

# STAT 515 Spring 2025 Class Schedule

Ray Bai

## Basic Set Theory and Probability

- 1/13/25: syllabus and course overview, introduction to sets
- 1/15/25: basic set theory, basics of probability
- 1/17/25: basics of probability, counting rules
- 1/20/25: **Martin Luther King Jr. Day (no class)**
- 1/22/25: **university closed (no class)**
- 1/24/25: counting rules, conditional probability
- 1/27/25: independence, conditional independence, Bayes Theorem
- 1/29/25: Bayes Theorem, random variables

## Probability Distributions

- 1/31/25: probability distribution, expected value, and variance for discrete random variables
- 2/3/25: Bernoulli trials, binomial distribution
- 2/5/25: binomial distribution, Poisson distribution
- 2/7/25: continuous probability distributions, uniform and exponential distributions
- 2/10/25: normal distribution
- 2/12/25: calculating probabilities and quantiles with the normal distribution

*End of Exam 1 material*

## Sampling Distributions and Central Limit Theorem

- 2/14/25: random sample, sampling distributions
- 2/17/25: sampling distribution of the sample mean, Central Limit Theorem (CLT)
- 2/19/25: sampling distribution of the sample proportion, more examples of the CLT
- 2/21/25: Review for Exam 1
- 2/24/25: **Exam 1 (in class)**
- 2/26/25: checking normality in small samples, bootstrap to approximate sampling distributions

## Confidence Intervals for Means and Proportions

- 2/28/25: confidence interval for population mean (variance known)
- 3/3/25: confidence interval for population proportion
- 3/5/25: variance estimation, chi-square distribution, confidence interval for population variance
- 3/7/25: confidence interval for population mean (unknown variance),  $t$ -distribution
- 3/10/25: **Spring break (no class)**
- 3/12/25: **Spring break (no class)**
- 3/14/25: **Spring break (no class)**
- 3/17/25: confidence interval for population mean (unknown variance), bootstrap intervals
- 3/19/25: sample size calculations, margin of error

## Hypothesis Testing for Means and Proportions

- 3/21/25: hypothesis test for population mean (variance known), Type I and Type II errors
- 3/24/25: hypothesis test for population mean (variance unknown)
- 3/26/25: hypothesis test for population proportion, p-values
- 3/28/25: p-values

*End of Exam 2 material*

- 3/31/25: connections between testing and confidence intervals

## Two-Sample Inference

- 4/2/25: confidence interval and hypothesis test for difference of two independent means
- 4/4/25: review for Exam 2
- 4/7/25: **Exam 2 (in class)**
- 4/9/25: confidence interval and hypothesis test for difference of two proportions
- 4/11/25: confidence interval and hypothesis test for matched pairs

## One-Way ANOVA and Simple Linear Regression

- 4/14/25: comparative experiments, one-way ANOVA, checking assumptions for one-way ANOVA
- 4/16/25:  $F$ -distribution,  $F$ -test for one-way ANOVA
- 4/18/25:  $F$ -test for one-way ANOVA
- 4/21/25: Pearson's correlation coefficient, simple linear regression (SLR)
- 4/23/25: least squares estimation, checking assumptions for SLR
- 4/25/25: inference for the slope in SLR
- 4/28/25: review for final exam
- 5/5/25: **Final Exam from 12:30-2:30 pm**