

# STAT 517 Fall 2024 Class Schedule

Ray Bai

## Linear Regression and Generalized Linear Models (GLMs)

- 8/21/24: syllabus and course overview, review of R
- 8/23/24: review of simple linear regression, diagnostic plots
- 8/26/24: review of simple linear regression, multiple linear regression
- 8/28/24: review of multiple linear regression, model selection
- 8/30/24: discrete and continuous random variables, idea of maximum likelihood estimation
- 9/2/24: **Labor Day (no class)**
- 9/4/24: overview of generalized linear models (GLMs), fitting GLMs in R

## Models for Binary Response Variables

- 9/6/24: simple logistic regression, odds ratio
- 9/9/24: inference for simple logistic regression
- 9/11/24: multiple logistic regression, adjusted odds ratio
- 9/13/24: inference for multiple logistic regression
- 9/16/24: classification with logistic regression, confusion matrix
- 9/18/24: sensitivity, specificity, ROC curve
- 9/20/24: probit and complementary log-log regression

## Models for Multinomial Responses

- 9/23/24: multinomial data, multinomial logistic regression
- 9/25/24: inference for multinomial logistic regression
- 9/27/24: **Hurricane Helene (no class)**
- 9/30/24: multiclass classification with multinomial logistic regression
- 10/2/24: ordinal data, cumulative link models
- 10/4/24: continuation ratio model for ordinal data

## Models for Count Response Variables

- 10/7/24: count data, Poisson regression for modeling count data
- 10/9/24: Poisson regression for modeling rate data
- 10/11/24: overdispersion in count data, quasi-Poisson regression model
- 10/14/24: negative binomial regression model
- 10/16/24: zero-inflated data, zero-inflated Poisson (ZIP) model
- 10/18/24: **Fall break (no class)**
- 10/21/24: zero-inflated negative binomial (ZINB) model, summary of GLMs for independent data

## Random Effects and Mixed Effects Models

- 10/23/24: dependent and clustered data, random effects models
- 10/25/24: random effects models with interaction
- 10/28/24: mixed effects analysis of variance models
- 10/30/24: linear mixed effects models with covariates
- 11/1/24: mixed effects models with multivariate random effects
- 11/4/24: generalized linear mixed effects models (GLMMs)
- 11/6/24: mixed effects logistic regression and mixed effects count regression

## Nonparametric/Semiparametric Regression and Classification

- 11/8/24: motivation for nonparametric regression,  $K$ -fold cross-validation
- 11/11/24: kernel estimators for univariate functions
- 11/13/24: spline estimators for univariate functions
- 11/15/24: additive models for functions with multiple predictors
- 11/18/24: generalized additive models for noncontinuous responses
- 11/20/24: decision tree modeling, regression trees
- 11/22/24: tree pruning, variable importance in tree models
- 11/25/24: **Thanksgiving holiday (no class)**
- 11/27/24: **Thanksgiving holiday (no class)**
- 11/29/24: **Thanksgiving holiday (no class)**
- 12/2/24: classification trees
- 12/4/24: bagging, random forests
- 12/6/24: partial dependence plots, summary of statistical models