

ISE 305 – Engineering Statistics I

Winter 2005

Course: ISE 305 – Engineering Statistics I - 4 credit hours
ISE 505 – Engineering Statistics I - 3 credit hours

Call number: 03978
Call number: 03998

Catalog description: Introduction to probability, concept of random variables, discrete and continuous probability distributions, and expectation

Sessions: Monday-Tuesday-Wednesday-Thursday 9:10-10:00, 192 Stocker

Instructor: Dale Masel *masel@ohio.edu*

273 Stocker Center, 593-1541

Office hours: Tuesday/Thursday 3:00-4:30
Wednesday 10:00-11:30

Textbook: Applied Probability and Statistics for Engineers, (3rd Edition), Montgomery and Runger, Wiley, 2003

Course objectives:

The laws of probability and probability distributions allow us to calculate the expected outcome in a given situation as well as the likelihood of all the possible outcomes. Based on the probabilities of the different outcomes, we can make decisions about what course of action we should take.

Probability can also be used to make decisions about a population by taking a sample from the population. Based on the mean and variance of the sample, information about the population can be estimated. This application of probability is statistics.

Course outcomes:

- Calculate the mean and variance of a sample data set.
- Apply the concepts of sample spaces for statistical experiments.
- Determine the permutations and combinations of a sample space and probabilities.
- Assess conditional probabilities for independent and dependent events.
- Differentiate between discrete and continuous sample space.
- Use probability functions and cumulative distributions for discrete and continuous single and joint variables $\{f(x)$ and $f(x,y)\}$
- Determine expected values from probability functions.
- Determine variance and covariance from probability functions.
- Determine the expected values and variation from combinations of independent random variables.
- Describe the parameters and application of common discrete probability distributions including:
 - Uniform
 - Binomial
 - Multinomial
 - Hypergeometric
 - Negative binomial
 - Geometric
 - Poisson
- Describe the parameters and application of common continuous probability distributions including:
 - Uniform
 - Normal
 - Exponential
 - Gamma
 - Chi-squared
 - Weibull
- Explain the concepts of random sampling.
- Describe an unknown population from a random sample.
- Determine the best sample measure of central tendency for a sample from a known population distribution.
- Estimate population variation from a random sample.
- Utilize sampling distribution tables to estimate population parameters with confidence.

Computer usage:

Microsoft Excel will be used for data analysis. A familiarity with data analysis and plotting is expected. Functions available for statistical calculations will be demonstrated and explained.

Grading policy:

Assignments:

• Homework assignments (~1 per week).....	25%
• Quizzes (each Friday, lowest one dropped).....	10%
• Midterm (open book) in class on Thursday, January 20.....	20%
• Midterm (open book) in class on Tuesday, February 15.....	20%
• The final exam (open book) will be Monday, March 14, at 10:10 a.m.....	25%
	100%

<u>Grading Scale:</u>	A	90-100%	D	60-69.5%
	B	80-89.5%	F	0-59.5%
	C	70-79.5%		

Attendance policy:

Attendance will not be taken for lecture classes, but students are expected to be present for all class periods. Make-up quizzes will not be given in any circumstances. Make-up tests will only be given in exceptional cases if prior arrangements are made.

Academic misconduct:

Cheating will not be tolerated. If you copy from another person, plagiarize, turn in someone else's work as your own, or otherwise fail to maintain a high standard of academic honesty, you will receive a 0 on the assignment and the case will immediately be referred to the university judiciary office.

Tentative schedule:

Week	Week of	Topic(s)	Chapter(s)
1	Jan. 3	Intro to Probability; Probability Rules; Random Variables	1-3
2	Jan. 10	Discrete Probability Distributions; Mean and Variance	3
3	Jan. 17	Discrete Probability Distributions; Midterm 1	3
4	Jan. 24	Continuous Probability Distributions; Mean and Variance	4
5	Jan. 31	Normal Distribution; Other Continuous Distributions	4
6	Feb. 7	Joint Discrete and Continuous Distributions; Covariance	5
7	Feb. 14	Midterm 2 ; Random Sampling; Displaying Sampled Data	6
8	Feb. 21	Displays for Sampled Data; Point Estimates	6-7
9	Feb. 28	Variance; Standard Error; Sampling Distributions	7
10	Mar. 7	Confidence Intervals for Mean and Variance	8