Stat 3302 - Statistical Modeling for Discovery II

Spring 2018

Time: MWF 12:40 – 1:35 **Place:** 312 Cockins Hall

	Instructor	**TA**
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Office:	Cockins Hall, Room 205C	MSLC Room 122
Office Hours	MW 3:00-4:00	M 11:30-12:30

Prerequisites: Stat 3301 (Statistical Modeling for Discovery I); A knowledge of linear algebra.

Main Textbooks:

1. A. J. Dobson and A. Barnett (2008), An Introduction to Generalized Linear Models, Third Edition, Chapman & Hall/CRC Texts in Statistical Science.
2. A. C. Rencher and W. F. Christensen (2012), Methods of Multivariate Analysis, Third Edition, Wiley. Available online at http://onlinelibrary.wiley.com.proxy.lib.ohio-state.edu/book/10.1002/9781118391686.
3. Lecture notes and other useful references mentioned in class.

Course Summary: This course continues to investigate statistical models for data analysis and discovery in big-data settings. The regression methods developed in Stat 3301 are extended to data settings with binary and multi-category outcomes. An introduction to some of the most commonly used statistical methods for exploring and analyzing multivariate data is provided. Interpretation and communication of the results of analyses is emphasized. Upon successful completion of the course, students will be able to

1. Build, fit and interpret statistical models for binary outcomes
2. Understand the difference between nominal and ordinal outcomes and build regression models that are appropriate for each
3. Recognize the types of questions that can be answered by regression models for multi-category data and structure models to answer those questions
4. Comprehend the statistical principles that underlie basic methods of multivariate data analysis

Tentative Course Outline:

1. Review of basic concepts from linear regression.
2. Inference for binary data and logistic regression.
3. Poisson regression and other Generalized Linear Models.
4. Multivariate data analysis including Principal Component Analysis
5. Additional topics such as deep learning, nonparametric regression, network modeling, causal inference depending on time and interest.

Computing This class requires you to use the statistical software package called R. More details will be given in class.

Grading Policy

Homework and quizzes	(15%)
Midterm 1	(20%)
Midterm 2	(20%)
Project	(15%)
Final	(30%).

Important Dates:

Midterm #1 ..... Monday, 12th Feb, in class
Midterm #2 ..... Friday, 23rd March, in class
Project Proposal ..... Friday, March 9th
Final Exam ..... Tuesday, May 1st, 12:00 to 1:45

Exams: There will be two mid terms and one final exam. All exams are cumulative. All exams are closed book/closed notes. A basic calculator is allowed – tablets, laptops, and cellphones are not.

Midterm 1 covers the material up to and including Friday 9 Feb. Midterm 2 covers the material up to and including Wed 21 Mar. The final will cover all the material for the course. There will be **no make-up** exams.

Homework policy: Homework will be due at the **beginning** of class on the day it is due. **No** late homework will be accepted. You are encouraged to work together on the homework, but **do not** copy any part of a homework. Each student must produce his/her own homework to be handed in. Electronic submissions are not permitted. Feel free to ask me for help after you have made an attempt of the questions. The best homework of a student may be posted for the entire class.

Homework preparation rules: Put your name and the homework assignment number on the top right-hand corner of every page. All homework must be submitted on 8.5"x11" paper. Staple the pages together. We are not responsible for lost pages. Please make sure to **submit the problems in order, making sure that the computer output and discussion is placed together (do not put the computer output at the end of homework)**. Raw computer output is not acceptable. Make it clear what parts of the output are relevant and show how they answer the questions posed in the homework.

Project: In groups of 3 or 4, students will be responsible for completing a project. Proposals for project ideas will be due at the start of the last class before spring break (Fri 9 Mar) and the project will be due near the end of the semester. The project will consist of finding a dataset, formulating questions that can be answered with the data, and performing an appropriate analysis to answer the questions posed. Further details, including deadlines will be given as the semester progresses.

Course Policy:

1. No "early" final exams or make-up exams will be given, so make your travel plans accordingly.
2. Use of personal computers, cell phones, etc. is prohibited during lecture. Please do not read the newspaper or other extraneous materials during lecture.

3. The class will involve a lot of discussions and active class participation is expected from all students.
4. Homework will be due at the start of class; please do not work on the homework during lecture.
5. No late home work will be accepted, unless a prior arrangement has been made with the instructor. Late submissions will result in a 0 grade.
6. The course policy is subject to change.

Attendance Policy: In accordance with University Rules, a student who is absent from three or more (not necessarily consecutive) classes, without contacting the instructor with a valid excuse, may be reported for possible disenrollment. To prevent disenrollment, the instructor should be contacted (e-mail: karwa.8@osu.edu) within 24 hours of the third (and any subsequent) absence.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Disability Services: Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.