

CENTRAL WASHINGTON UNIVERSITY
Mathematics 411A, Introduction to Probability
Fall, 2009

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OVERVIEW OF COURSE

OVERALL COURSE OBJECTIVES:

The major objectives of this course are to help students:

1. Gain the knowledge and ability to work with probability, conditional probability, random variables, density and distribution functions, and expectation.
2. Learn to formulate and solve probability related problems.

Student Outcomes:

At the conclusion of this course, the student will be able to:

1. Solve basic "counting" problems.
2. Understand and apply the axiomatic approach to probability theory.
3. Understand independence, find conditional and unconditional probabilities and apply Bayes' Theorem.
4. Apply all the standard discrete and continuous probability distributions.
5. Understand and calculate mathematical expectations for random variables and functions of random variables.

COURSE MATERIALS REQUIRED:

Irwin Miller and Marylees Miller, John E. Freund's Mathematical Statistics with Applications, 7th Edition (Prentice-Hall), 2004. Chapters 1-5 will be covered.

Advance reading of the problems and text material is essential to good performance in this course. This textbook is particularly easy to read, and that is the main reason for its choice. There are a number of difficult topics, however, and I will supplement the material with handouts, discussions, and examples. The course is demanding---far more so than Math 311, for example. Advice from previous students is: "If you want to do well, *go to class every day, study your notes, and do not fall behind.*"

COURSE POINTS:

Worksheets	50 points
Chapter Hw	50 points
Chapter Tests (Four)	400 points
Final Exam	100 points
Total	600 points

The final exam is cumulative.

Text Problems Assigned:

Chapter 1: 1, 11, 14, 15, 16, 19, 25-27, 32-34, 41-45, 48, 51, 55-57

Chapter 2: 2, 6-9, 13, 24-26, 32, 35, 37, 48, 50, 52, 54, 57, 60, 61, 68, 76, 89, 90, 94, 96, 99, 100, 104-108, 109, 112

Chapter 3: 1-5, 11-13, 16-24, 26-35, 37, 38, 41-45, 47-51, 53-55, 58, 68-71, 74-77, 83-86, 91-96, 98, 100, 101, 107-109

Chapter 4: 6, 8, 10, 11, 17, 18, 20, 22-24, 33-35, 40-47, 50, 52, 53, 60, 61, 63-65, 69, 73, 76-78, 83

(Preview) Chapter 5: 1, 2, 6, 10, 14, 20, 21, 23, 38-45, 51-55, 57-61, 63, 64, 66, 68, 73-75, 77, 83-85, 87

LEVEL OF AWARENESS ISSUES INCORPORATED IN THIS COURSE:

AWARENESS ISSUE	-----ACTIVITY LEVEL-----			
	NONE	LOW	MODERATE	HIGH
Graphical Data Display		*		
Data/Information Sources		*		
Interpret Information				*
Mathematical Proof		*		
Probability Principles				*
Solving Problems				*

SCHEDULE OF CLASS TOPICS AND ASSIGNMENTS

A tentative list of timing of topic coverage and chapter tests is presented below. Due to the intensive nature of the course, and possible variability in student backgrounds and learning process, we may deviate from this schedule. Please pay attention to the announcements.

<u>Week</u>	<u>Section</u>	<u>Topic</u>
1 Sept.23 --Sept.25	1.1~1.4	(Introduction) <ul style="list-style-type: none"> • Combinatorial Methods • Binomial Coefficients
2 Sept. 28 --Oct.2	2.1~2.6	(Probability) <ul style="list-style-type: none"> • Sample Spaces • Events • Probability of An Event • Rules of Probability • Conditional Probability
3 Oct.5 --Oct.9	2.7-2.9	<ul style="list-style-type: none"> • Independent Events • Bayes' Theorem.

Oct. 10	Chapter Test 1
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4 Oct.12 --Oct.16	3.1~3.4	(Probability Distributions) <ul style="list-style-type: none"> • Probability Distributions • Continuous Random Variables • Probability Density Functions
5 Oct. 19 --Oct.23	3.5~3.6	(Probability Densities) <ul style="list-style-type: none"> • Multivariate Distributions • Marginal Distributions

6
 Oct. 26 3.7~3.8
 --Oct.30 • Conditional Distributions

Oct. 29	Chapter Test 2
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7
 Nov.2 4.1~4.5 **(Mathematical Expectation)**
 --Nov.6 • Expected Value of a Random Variable
 • Moments
 • Chebyshev's theorem
 • Moment Generating Functions

8
 Nov.9 4.6~4.9
 --Nov.13 • Product Moments
 • Moments of Linear Combinations of Random Variables
 • Conditional Expectations

9
 Nov.16
 --Nov.20

Nov. 19	Chapter Test 3
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THANKSGIVING!!!

10
 Nov. 23 5.1~5.7 **(Special Probability Distributions)**
 --Nov.27 • Discrete Uniform Distribution
 • Bernoulli Distribution
 • Binomial Distribution
 • Negative Binomial and Geometric Distributions
 • Hypergeometric Distribution

11
 Nov.30 5.8~5.10
 --Dec.4 • Poisson Distribution
 • Multinomial Distribution

Dec. 4

Chapter Test 4

12
Dec.7
--Dec.11

FINAL EXAM!!

TEST POLICY

Because of the timely nature of the tests, no make-ups will be given. A grade of zero will be assigned unless you contact me **before** the scheduled time and provide an acceptable excuse. A weighted average of your score on the remaining tests will be used for the missing score. Final examination policy is as established by the Dean of Students.

HOMEWORK POLICY

Homework will be assigned and collected. Working on exercises and homework is the only way most of us learn to critically analyze and “solve” problems.

Some class time will be devoted to questions on the exercises and homework. Office hours are also scheduled to provide opportunities for more in-depth discussion of homework problems.

Your homework must be well **stapled** and written/printed on **flat papers**. Failing to do any one of the above will result in losing homework points.

No late homework will be accepted once it's graded and returned to the class.

IMPORTANT NOTE

If you have a severe respiratory or influenza-like illness (ILI) (high fever, aches, chills, cough) you should not come to class until you are without fever for 24 hours without the aid of fever-reducing medication. If your absences are related to a severe respiratory or flu-like illness, you will be given the opportunity to make up your assignments and class content without penalty. It is YOUR responsibility to notify your instructor, **in advance**, when absent due to H1N1. Faculty is under no obligation to excuse class absences **related to sickness**. If you are pregnant, work with your instructor to prevent exposure to H1N1. You should utilize the following precautions to prevent H1N1 exposure: 1) Frequent hand washing and carry a bottle of alcohol-based hand sanitizer with you at all times. 2) Cough etiquette (grab your shoulder and cough into your elbow). 3) Place used tissues immediately in the trash, followed by washing your hands. 4) Use CDC-approved disinfectants on shared surfaces such as doorknobs, desks, etc. 4) **Stay home if you have a severe respiratory or flu-like illness**. If you are concerned you may have H1N1, notify student health.

Plan for potential absences and assure you have access to the Internet to send me e-mail (Chueh@cwu.edu) and my webpage (<http://www.cwu.edu/~chueh>) for assignments.

Regardless of your H1N1 flu status, you MUST complete the requirements of the course to receive a passing grade.

Please check the CWU H1N1 Web page located on CWU's homepage or at www.cwu.edu/~police/emergency/h1n1.html for more information.