

University of Florida
College of Public Health & Health Professions Syllabus
PHC 6937: Advanced Bayesian Methods (3 credit hours)
Spring: 2022
Delivery Format: In-person
Course Website and E-Learning

Instructor Name: Subha Guha, Ph.D.
Campus Course Room: To be announced
Phone Number: 352-294-5921
Email Address: s.guha@ufl.edu
Lecture time: Tuesdays 11:45 - 12:35 and Thursdays 11:45 - 12:35, 12:50 - 1:40
Office Hours: Friday 10:30 a.m. – 11:30 p.m.
Preferred Course Communications:
Lecture notes, assignments, and exams will be distributed through Canvas at <http://elearning.ufl.edu/>.

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

PURPOSE AND OUTCOME

Course Overview

This course introduces students to advanced concepts of Bayesian biostatistics with special emphasis on practical implementation in bioassay, measurement error, survival analysis, longitudinal studies, and spatial statistics. Students will be able to fit Bayesian models to analyze real data sets using freely available software such as WinBUGS and R.

Relation to Program Outcomes

This course prepares students to communicate Bayesian biostatistics concepts and methods, and to apply them, including the interpretation and communication of results.

Course Objectives and/or Goals

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

- Fit Bayesian models to real data sets
- Understand computational techniques to fit Bayesian models
- Use software such as WinBUGS and specialized R packages
- Be capable of applying Bayesian techniques in survival analysis, longitudinal studies, disease mapping, image analysis, and bioinformatics

Instructional Methods

Lectures with slides, data analysis demonstrations in R and WinBUGS, and whiteboard use. Homework assignments. Two in-class exams.

Course Materials and Technology

Required text: “Bayesian Biostatistics” by Emmanuel Lesaffre and Andrew B. Lawson. John Wiley & Sons, Incorporated, 2012.

Recommended text: “Bayesian Data Analysis” by Andrew Gelman, John B. Carlin, Hal S. Stern, David B. Dunson, Aki Vehtari, and Donald B. Rubin. Chapman and Hall/CRC, 2013.

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
- (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	01/06	Review: Modes of statistical inference
2	01/11	Review: Bayes Theorem
	01/13	Review: Introduction to Bayesian inference
3	01/18	Review: Some models with several parameters
	01/20	Review: Choosing the prior
4	01/25	Review: MCMC sampling
	01/27	
5	02/01	Hierarchical models
	02/03	
6	02/08	Model building and assessment
	02/10	
7	02/15	
	02/17	
8	02/22	Variable selection
	02/24	
9	03/01	Pre-exam review
	03/03	Exam 1
10	03/08	No class (Spring break)
	03/10	
11	03/15	Bioassay
	03/17	Measurement error
12	03/22	Survival analysis
	03/24	
13	03/29	Longitudinal analysis
	03/31	
14	04/05	Spatial applications
	04/07	
15	04/12	Pre-exam review
	04/14	
16	04/19	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 online 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 online.

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 two exams are in-class. Students may not share exams or exam solutions with anyone else at any time, even after the course is finished. Late exam submissions will have a penalty of 5% of the total exam points if they are submitted 5 – 15 minutes late. Submissions more than 15 minutes late will not be accepted.

Students may not share exams or exam solutions with anyone else at any time, even after the course is finished. You may use R or 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.

Professionalism and COVID

As students pursuing a path in the health professions or public health, it is crucial to demonstrate professional behaviors that reflect integrity and commitment to the health of patients, fellow health professionals, and to populations we serve. To accomplish this, a strong responsibility for the well-being of others must be evident in our decisions, along with accountability for our actions. Professionalism in the health disciplines requires adherence to high standards of conduct that begin long before graduation. This is particularly true during times of health emergencies such as the COVID pandemic, given our professional habits can have a direct impact upon the health of persons entrusted to us.

If you are not vaccinated, get vaccinated. Vaccines are readily available at no cost and have been demonstrated to be safe and effective against the COVID-19 virus. Visit this link for details on where to get your shot, including options that do not require an appointment: <https://coronavirus.ufhealth.org/vaccinations/vaccine-availability/>. Students who receive the first dose of the vaccine somewhere off-campus and/or outside of Gainesville can still receive their second dose on campus.

In response to COVID-19, the following professional practices are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to protect the health and safety of ourselves, our patients, our neighbors, and our loved ones.

- You are required to wear approved face coverings at all times while in Health Science Center classrooms and within Health Science Center buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus. UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Continue to follow healthy habits, including best practices like frequent hand washing.
- Avoid crowded places (including gatherings/parties with more than 10 people)

Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. If you are withheld from campus by the Department of Health through Screen, Test & Protect you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.

Continue to regularly visit coronavirus.UFHealth.org and coronavirus.ufl.edu for up-to-date information about COVID-19 and vaccination.

COVID-19 Symptoms

See <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html> for information about COVID-19 symptoms, which may include fever, cough, shortness of breath or difficulty breathing, fatigue, chills, muscle or body aches, headache, sore throat, congestion or runny nose, nausea or vomiting, diarrhea, and loss of taste or smell.

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.php.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