MATH 254 Applied Probability & Statistics

Your instructor Chi-Ming Leung
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Course Description

Topics: data, central tendency, random variables, hypothesis testing, p-values, confidence intervals, the binomial, hypergeometric, Poisson, normal, Chi-square and student's t distributions, linear regression, contingency tables.

Offered: Quarter 4
Credit: 3
In-Class Workload: 4 hours
Out-of-Class Workload: 3-6 hours

Prerequisites: Open to ENGBRIDGE students

Textbook

Jay L. Devore, *Probability and Statistics for Engineering and the Sciences*, 5th Edition.

Evaluation

Assignments: 10% of Final Mark

Assignment is given weekly, it is due on Thursday. No late assignement is accepted. Solutions should be presented in a neat and clear fashion and the paper should be well organized and stapled at the top left cornner if there is more than one page. Complete solutions will be posted.

Tests: 40% of Final Mark
There will be 2 midterm tests. There is **NO** makeup (medical excuse must be accompanied by a physician's note). Complete solutions will be posted.

Final Examination: 50% of Final Mark

The following percentage conversion to letter grade will be used:

0-49	50-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
F	D	C	C+	B-	B	B+	A-	A	A+

Mathlab

Extra help available from assistant at the Interurban Math Lab: TB 142

Outline

1. **Overview and Descriptive Statistics**
    - Populations, Samples, and Process (1.1)
    - Pictorial and Tabular Methods in Descriptive Statistics (1.2)
    - Measures of Location (1.3)
    - Measures of Variability (1.4)

2. **Probability**
    - Sample Spaces and Events (2.1)
    - Axioms, Interpretations, and Properties of Probability (2.2)
    - Counting Techniques (2.3)
    - Conditional Probability (2.4)
    - Independence (2.5)

3. **Discrete Random Variables and Probability Distributions**
    - Random Variables (3.1)
    - Probability Distributions for Discrete Random Variables(3.2)
    - Expected Values of Discrete Random Variables (3.3)
    - The Binomial Probability Distribution (3.4)
    - Hypergeometric and Negative Binomial Distributions (3.5)
    - The Poisson Probability Distribution (3.6)

4. **Continuous Random Variables and Probability Distributions**
    - Continuous Random Variables and Probability Density Functions (4.1)
    - Cumulative Distribution Functions and Expected Values (4.2)
    - The Normal Distribution (4.3)
    - The Gamma Distribution and its Relatives (4.4)

5. **Joint Probability Distributions and Random Samples**
    - Statistics and Their Distributions (5.3)
    - The Distribution of Sample Mean (5.4)

6. **Point Estimation**
    - Some General Concepts of Point Estimation (6.1)
    - Methods of Point Estimation (6.2)

7. **Statistical Intervals Based on a Single Sample**
    - Basic Properties of Confidence Intervals (7.1)
    - Large-Sample Confidence Intervals for a Population Mean and Proportion (7.2)
    - Intervals Based on a Normal Population Distribution (7.3)
    - Confidence Intervals for the Variance and Standard Deviation of a Normal Population (7.4)

8. **Tests of Hypotheses Based on a Single Sample**
    - Hypotheses and Test Procedures (8.1)
    - Tests About a Population Mean (8.2)
    - Tests Concerning a Population Proportion (8.3)
    - p-Values (8.4)

9. **Inferences Based on Two Samples**
- Z Tests and Confidence Intervals for a Difference Between Two Population Means (9.1)
- The Two- Sample t Test and Confidence Interval (9.2)
- Analysis of Paired Data (9.3)
- Inferences Concerning a Difference Between Population Proportions (9.4)

12. **Simple Linear Regression and Correlation**
- The Simple Linear Regression Model (12.1)
- Estimations Model Parameters (12.2)
- Correlation (12.5)

14. **The Analysis of Categorical Data**
- Goodness-of-Fit Tests When Category Probabilities Are Completely Specified (14.1)
- Goodness of Fit for Composite Hypotheses (14.2)
- Two-Way Contingency Tables (14.3)

Lecture: 42 hours   Test: 4 hours   Leeway: 2 hours   Total: 48 hours

Office Hours

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
9:30 - 10:20					
10:30 - 11:20				Office Hour	
11:30 - 12:20				Office Hour	
12:30 - 1:20					
1:30 - 2:20				**Math 254(1) CBA 101**	Office Hour
2:30 - 3:20	Office Hour	**Math 254(1) CBA 101**	**Math 254(1) CBA 101**	**Math 254(1) CBA 101**	Office Hour
3:30 - 4:20	Math 254(2) TEC 177	Math 254(2) TEC 177	Math 254(2) TEC 177	Math 254(2) TEC 177	**Math 251 TEC 177**
4:30 – 5:20	**Math 251 TEC 177**	**Math 251 TEC 177**	**Math 251 TEC 177**	**Math 251 TEC 177**	**Math 251 TEC 177**

Extra office hours can be arranged by appointment.