

**University of Florida**  
**College of Public Health & Health Professions Syllabus**  
**PHC 6937: Analysis of Multivariate Data (3 credit hours)**  
Fall: 2022  
Delivery Format: On-Campus  
Course Website and E-Learning

---

Instructor Name: Subha Guha, Ph.D.  
Campus Course Room: TBD  
Phone Number: 352-294-5921  
Email Address: [s.guha@ufl.edu](mailto:s.guha@ufl.edu)  
Lecture time: Mondays 11:45 - 12:35 and Wednesdays 11:45 - 12:35, 12:50 - 1:40  
Office Hours: Friday 11:30 a.m. – 12:30 p.m. via Zoom (see Canvas website for the link)  
Preferred Course Communications:  
Lecture notes, assignments, and exams will be distributed through Canvas at <http://elearning.ufl.edu/>.

---

Prerequisites: PHC 6092, PHC 6050C, and PHC 6051. Permission of the instructor is needed if this requirement is not met.

---

## **PURPOSE AND OUTCOME**

### **Course Overview**

This course covers linear models methodology including simple and multiple regression and analysis of variance including factorial and block designs. The course covers regression for categorical data, random effects models for correlated data, and nonparametric and semiparametric regression.

### **Course Objectives and/or Goals**

Upon successful completion of the course, students will be able to:

- Understand the fundamental concepts of multivariate statistical theory
- Apply the concepts to their own methodological and collaborative research

### **Course Materials and Technology**

Required text: Applied Multivariate Statistical Analysis, Johnson and Wichern, Sixth edition.

This course will use Canvas, and eLearning website that can be accessed at <http://elearning.ufl.edu> to organize and disseminate information. Students must be able to run the statistical package R, which is freely available at <http://cran.r-project.org/>.

For technical support for this class, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

---

## DESCRIPTION OF COURSE CONTENT

**Topical Outline/Course Schedule**      Adjustments to this schedule may be made during the semester

Week	Date	Topic(s)
1	08/24	Aspects of Multivariate Analysis
2	08/29	
	08/31	
3	09/05	No class
	09/07	Matrix algebra and random vectors
4	09/12	Sample geometry and random sampling
	09/14	
5	09/19	
	09/21	
6	09/26	The multivariate normal distribution
	09/28	
7	10/03	Inferences about a mean vector
	10/05	
8	10/10	Review
	10/12	Exam 1
9	10/17	Inferences about a mean vector
	10/19	
10	10/24	Comparisons of several multivariate means
	10/26	
11	10/31	
	11/02	
12	11/07	Multivariate linear regression models
	11/09	
13	11/14	Principal Components
	11/16	
14	11/21	Factor Analysis
	11/23	No class
15	11/28	Factor Analysis
	11/30	
16	12/05	Review
	12/07	Exam 2

### Additional Academic Resources

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.

On-Line Students Complaints: View the Distance Learning Student Complaint Process.

---

## ACADEMIC REQUIREMENTS AND GRADING

### Assignments

The overall grade will include in-class homework discussion and two exams. Students are encouraged to discuss in groups or with the instructor on homework assignments, but are expected to complete homework on their own. Homework will not be graded. Students will be asked to present homework solutions during the scheduled discussions.

All homework must be typed in Word or Latex (12 point font size, double-spaced, 1-inch margin). Alternatively, scanned copies of handwritten solutions may be submitted in PDF format. If a homework question requires you to use R, the code and computer output must be submitted. Unless otherwise specified, all assignments should be turned in via the Canvas assignment tab by 5 p.m. of the due date. Hard copies will not be accepted.

Homework discussion: 30%

Exam 1: 35%

Exam 2: 35%

The instructor reserves the right to revise the above distribution if necessary.

The grading scale for this course consists of the standard scale, including minus grades, below. Percentages will be rounded up when computing the grade.

93% - 100% = A  
 90% - 92% = A-  
 87% - 89% = B+  
 83% - 86% = B  
 80% - 82% = B-  
 77% - 79% = C+  
 73% - 76% = C  
 70% - 72% = C-  
 67% - 69% = D+  
 63% - 66% = D  
 60% - 62% = D-  
 Below 60% = E

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 based on 5000 level courses and above to graduate. A grade of C counts toward a graduate degree only if based on credits in courses numbered 5000 or higher that have been earned with a B+ or higher.

Letter grade to grade point conversions fixed by UF:

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I	NG	S-U
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0	0.0	0.0	0.0	0.0

More information on UF grading policy may be found at:  
<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

### **Exam Policy**

The exams will be given in class. Late exam submissions will have a penalty of 5% of the total exam points if submitted 5 – 15 minutes late. Submissions more than 15 minutes late will not be accepted.

Students may not share exams or solutions with anyone else at any time, even after the course is finished. You may use a calculator for solving the numerical problems. You must work independently and consult no one other than the instructor. You may only ask clarification questions from the instructor.

### **Policy Related to Make up Exams or Other Work**

In the event of unusual circumstances, a student could be given a make-up exam, or an incomplete grade in the course. The instructor must be notified by email about a request for a make-up exam as soon as possible. Make-up exams due to an excused absence will be handled on an individual basis.

Homework assignments must be submitted by 5 p.m. of the due date. Late assignments will not be accepted after the due date without an official excused absence.

Any requests for make-ups due to technical issues MUST be accompanied by the UF Computing help desk (<http://helpdesk.ufl.edu/>) correspondence. You MUST e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

All faculty are bound by the UF policy for excused absences. Excused absences must be consistent with university policies in the Graduate Catalog (<https://catalog.ufl.edu/graduate/regulations/#text>).

## **STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT**

### **Expectations Regarding Course Behavior**

All students are expected to remain actively engaged in lecture material and participate in class discussions. Out of respect for your peers, cell phones and off-topic use of laptops will not be tolerated. Not only will these distractions interfere with the student's ability to learn, but they will also interfere with the learning of their classmates.

### **Communications Guidelines**

When communicating with classmates or the instructor, especially when using email messages or Canvas discussions, please be courteous and respectful to avoid hindering the learning community established by the course. For information on netiquette guidelines, go to <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>

### **Academic Integrity**

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

**“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”**

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

**“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>  
<http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

### **Recording Within the Course:**

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

### **Policy Related to Guests Attending Class:**

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are **not** permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Link to full policy: <http://facstaff.phphp.ufl.edu/services/resourceguide/getstarted.htm>

### **Online Faculty Course Evaluation Process**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## **SUPPORT SERVICES**

### **Accommodations for Students with Disabilities**

If you require classroom accommodation because of a disability, it is strongly recommended you register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class or as soon as you believe you might be eligible for accommodations. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please do this as soon as possible after you receive the letter. Students with disabilities should follow this procedure as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The **Counseling and Wellness Center** 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- **U Matter We Care** website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The **Student Health Care Center** at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from: Alachua County Crisis Center: (352) 264-6789 <http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>
- **University Police Department:** [Visit UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).
- **UF Health Shands Emergency Room / Trauma Center:** For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website.](#)

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

**Inclusive Learning Environment**

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: [www.multicultural.ufl.edu](http://www.multicultural.ufl.edu)