STA 7249 Generalized Linear Models **Spring 2021**

Instructor: Dr. Mike Daniels (mdaniels@stat.ufl.edu)
102C Griffin-Floyd Hall
273-2966

Lecture: T Period 4, Th Period 3-4 (streamed live on zoom; will also be recorded and posted on Canvas)

Pre-requisites: STA 6207 and Stat 6327.

Some Useful texts (on reserve as e-books in Marston Science Library):

Dobson and Barnett (2008) *An introduction to generalized linear models, 3rd edition*, CRC Press.

Diggle, Heagerty, Liang, Zeger (2002) *Analysis of longitudinal data, 2nd edition*, Oxford University Press.

Fahrmeir and Tutz (2001) *Multivariate statistical modelling based on generalized linear models.* Springer.

Faraway, J. J. (2016). *Extending the linear model with R: generalized linear, mixed effects and nonparametric regression models.* Chapman and Hall/CRC.

Hardin, J. W., & Hilbe, J. M. (2012). *Generalized estimating equations.* Chapman and Hall/CRC.

Hastie and Tibshirani (1990) *Generalized Additive Models.* Chapman & Hall.

McCullagh and Nelder (1989) *Generalized Linear Models, 2nd edition*, Chapman & Hall.

McCulloch, Searle, Neuhaus (2008) *Generalized, linear, and mixed models*, Wiley.

Wood (2017) *Generalized additive models: An introduction with R, 2nd edition.* Chapman & Hall/CRC Press.

Zoom Office Hours: T Period 2-3, Th Period 2 or by appointment (call or email)

Content:

This course will focus on the theory and application of generalized linear models and related topics. The first 9 weeks will cover the topics from a generalized linear model course for independent data (McCullagh and Nelder first nine chapters) including conditional likelihood and quasi-likelihood. One week will be spent on generalized additive models while three weeks will be spent on generalized linear models for correlated data including generalized linear mixed models and generalized estimating equations. The final two weeks of the course will be the presentation of projects. Questions on the material for this course appear on the PhD qualifying exam.

(Rough) Weekly Schedule

Weeks	Topics
1-2	Theory of generalized linear models
3-4	Binary regression
5	Multinomial regression
6-7	Count regression
8	Quasi-likelihood
9	Conditional likelihood
10	Generalized additive models
11-12	Generalized linear mixed models
13	Generalized estimating equations
14-15	Projects

Computing: Models introduced will be fit using R. You will be required to write code to fit some of these models. Datasets will be provided.

Assignments: There will be several assignments handed out during the semester. Each ssignment will need to be emailed to me as a *one pdf file* before the beginning of class on the due date. Late assignments will not be accepted. Your homework grade will be based on both completing the assignment and my grading of selected problems.

Project: A twenty minute presentation on an advanced topic not covered in the course. It will be graded based on correctness and clarity. Topic must be approved by me ahead of time. I will give more details at the end of February.

Exams: There will be two exams given *in person* during regular class time (dates given below; location TBD). The exams will require a calculator. If you are unable to take an exam on the scheduled date (due to circumstances beyond your control), you need to contact me **BEFORE** you miss the exam. Otherwise, you will receive a 0 on the exam.

Grades: Grades for the course will be based on the following:

Assignments	10%
Project	20%
Exam I	35%
Exam II	35%

Important Dates

No class: Thursday February 25 (Recharge day); Tuesday March 16

Exam I: Thursday February 18 (Larsen 310/330)

Exam II: Thursday April 15 (Larsen 310/330)