ISE 316/516: Engineering Probability
Spring 2008-09
Monday, Tuesday, Wednesday, and Thursday 8:10 a.m.-9:00 a.m. Stocker 194

ISE 316: 4 credit hours, call number 04053
ISE 516: 3 credit hours, call number 04072

Course Description:
This course introduces students to probability theory and applications in engineering, particularly industrial and systems engineering. Significant discrete and continuous probability distributions, generation of random number on computers, Monte Carlo simulation and queuing models will be covered.

Instructor:
Dr. Tao Yuan
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Office hours: 9:00 am – 10:00 am M, T, W, R or by appointment
Course webpage: http://bb7pilot.ohio.edu/

Textbook:
James J. Higgins and Sallie Keller-McNulty, "*Concepts in Probability and Stochastic Modeling*," Duxbury Press.

Course outcomes:

Upon the completion of this course, students will be able to:

1. Use probability functions and cumulative distributions for discrete and continuous single and joint variables {f(x) and f(x,y)}
2. Determine variance and covariance from probability functions
3. Determine the expected values and variation from combinations of independent random variables
4. Describe the parameters and the application of common discrete probability distributions including: Multinomial, Hypergeometric, Negative binomial, Geometric, Poisson
5. Describe the parameters and the application of common continuous probability distributions including: Triangular, Gamma, Exponential, Chi-square, Weibull
6. Test sample data against a hypothesized distribution using a χ^2 goodness-of-fit test
7. Describe random number generation methods
8. Apply random number generation for IE models in spreadsheet software
9. Describe Monte Carlo method for decision making
10. Apply Monte Carlo simulation for decision making
11. Apply Monte Carlo simulation in risk analysis
12. Develop Markov chain model for industrial processes
13. Develop Markov chain model for decisions
14. Apply queuing model equations to estimate performance of industrial processes

Course outline:
1. Basic probability
2. Random variables
3. Common probability distributions
4. Sampling and simulation
5. Markov chain and queuing models

Homework:
Homework problems will be assigned typically once a week. No late turn-in is accepted. Each student is expected to solve and submit problems individually. Students using the work of others without giving credit (plagiarism) will receive a failing grade in the course.

Exams:
You will have two midterm exams and a final exam (comprehensive). Midterm exams will be announced at least one week in advance. A student who misses an exam may make it up if prior permission is obtained from the instructor.

Grading:

Homework and quiz	20%
Two mid-term exams	50%
Final exam	25%
Attendance	5%

Grading scale:

A	>=93%	A-	90~<93%		
B+	87~<90%	B	83~<87%	B-	80~<83%
C+	77~<80%	C	73~<77%	C-	70~<73%
D+	67~<70%	D	63~<67%	D-	60~<63%
F	<60%				

Attendance policy:
Class attendance is mandatory. I will take attendance each class. At most five unexcused absences are allowed for each student. Student who missed more than 15 classes will receive a failing grade.

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