Mark Gardener, John Wiley and Sons, 2012. This book is one of two selected for this course to serve as a good general

reference for R and R programming. As experience with R and general programming will be varied within the group use of this resource is left to students' judgment.

Electronic versions of these books are available at no cost to USF students via:

http://ezproxy.lib.usf.edu/login?url=http://ebookcentral.proquest.com/lib/usf/detail.action?docID=836575.

http://ezproxy.lib.usf.edu/login?url=https://doi.org/10.1017/CBO9781316451090.

http://ezproxy.lib.usf.edu/login?url=http://ebookcentral.proquest.com/lib/usf/detail.action?docID=1076196.

Software

We will be primarily using R with R Studio in this course. Some supplemental work will be done with Microsoft Excel, and Minitab. The complete MS-Office suite is also available to all USF students free of charge to install on their own machines. For any technical assistance you need in gaining access to MS-Office call USF Tech Support at 974-1222. Minitab is not required for this course, but if you wish your own installation Minitab offers 30-day free trials of its software via direct download. Extended academic licenses for students are also available at nominal cost. R and R Studio are both available as free downloads. Install R first from www.r-project.org, then install R Studio from www.rstudio.com. There are numerous online sites that can give assistance if needed with these tasks. Some add-in packages for R will also be used. This line of R code will install the packages you need for this course.

```
install.packages(c("car", "Hmisc", "rio", "moments", "corrplot",
"MASS", "stargazer"),dep=TRUE)
```

Please be prepared at our initial class meeting to use R and R Studio. This means you should have the software installed and ready for use before class.

Outside Materials

Numerous materials are available online to help students learn general statistics as well as R programming. Using such materials would not constitute an act of academic misconduct in this course. For students who feel they need additional assistance with course material beyond that given in class, these materials can be quite useful. One excellent resource is a series of R Studio tutorial videos available on YouTube and created by Michael Marin of the University of British Columbia. There are many videos in this set and they can be found at: https://www.youtube.com/user/marinstatlectures.

Learning Outcomes

Upon completion of the course students will demonstrate the ability to:

1. Understand difference between inferential and descriptive statistics.
2. Use R to build simple graphics, and be able to interpret those graphics.
3. Use R to apply basic inferential tools to data, such as confidence intervals, hypothesis test, regressions, and other associated analyses.
4. Interpret a confidence interval.
5. Formulate and interpret results from a simple hypothesis test.
6. Set up and evaluate results of a regression analysis.
7. Estimate the influence of factors in an analysis of variance.
8. Predict the probability of an event after conducting a logistic regression analysis.
9. Build a simple mathematical programming model for a business case.

Course Assignments

Ten assignments will be administered in this course, each corresponding to concepts taught in a particular module. Each assignment will be worth 50 points. The assignments are to be completed individually with no consultation from other students. Any collaboration, in-person or electronic, with current or former students will be considered an act of academic misconduct and will be dealt with accordingly. Please see the Academic Integrity and Honorlock in Assignments sections of this syllabus. You may, however, use any legitimate third-party electronic references dealing with statistics or R in the completion of your assignment and the construction of your deliverable.

Assignments will be completed during time set aside in class and uploaded to Canvas prior to the scheduled end time for our weekly session. In-class assignments turned in late to Canvas will be assessed a penalty of ten points per half-hour late or portion thereof. For example, if a student turns in an assignment 45 minutes late they will suffer a 20-point penalty. This penalty will be in addition to normal deductions of points for failure to do the assignment correctly. Times of assignment uploads are recorded by Canvas and reported to the professor.

Should you wish to discuss the grading and points awarded for any assignment your professor is happy to accommodate you. However, you must do so within two weeks of the graded assignment being returned to you via Canvas. If you do not discuss such with your professor within the two-week window the professor will assume you are satisfied with the grading of the assignment and will consider the points awarded to be final. After the two-week window no discussions of points awarded on an assignment will be entertained.

Honorlock in Assignments

All students must review the syllabus and the requirements, including the online terms and video testing requirements, to determine if they wish to remain in the course. Enrollment in the course is an agreement to abide by and accept all terms. Any student may elect to drop or withdraw from this course before the end of the drop/add period.

Online exams and quizzes within this course may require online proctoring. Therefore, students will be required to have a webcam (USB or internal) with a microphone when taking an exam or quiz. Students understand that this remote recording device is purchased and controlled by the student and that recordings from any private residence must be done with the permission of any person residing in the residence.

To avoid any concerns in this regard, students should select private spaces for the testing. Students with concerns may discuss location of an appropriate space for the recordings with their instructor or advisor.

Students must ensure that any recordings do not invade any third-party privacy rights and accept all responsibility and liability for violations of any third-party privacy concerns.

Students are strictly responsible for ensuring that they take all exams using a reliable computer and high-speed internet connection. Setup information will be provided prior to taking the proctored exam. To use Honorlock, students are required to download and install the *Honorlock Google Chrome extension*. For additional information please visit the *USF online proctoring student FAQ* and *Honorlock student resources*.

Honorlock is a facility used across USF to insure security and fairness in online assignments. We use Honorlock in this course for our course assignments. On our course Canvas site is a specialized module developed by USF to teach you how to use Honorlock, help you install all needed parts of Honorlock on your computer, and test Honorlock's functioning. **It is your responsibility to make sure you have Honorlock properly working on your computer before each assignment.** Honorlock can be tested at any time by taking the Honorlock Practice Quiz always available to you on Cavas. Should you have difficulty there are tech support facilities open to you should, provided by USF and Honorlock. Whether you complete assignments in our classroom or elsewhere, you must use Honorlock to record **the entire duration of your work** in completing the assignment. **No Honorlock, no points for the assignment.** In our course we also have other conditions and requirements involving Honorlock, academic integrity, and our assignments. These are:

1. You must have a webcam on all our assignments. Your webcam will be recorded as will your computer screen and your browsing activity.
2. Your webcam must be positioned to show your face completely.
3. Lighting in your location must be sufficient to recognize your face. Backlighting should be minimal.
4. Only one monitor may be used during our assignments.
5. You should complete your assignment in a place where you have a reasonable expectation of being alone.

6. Conversation or communication with any other person while completing the assignment will be considered collaboration and an act of academic misconduct. This includes verbal, non-verbal, and electronic communication.
7. Soliciting, receiving, or providing assistance by any means while completing the assignment will be considered an act of academic misconduct. This includes but is not limited to coding advice, code chunks, script files, analysis output, and interpretations of analysis results.
8. Using code from prior student assignments will be considered an act of academic misconduct.
9. Submitting as your own any work done by others will be considered an act of academic misconduct.

Committing academic misconduct in this course will result in a failing (F) grade for the course. In such a case the course will need to be taken again in order to complete the MS-BAIS degree. Other penalties may be applied by the School of Information Systems and Management. Particularly egregious cases will result in a Double-FF (FF) grade being awarded, which will lead to expulsion from our program and the University of South Florida.

Further, students are reminded that webcam videos are recorded and are accessible at any time by the professor and his designees as well as other technical staff of USF and Honorlock. Professional deportment is recommended while recordings are being made.

Integrity of Technology

Students are also reminded that, as would be the case in working on a job or for a contracting client, **integrity of your technology is your responsibility.** Excuses of "laptop problems" will not be accepted in the case of late work submissions. **Make certain your technology is in proper working order before every assignment.**

Grade Determination

This is a 550-point course. Letter grades will be awarded according to the percentage scale below.

Letter Grade	Percent Score
A	93% - 100%
A-	90% - 93%
B+	87% - 90%
B	83% - 87%
B-	80% - 83%
C+	77% - 80%
C	73% - 77%
C-	70% - 73%
D+	67% - 70%
D	63% - 67%
D-	60% - 63%
F	Below 60%

Course Policies

Attendance Quiz

To meet USF's First Day Attendance requirement in these times a short one-question attendance quiz has been set up in Canvas. Please complete the quiz before Thursday, January 12, 2023 at 11:59 PM. If you do not complete the quiz, or if you answer "no" to the single question, you will be administratively dropped from our course.

Late Work Policy

There are no make-up opportunities for assignments. Assignments turned in late will be assessed a penalty of ten points per half-hour late or portion thereof. This penalty will be in addition to normal deductions of points for failure to do the assignment correctly. Times of assignment uploads are recorded by Canvas and reported to the professor.

Extra Credit Policy

There are no opportunities for extra credit in this course. Students' focus should be on the primary work in the course.

Grades of "Incomplete"

An "I" grade may be awarded to a student when 1) arrangements are made prior to the end of the semester, 2) in the judgment of the instructor a valid reason is offered for granting an Incomplete, and 3) a clear path to a standard grade is agreed to by the instructor and the student which will result in successful completion of course requirements by the end of the succeeding semester. "I" grades not replaced by the end of the subsequent semester will be changed to "IF" and are a failing grade for the course.

Email

The primary means of communication between instructor and students between live class meetings will be email. "Blast emails" will occasionally be sent by the instructor to all students via Canvas. Students can feel free to email their instructor with questions at any time. Please anticipate a response time of 24 hours to email queries.

Canvas

Canvas will be used in this course to disseminate materials turn in weekly assignments and return graded assignments. If you need help learning how to perform various tasks related to this or other courses in Canvas, please consult the Canvas help guides. You may also contact USF's IT support at (813) 974-1222 or help@usf.edu.

Laptop Usage

Laptop/Tablet usage is highly encouraged in this course given the nature of the material.

Phone Usage

Students attending the in-person lectures are asked to place their mobile phones on "silent" and to step outside the classroom to take any important calls. Phones may not be used during in-class assignments.

Academic Integrity and Academic Misconduct

Academic integrity is the foundation of the University of South Florida System's commitment to the academic honesty and personal integrity of its university community. Academic integrity is grounded in certain fundamental values, which include honesty, respect, and fairness. Broadly defined, academic honesty is the completion of all academic endeavors and claims of scholarly knowledge as representative of one's own efforts. The final decision on an academic integrity violation and related academic sanction at any USF System institution shall affect and be applied to the academic status of the student throughout the USF System, unless otherwise determined by the independently accredited institution. The process for faculty reporting of academic misconduct, as well as the student's options for appeal, are outlined in detail in USF System Regulation 3.027.

In our course assignments the professor has several methods for penalizing those who engage in academic misconduct. Among these methods the professor can 1) award 0 points for an assignment on which a student has engaged in misconduct, 2) award an F in the entire course, or 3) award a special FF grade in the course. An FF appears permanently on the student's transcript as a special designation showing the student failed the course for reasons of academic misconduct. The FF includes expulsion from the University.

Web Posting Course Materials

Students are reminded that posting course materials to third-party sites such as Course Hero or Chegg represents a violation of the professor's copyright on those materials and constitutes theft of intellectual property.

Disruption to Academic Process

Disruptive students in the academic setting hinder the educational process. Disruption of the academic process is defined as the act, words, or general conduct of a student in a classroom or other academic environment which in the reasonable estimation of the instructor: (a) directs attention away from the academic matters at hand, such as noisy distractions, persistent, disrespectful or abusive interruption of lecture, exam, academic discussion, or general University operations, or (b) presents a danger to the health, safety, or well-being of self or other persons.

Student Academic Grievance Procedures

The purpose of these procedures is to provide all undergraduate and graduate students taking courses within the University of South Florida System an opportunity for objective review of facts and events pertinent to the cause of the academic grievance. An "academic grievance" is a claim that a specific academic decision or action that affects that student's academic record or status has violated published policies and procedures or has been applied to the grievant in a manner different from that used for other students.

Disability Access

Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) to receive academic accommodations. SDS encourages students to notify instructors of accommodation requests at least 5 business days prior to needing the accommodation. A letter from SDS must accompany this request.

Sexual Misconduct/Sexual Harassment Reporting

USF is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence (USF System Policy 0-004). The USF Center for Victim Advocacy and Violence Prevention is a confidential resource where you can talk about incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. This confidential resource can help you without having to report your situation to either the Office of Student Rights and Responsibilities (OSSR) or the Office of Diversity, Inclusion, and Equal Opportunity (DIEO), unless you request that they make a report. Please be aware that in compliance with Title IX and under the USF System Policy, educators must report incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to OSSR or DIEO for investigation. Contact the USF Center for Victim Advocacy and Violence Prevention: (813) 974-5757.

Attendance Policy

Students are expected to exhibit professionalism through regular and on-time attendance to class lectures, whether those lectures attending lectures live or online.

Religious Observances

All students have a right to expect that the University will reasonably accommodate their religious observances, practices and beliefs. If you observe religious holidays, you should plan your allowed absences to include those dates.

Material Coverage and Schedule

Day	Date	Topic	
Monday	1/9/2023	Intro to Statistics and R	Raykov & Marcoulides: Chapters 1, 2, and 3.
Wednesday	1/11/2023	Intro to Statistics and R	Raykov & Marcoulides: Chapters 1, 2, and 3.
Monday	1/16/2023	MLK Holiday	
Wednesday	1/18/2023	Assignment 1	
Monday	1/23/2023	Probability Distributions & CLT	Raykov & Marcoulides: Chapters 5 and 6.
Wednesday	1/25/2023	Probability Distributions & CLT	Raykov & Marcoulides: Chapters 5 and 6.
Monday	1/30/2023	CI and Hypothesis Tests	Raykov & Marcoulides: Chapter 7.
Wednesday	2/1/2023	Assignment 2	
Monday	2/6/2023	CI and Hypothesis Tests	Raykov & Marcoulides: Chapter 7.
Wednesday	2/8/2023	CI and Hypothesis Tests	Raykov & Marcoulides: Chapter 7.
Monday	2/13/2023	Simple Regression	
Wednesday	2/15/2023	Assignment 3	
Monday	2/20/2023	Simple Regression	Raykov & Marcoulides: Chapters 11 and 12.
Wednesday	2/22/2023	Simple Regression	Raykov & Marcoulides: Chapters 11 and 12.
Monday	2/27/2023	Simple Regression	Raykov & Marcoulides: Chapters 11 and 12.
Wednesday	3/1/2023	Assignment 4	
Monday	3/6/2023	Multiple Regression	Raykov & Marcoulides: Chapter 13.
Wednesday	3/8/2023	Multiple Regression	Raykov & Marcoulides: Chapter 13.
Monday	3/13/2023	Spring Break	
Wednesday	3/15/2023	Spring Break	
Monday	3/20/2023	Multiple Regression	Raykov & Marcoulides: Chapter 13.
Wednesday	3/22/2023	Assignment 5	
Monday	3/27/2023	Multiple Regression	Raykov & Marcoulides: Chapter 13.
Wednesday	3/29/2023	Assignment 6	
Monday	4/3/2023	Time Series Regression	None. Class lectures will be the primary reference materials. Students are free to draw on any other materials for reference.

Wednesday	4/5/2023	Assignment 7	
Monday	4/10/2023	Logistic Regression	None. Class lectures will be the primary reference materials. Students are free to draw on any other materials for reference.
Wednesday	4/12/2023	Assignment 8	
Monday	4/17/2023	Analysis of Variance	None. Class lectures will be the primary reference materials. Students are free to draw on any other materials for reference.
Wednesday	4/19/2023	Assignment 9	
Monday	4/24/2023	Math Optimization I	None. Class lectures will be the primary reference materials. Students are free to draw on any other materials for reference.
Wednesday	4/26/2023	Math Optimization II	None. Class lectures will be the primary reference materials. Students are free to draw on any other materials for reference.