Syllabus for STAT 504 --- Analysis of Discrete Data

Penn State World Campus -- Spring 2014

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Contact preference: ANGEL mailbox and discussion boards. Response is expected within 48 hours. Video and phone chats are available on request. Adobe Connect room at https://meeting.psu.edu/abs12

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Prerequisites:
• Stat 460, Stat 502 or Stat 512
• Matrix algebra

Textbooks:
• Required: An Introduction to Categorical Data Analysis, by Alan Agresti 2nd edition (2007), Wiley – a great introductory level book
• Suggested: Categorical Data Analysis by Alan Agresti, 3rd edition (2013), Wiley – a more comprehensive and mathematically rigorous book

Tentative Outline
• Review of discrete probability distributions: binomial, multinomial, Poisson
• Introduction to the concept of likelihood.
• Tests for one-way tables
• Introduction to two-way contingency tables
• Introduction to three-way tables – concepts of independence
• Logistic regression for dichotomous response
• Introduction to generalized linear models
• Poisson regression.
• Loglinear models
• Polytomous logit models for ordinal and nominal response
• Other topics time permitting!

For comprehensive information consult Stat 504 Lessons available in ANGEL.

Course Learning Objectives
• To understand and be able mathematically to describe the structure of multivariate discrete distributions.
• To develop basic skills in the analysis of contingency table data.
• To examine the basic ideas and methods of generalized linear models.
• To develop facility in the basic analysis of discrete data using SAS or R.
• To be able to utilize the fundamental concepts learned in this class to more easily communicate with others about categorical data and to more easily learn many new, and possibly more advanced, methods for categorical data analysis.
Course Grading

- Homeworks – 40%
- Exams – 50% -- Midterm 20% & Final comprehensive exam 30%
- Project – 10%

**Software**: SAS and R will be supported. Sample programs will be supplied but you **will be required** to do some programing on your own. Students should already feel comfortable using either SAS or R, or be a quick learner of software packages, or able to figure out how to do the required analyses in another package of their choice. Due to different software versions and platforms there may be issues with running a code. Do NOT wait to the point of frustration but please seek help in the online discussion boards and from the instructor and the TA.

**Lessons and Homework – Due (almost) weekly**

Almost every week one lesson will be assigned and one set of assignments will be given. Assignments are to be turned in on the given due dates or earlier. Doing the homework promptly and carefully is necessary for learning the material. A reasonable amount of collaboration is allowed and encouraged on homework. However, each student must turn in his or her own written work which reflects his or her own understanding of the material. There is penalty (10% off for each additional day) for handing in homework late, unless the instructor is notified beforehand. You can drop the lowest homework grade.


*Two at-home tests will be given*. They will assess your understanding and ability to analyze categorical data. All tests will be posted online. Over the given 4 days, you will be given a specific time window to complete the assigned problems and turn the solutions in from the time you access the exam. No proctoring is required for this course. **During the exam days you will not be corresponding with anyone else except the instructor regarding the exam problems.**

**Course Project – Due May 2, 2014**

The project is an opportunity for you to work on a problem from your own area of application, by utilizing methods and tools for analysis of discrete data. You can work on your own or in groups of 2 or 3, and will need to submit a proposal to ensure that the project is acceptable for this course. You will either submit a 20min online presentation or a short written report no more than 5 pages. More information is provided on ANGEL. The range of possible projects is wide. For example

- Use categorical methods to analyze a data set of interest
- Learn a new method for analysis of discrete data not covered in class

**Alternative Texts and Suggested Reading Materials:**

Physically disabled and learning disabled students
Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines/documentation-guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

Academic Integrity
All Penn State policies regarding ethics and honorable behavior apply to this course. Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. All University policies regarding academic integrity apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

For any material or ideas obtained from other sources, such as the text or things you see on the web, in the library, etc., a source reference must be given. Direct quotes from any source must be identified as such.

All exam answers must be your own, and you must not provide any assistance to other students during exams. Any instances of academic dishonesty WILL be pursued under the University and Eberly College of Science regulations concerning academic integrity. For more information on academic integrity, see Penn State's statement on plagiarism and academic dishonesty.

The Eberly College of Science Code of Mutual Respect and Cooperation embodies the values that we hope our faculty, staff, and students possess and will endorse to make The Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded.

Weather-related Disruption
In case of weather-related delays at the University, this online course will proceed as planned. Your instructor will inform you if there are any extenuating circumstances regarding content or activity due dates in the course due to weather delays. If you are affected by a weather-related emergency, then please contact your instructor at the earliest possible time to make special arrangements.

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