STA 4504: Categorical Data Analysis

Spring 2026

Instructor
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Class Information:

Classroom: AND 0134
Meeting Times: 3:00-3:50 MWF

Course Description:

STA 4504 will cover a wide range of analysis techniques used when dealing with categorical data. Course content includes description and inference for binomial and multinomial observations using proportions and odds ratios; multiway contingency tables; generalized linear models for discrete data; logistic regression for binary responses; multi-category logit models for nominal and ordinal responses; inference for matched pairs and correlated clustered data; and log-linear models.

Course Goals:

1. Be able to identify and analyze categorical variables.
2. Be able to calculate and interpret odds ratios and relative risks and associated inference procedures.
3. Be able to apply statistical tools to make inference about a single binomial proportion or two sample proportions.
4. Understand and be able to calculate the different goodness of fit statistics.
5. Understand and explain the properties of different measures of association by estimating various forms of measures of association from retrospective, cross-sectional and prospective studies.
6. Be able to analyze three-way tables.
7. Understand the fundamental importance of the logistic model

Required Course Materials:

Textbook: An Introduction to Categorical Data Analysis, 3rd Edition, Author(s): A. Agresti ISBN-13: 9781119405269

Scientific or Graphing Calculator: You will need a calculator capable of basic arithmetic operations and taking square roots will be needed for in-class exams. Internet-enabled electronic devices, such as cell phones or tablets, cannot be used as calculators during exams.

Web-enabled device: You will need some type of web-enabled device such as a laptop, smartphone, or tablet to use in-class to access Canvas as needed.

Computing software: Some assignments will require the use of computing software. We will be using the open-source statistical computing software, R.

Course Assignments:

Your final course grade will be based on a combination of homework assignments, a class project, and in-class exams. Due dates will be posted on the course schedule, on the Canvas course page and announced in class.

Grades

In total, there will be 3 exams, 6 homework assignments, and one class project. The corresponding weights are:

Assignment	Weight
Exam 1	20%
Exam 2	20%
Exam 3	20%
Class Project	20%
Homework	20%

Final grades will be based on the following scale:

Grade	Range
A	94-100
A-	90-93
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-73
D+	67-69
D	63-66
D-	60-63
E	0-59

Attendance and Make-Ups

Attendance is expected and will be essential for performing well in the class. There is however, no attendance grade. See university attendance policies here. Late homework will be graded with a 15% deduction per day late. More than 3 days late will receive a 0. Make-up exams and assignment extensions will be granted in extreme circumstances provided the instructor has been notified.

UF Grading Policies

https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Evaluations

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/.

Recordings

This class is 100% in-person, there will be no recordings of the lectures.

Dropping and Withdraw

For late course drops and course withdrawals check the catalog.

Incomplete

An incomplete grade may be assigned at the discretion of the instructor as an interim grade fora course in which the student has completed a major portion of the course with a passing grade,been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details please visit CLAS incomplete grade policy and contract.

Accommodating Students with Disabilities

Students requesting accommodation for disabilities must first register with the Disability Resource Center (DRC). The DRC will provide documentation to the students who must then provide this documentation to the instructor when requesting information. You must submit this documentation prior to submitting any assignments for which you are requesting accommodation.

U Matter, We Care

U Matter, We Care, through the Dean of Student's Office, offers care related resources and programsfocused on health, safety, and holistic well-being

If this document is updated, an announcement will be made in class, and the new version will be uploaded to the course website in canvas.

Weekly Course Outline

Here is a tentative weekly schedule for the class:

Week 1
- Introduction and review
- Probability distributions for categorical data

Week 2
- Inference:
  - Proportions
  - Discrete data
- Homework 1 due

Week 3
- Contingency tables
- Odds ratios
- Chi-squared test for independence
- Fisher's exact test

Week 4
- Association in three-way tables
- Review
- Exam 1
- Homework 2 due

Week 5
- Matrix algebra and linear regression
- Introduction to GLMs
  - Binary data
  - Count data

Week 6
- Fitting GLMs:
  - Maximum Likelihood Estimation
  - Newton's Method and Fisher Scoring
  - Bayesian Methods

Week 7
- Inference for GLMs
- Overdispersion in GLMs
- Model Checking for GLMs
- Homework 3 due

Week 8
- Review
- Exam 2

Week 9
- Logistic regression
  - Link functions
  - Inference
  - Multiple logistic regression
  - Categorical predictors
- Class project assigned

Week 10
- Spring Break

Week 11
- Model selection
- Model checking
- Homework 4 due

Week 12
- Baseline category logit models
  - Nominal data
  - Ordinal data
- Loglinear models
  - Connection to logistic regression
  - Inference

Week 13
- Models for matched pairs
  - McNemar test
  - GEEs
- Regularization for high dimensional categorical data
- Homework 5 due

Week 14
- Random effects models
- Nonparametric methods for categorical data
- Smoothing methods

Week 15
- Review
- Exam 3
- Final project due