

University of Florida
College of Public Health & Health Professions Syllabus
PHC 7056: Longitudinal Data Analysis (3 credit hours)

Spring: 2019

Delivery Format: On-Campus and Online

E-Learning: lss.at.ufl.edu

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Campus Course Hours: Tuesdays 3:00-3:50 and Thursdays 3:00-4:55

Campus Course Room: CTRB 5235

Office Hours: Tuesdays 4-5pm and by appointment

Preferred Course Communications: e-mail

Prerequisites: STA 6326, STA 6327 (or equivalent), STA 6207, STA 6208 (or equivalent), and STA 6246 (or equivalent). Students having finished the first year of Biostatistics MS courses plus Advanced Biostatistical Methods I would have sufficient prerequisites for this course. Students must own a laptop that can run the statistical package R, which is freely available at <http://cran.r-project.org/>, as well as SAS.

PURPOSE AND OUTCOME

Course Overview

Likelihood-based and semiparametric methods for longitudinal data. Methods to deal with missing data in both settings.

Relation to Program Outcomes

This course serves the knowledge and skills student learning objectives by preparing students to communicate the underpinning of biostatistics concepts and methods and to apply biostatistical concepts and methods on one's own, including interpretation and communication of results.

Course Objectives and/or Goals

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

- Formulate the marginal model, conditional model, and transitional model for the analysis of longitudinal data
- Specify and interpret models for the correlation structure.
- Derive the ML, REML, and GEE estimation procedures.
- Assess methods for longitudinal statistical inference.
- Incorporate time-dependent covariates
- Handle missing data in longitudinal data analysis
- Select appropriate models and methods and apply those using SAS

Instructional Methods

Lectures with slides, data analysis demonstrations in R and SAS, and whiteboard use. Homework assignments. Some homework assignments will consist of individual students presenting solved textbook exercises to the class. Two takehome exams.

DESCRIPTION OF COURSE CONTENT

Topical Outline/Course Schedule D: Diggle et al., A: Appendix of Diggle et al., F: Fitzmaurice et al.

1. Introduction, examples, design issues (D1-2) (Jan 8, 10)
2. Exploring Longitudinal Data (D3) (Jan 15, 17)
3. General linear models (D4, A2-4) (Jan 22, 24)
4. General linear models: practical issues (F5-7) (Jan 29, rescheduled class for Jan 31)
5. CLASS for Thurs Jan 31 will be rescheduled
6. NO CLASS Tues Feb 5
7. Linear mixed models (F8, 10) (Feb 7, 12, 14, 19)
8. First exam (takehome): Hand out Feb 14, due Feb 26
9. NO CLASS Thurs Feb 21
10. Generalized linear models and Marginal Models (D7-8) (Feb 26, 28)
11. SPRING BREAK (NO CLASS) (Mar 5, 7)
12. Random effects model (D9), (Mar 12, 14, 19, 21)
13. Transition model (D10) (Mar 21)
14. NO CLASS Tues Mar 26
15. Likelihood methods for categorical data (D11) (Mar 28)
16. Time-dependent covariates and exposures (D12) (Apr 2, 4)
17. Missing data (D13) (Apr 9, 11)
18. Special Topics (TBA) (Apr 16, 18)
19. Second exam (takehome): Hand out Apr 16, due Apr 23

Course Materials and Technology

Required text: *Analysis of Longitudinal Data* (2002), 2nd Edition, by Peter Diggle, Patrick Heagerty, Kung-Yee Liang, and Scott Zeger. Oxford University Press, Oxford, UK.

Recommended text: *Applied Longitudinal Analysis* (2011), 2nd Edition, by Garrett M. Fitzmaurice, Nan M. Laird, and James H. Ware. John Wiley & Sons, Hoboken, NJ.

Additional Course Materials Available via E-Learning at lss.at.ufl.edu

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>

ACADEMIC REQUIREMENTS AND GRADING

Assignments

Students are expected to be actively involved in each class, including sharing comments of required reading, discussing answers and questions to homework assignments, and participating in class discussion. Grades for homework will be assessed by leading and participating in the discussion. Students are not expected to hand in their answers.

The overall grade will include class participation and two takehome exams. Class participation will include weekly attendance, sharing reading comments, and leading and participating in discussion. Students are

encouraged to discuss either in groups or with the instructor on homework assignments, but are expected to complete homework on their own.

Class participation: 50%

Exam 1 (mid-semester): 25%

Exam 2 (final day of classes): 25%

The grading scale for this course consists of the standard scale, including minus grades, below. Percentages will be rounded to the nearest 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. A grade of C counts toward a graduate degree only if an equal number of credits in courses numbered 5000 or higher have been earned with an A.

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

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:

<http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Exam Policy

The two exams are take-home exams. Students are bound by the UF honor code (see below) and may neither give nor receive aid on the exams. Students may not share exams or exam solutions with anyone else at any time, even after the course is finished.

Policy Related to Make up Exams or Other Work

In the event of unusual circumstances, a student could receive an extension of the due-date to a take-home exam, or a make-up exam if it is in class, or an incomplete grade in the course.

Policy Related to Required Class Attendance

Attendance of all class sessions is expected. We will follow the UF Attendance Policy.

For information regarding the UF Attendance Policy see the Registrar website for additional details:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

Students are expected to show up for class prepared and on time. Cell phones are to be silenced during class unless there is an emergency, in which case please inform the instructor.

Communication Guidelines

Students are expected to participate in class discussions. Assignments must be clearly written in reasonably good English.

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.

Online Faculty Course Evaluation Process

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

SUPPORT SERVICES

Accommodations for Students with Disabilities

If you require classroom accommodation because of a disability, you must register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you then give to me as the instructor of the course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. 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.
- You 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>

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.
