# CE 262
## ANALYSIS OF TRANSPORTATION DATA

*Professor Joan Walker*
*Department of Civil and Environmental Engineering & Center for Global Metropolitan Studies*
*111 McLaughlin Hall*
*JoanWalker@Berkeley.Edu*
*510 642 6897*

## COURSE OBJECTIVES

1. Provide instruction in probability and statistics for students requiring it
2. Strengthen and extend capabilities of all students to use probability and statistics to solve real-world transportation problems
3. Present wide range of transportation applications

## COURSE COVERAGE

1. Probability
2. Random Variables
3. Estimation
4. Hypothesis Testing
5. Data Analysis and Regression

## BOOKS

**L:** Larsen, R.J. and Morris L. Marx, <u>An Introduction to Mathematical Statistics and Its Applications, 5th Edition</u>, Prentice Hall, 2012.

**P**: Pindyck and Rubinfeld, Econometric Models and Economic Forecasts, 4th Edition, Irwin/McGraw-Hill, 1998.

# SCHEDULE

| | Class | Date | | Lecture | Reading | Assignment |
|---|---|---|---|---|---|---|
| | 1 | AUG | 29 | Introduction | L1 | |
| | 2 | SEP | 3 | Experiments, Sets, Probabilities | L2.1-2.3 | |
| | 3 | | 5 | Conditional Probability and Independence | L2.4-2.5 | PS1--Out |
| | 4 | | 10 | Combinatorics | L2.6 | |
| | 5 | | 12 | Combinatorial Probability | L2.7-2.8 | |
| | 6 | | 17 | Random Variables: Concept and Examples | L3.1-3.2 | |
| | 7 | | 19 | Discrete and Continuous Random Variables | L3.3-3.4 | PS1--Due/PS2--Out |
| | 8 | | 24 | Expected Value and Variance | L3.5-3.6 | |
| | 9 | | 26 | Joint Distributions, Functions of Random Variables | L3.7-3.8 | |
| | 10 | OCT | 1 | Functions of Random Variables, Conditional Distributions | L3.9,3.11 | |
| | 11 | | 3 | Poisson and Normal Distributions | L4.1-4.3 | PS2--Due |
| | 12 | | 8 | Other Special Distributions | L4.4-4.6 | |
| | 13 | | 10 | Estimation Methods | L5.1-5.2 | PS3--Out |
| | 14 | | 15 | Interval Estimation and Estimation Efficiency | L5.3-5.5 | |
| | 15 | | 17 | Other Properties of Estimators, Bayesian Estimation | L5.6-5.8 | |
| | 16 | | 22 | **Midterm Exam** | | |
| | 17 | | 24 | Hypothesis Testing | L6.1-6.3 | |
| | 18 | | 29 | Hypothesis Testing | L6.4-6.5 | PS3--Due |
| | 19 | | 31 | Normal Distribution | L8 | PS4--Out |
| | 20 | NOV | 5 | Two-Sample Problems | L9.1-9.5 | |
| | 21 | | 7 | Goodness of Fit Tests | L10 | |
| | 22 | | 12 | Single Variable Regression | L11.1-11.3 | |
| | 23 | | 14 | Covariance and Correlation | L11.4-11.6 | PS4--Due/PS5--Out |
| | 24 | | 19 | Analysis of Variance | L12 | |
| | 25 | | 21 | Multiple Regression | P4-5 | |
| | 26 | | 26 | Serial Correlation and Heteroscedasticity | | |
| | 27 | | 28 | **THANKSGIVING** | P6 | |
| | 28 | DEC | 3 | Non-Linear Regression | P10 | PS5--Due |
| | 29 | | 5 | Discrete Choice Models | P11 | |
| | 30 | | 10 | **Reading/Review/Recitation Week** | | |
| | 31 | | 12 | **Reading/Review/Recitation Week** | | |
| | F | | 20 | **FINAL EXAM (8-11 AM)** | | |

_Probability_ (rows 1–5), _Random Variables_ (rows 6–12), _Estimation and Statistical Inference_ (rows 13–31)

## COURSE REQUIREMENTS AND GRADING

- Reading
- 5 Problem sets (40%)
- In-class midterm on Tuesday October 22 (20%)
- Final exam on Friday December 20 from 8-11 AM (40%)

## COURSE WEBSITE

bspace.berkeley.edu

## ACADEMIC INTEGRITY

From the *Berkeley Campus Code of Student Conduct*:
(http://sa.berkeley.edu/code-of-conduct)

> "The Chancellor may impose discipline for the commission or attempted commission (including aiding or abetting in the commission or attempted commission) of the following types of violations by students…, as well as such other violations as may be specified in campus regulations:

> 102.01 Academic Misconduct: All forms of academic misconduct including but not limited to cheating, fabrication, plagiarism, or facilitating academic dishonesty."

For this course, instances of academic dishonesty include, and are not limited to, the following:

> Homework: You may discuss problems together, but all written work must be original. Copying of solutions IS NOT acceptable.

> Exams: Open book, note, and computer. No use of the internet. No discussion, collaboration, or copying.