CENTRAL WASHINGTON UNIVERSITY
Mathematics 411C, Mathematical Statistics II
Spring, 2019

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OVERVIEW OF COURSE

OVERALL COURSE OBJECTIVES:

The major objectives of this course are to help students apply probability densities, sampling

distributions, and statistical theorems and techniques to solve applied problems.

Student Outcomes:
Students will gain an understanding of the relation between probability and mathematical statistics, and
will study the most important probability distributions, learning the situations in which they arise.
Students will be able to find the distribution of functions of random variables and will learn the basic
statistical distributions that are derived from the normal distribution. They will be able to find the
distribution of order statistics such as the sample minimum, sample maximum and the i-th order
statistic. Students will also learn how to set confidence intervals on unknown parameters, and will also
learn methods of statistical estimation, including least squares, method-of-moments, and maximum
likelihood.

COURSE MATERIALS REQUIRED:

Probability and Statistical Inference. 9th Edition. Hogg|Tanis|Zimmerman. Published by

Pearson.

Course Pack from the bookstore.

Reference book: John Freund's Mathematical Statistics by Miller & Miller.

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 and fast paced---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:

Attendance and Class Participation	30 points
Worksheets/Homework	120 points
Quizzes	50 points
Two Tests	200 points
Final Exam	100 points
Total	500 points

The final exam is cumulative.

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				*

Final grades will be assigned according to the following scale:

A 100-93%   **A-** 92.9-90%
B+ 89.9-87%   **B** 86.9-83%   **B-** 82.9-80%
C+ 79.9-77%   **C** 76.9-73%   **C-** 72.9-70%
D+ 69.9-67%   **D** 66.9-63%   **D-** 62.9-60%
F 59.9% and below

Class Expectations

- ***Think critically***. This course will require critical thinking. People that analyze, infer, evaluate, and make reasoned judgments do better in college and career, make better daily decisions, and have greater professional success. Developing critical thinking and reasoning should be a key goal of every student.

- ***Apply yourself.*** This course will take a lot of time and energy. You should have high learning expectations and challenge yourself. Success in this course will require significant effort (several hours of study time for each hour of class). Depending on your mathematical background, you may need to spend more or less study time. Attend class regularly, be on time, and budget your time to accommodate the workload.

- ***Ask questions***. Loss Modeling is fascinating, but it can be confusing sometimes, too. Ask questions. If you aren't clear on something, there are likely others who are equally unclear on the specific detail or area. Asking questions also help your peers and the instructor deliver/facilitate effective lessons.

- ***Be informed***. People sometimes use information to manipulate others' behaviors and decision-making in ways not always to your benefit. If you don't understand the mathematical basis of a claim about data, you can't make an informed decision about it. Be curious; try and find out all you can about a topic before you make a decision that may profoundly affect your life and career.

- ***Communicate clearly***. Effective written and oral communication of difficult concepts and techniques indicates an intelligent mind and true understanding. Clarity, proper format, spelling, and grammar are expected of every student.

- ***Use common sense***. Cheating on assignments or exams, plagiarizing others' work, and turning in late assignments is unacceptable. Any infractions may result in a zero for the assignment, a failing course grade, and the possibility of disciplinary action by the university. I won't accept *anything* late unless you have written documentation from an appropriate source or have made prior arrangements with me. If you have a problem that prohibits you from turning something in on time, let me know ahead of time. In all instances, communicate with me so we can prevent future problems.

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.

SCHEDULE OF CLASS TOPICS AND ASSIGMENTS

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.

Week	Section Reading Assignment	Topic
1 Mar 26~29	6.1~6.3	**(Point Estimation)** • Descriptive Statistics • Exploratory Data Analysis • Order Statistics
2 Apr 1~5	6.4~6.6 (6.5 &6.6 optional)	• Maximum Likelihood Estimation • Simple Regression (optional) • Asymptotic Distribution of MLE (optional)
3 Apr 8~12	6.7~6.8	• Sufficient Statistics • Bayesian Estimation
4 Apr 15~19		Review and Problem Solving

April 19	**Test 1**

Week	Section Reading Assignment	Topic
5 Apr 22~26	7.1~7.4	**(Interval Estimation)** • Confidence Intervals for Means • Conditional Intervals for the Difference of Two Means • Confidence Intervals for Proportions • Sample Size
6 Apr 29~May 3	8.1~8.3	**(Tests of Statistical Hypotheses)** • Tests About One Mean • Test of Equality of Two Means • Test About Proportions
7		

| May 6~10 | 8.4~8.6 | • The Wilcoxon Tests
• Power of a Statistical Test
• Best Critical Regions |

8
| May 13~17 | 8.7 | • Likelihood Ratio Tests

Review and Problem Solving |

9
May 20~24

| **May 20** | | **Test 2** |

• Chi-Square Goodness-of-fit Tests

10
| May 27~31 | | Review and Problem Solving |

11
| **June 3~7** | | ***FINAL EXAM!!*** |