

IEOR 4307 Applied statistical models in operations research

This course includes the following topics:

1. Descriptive statistics:
 - Describing data sets
 - Summarizing data sets
 - Paired data sets
 - Chebyshev's inequality
 - Markov inequality
2. Distribution of sampling statistics:
 - Sample mean
 - Sample variance
 - Central Limit Theorem
3. Parameter estimation:
 - Maximum likelihood estimators
 - Interval estimates
 - Estimating the difference between means of two normal populations
 - Approximate confidence interval for the mean of a Bernoulli random variable
4. Sufficient statistics:
 - Measuring the quality of estimators
 - A sufficient statistic for a parameter
 - Complete sufficient statistics
 - Rao-Blackwell Theorem
5. Hypothesis Tests:
 - Significance levels
 - Tests concerning the mean of a normal population
 - Testing the equality of means of two or more normal populations
 - Tests concerning the variance of a normal population
 - Hypothesis tests for Bernoulli populations
 - The Neyman-Pearson Lemma
6. Regression:
 - Least squares estimates for regression parameters
 - Distribution of estimators
 - Statistical inference for regression parameters
 - The coefficient of determination and correlation coefficient
 - Analysis of residuals
 - Weighted least squares
 - Polynomial regression
 - Multiple linear regression
 - Logistic regression
7. Goodness of fit and categorical data analysis
8. Other topics:
 - Associated random variables
 - Other material to be determined

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Text: Applied Statistics and Probability for Engineers, 6th edition, Montgomery and Runger

GRADING:

Homework: 10%

Examination 1: 25%

Examination 2: 25%

Final examination: 40%

Homework will be assigned weekly, and collected on Monday at the beginning of class.

No late homework will be accepted.

EXAMINATION SCHEDULE

Examination 1: Monday, February 24

Examination 2: Monday, March 31

Final examination (tentative): Monday, May 12, 9:00am-noon.

Part of the final examination will be a group project given in class.

Students should be aware of the IEOR Code of Academic Integrity. Cheating will not be allowed under any circumstance.