CENTRAL WASHINGTON UNIVERSITY
Mathematics 311—Statistical Concepts and Methods

MTWR 11-11:50 BU210
F 11-11:50 BU103

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OVERVIEW OF COURSE

PURPOSES OF MATHEMATICS 311:
This course is designed to acquaint you with the basic notions of descriptive and inferential statistics and *especially* to make you a more intelligent consumer and appraiser of statistics rather than someone who simply plugs numbers into formulas. This is important, as most people will have far more exposure to other peoples' uses (and misuses) of statistics than they will have to their own. Successful completion of this course will by no means make you a statistician, but *you will know more about statistics than 98% of the general public.* Because Finite Mathematics is now a prerequisite for Math 311, it is assumed that you have a basic knowledge of elementary probability. When we use probability in Math 311, we will not spend much time on these areas that are presumed known. If you did not take Finite Mathematics here at CWU, or do not have a reasonable feel for elementary probability, you will be at a disadvantage.

STUDENT OUTCOMES:

Students will gain an understanding of statistical principles and their uses. They will learn how to collect and effectively present data, examine data for patterns and relationships, and analyze data to draw conclusions. They will learn to interpret and judge statistical information in the world around them, and to critically appraise statistical arguments encountered in the media.

TEXT:

Elementary Statistics-Looking at the big pictures, by Nancy Pffenning, Brooks/Cole Cengage learning. This book is new and stresses the basic situations—single categorical, single quantitative variable, relationships among them, as a framework to understand statistical thinking and interpreting the real world. The *big picture approach: 1. Data Production 2. Displaying and Summarizing 3. Understanding Probability 4. Using Probability to perform Statistical inference as the* four basic processes has played a main role in this book. ***Advance reading of the problems and text material is essential to good performance in this course.*** Calculators with statistical functions are required. TI83 plus and statistical software MINITAB will be used for demonstration.

COMPUTER:

We will use MINITAB extensively. Even with no prior computer experience, you will find MINITAB fun, and especially easy to use. The latest, full-blown version of MINITAB is on PCs in the Computer Lab in Bouillon 103. Additionally, Microsoft Office software in campus labs will allow you to integrate your statistical work and graphics from Minitab with text and to produce high-quality, professional-looking documents, a skill of importance in other courses as well as the workplace. Only the Bouillon lab has MINITAB, so your statistical work should be done there. **Note:** Many of you have Microsoft Excel, which does have extensive statistical capabilities, and you may choose to explore these. MINITAB, however, is a superior program for statistics, and if you will ever use statistics on the job (and many of you will), it will be worth your while to learn MINITAB.

MATERIAL TO BE COVERED:

We will cover much of the material in Chapters 1-14, skipping charters 6, 12, 13. Exercise problems from the book are shown below. In addition, there will be several handouts/worksheets given in class. I will *not collect Exercise Problems* but I will collect *assigned homework.* You should, however, work these exercise problems in order to succeed in the course. We will discuss *only a few* of the book problems in class. ***The best possible indication of exam-type problems is given by class examples, worksheets assigned, and textbook exercises*.**

EXERCISES TO BE WORKED:

Chapter	Problems to be Worked
1	1-30 all odd numbers
2	1-28 all odd numbers
3	1-65 all odd numbers
4	1-62 all odd numbers
5	1-69 all odd numbers
7	1-69 all odd numbers
8	1-64 all odd numbers
9	1-67 all odd numbers
10	1-62 all odd numbers
11	1-79 all odd numbers
14	1-50 all odd numbers

LEVEL OF AWARENESS ISSUES INCORPORATED IN THIS COURSE:

AWARENESS ISSUE	**----------ACTIVITY LEVEL----------**			
	NONE	LOW	MODERATE	HIGH
Graphical Data Display				*

Numerical Data Summary			*
Data/Information Sources	*		
Interpret Information			*
Measurement Challenges		*	
Probability Principles		*	
Statistical Inferences			*
Personal Work Quality Goals			*

ATTENDANCE:

To achieve success in *any* mathematics class, **regular attendance is almost imperative**. Unlike most subjects, new topics in statistics build on previous knowledge; failure to learn something early may haunt you throughout the course. We will do work in groups, so if you missed a class you missed group credit

IF YOU MISS CLASS, IT IS YOUR RESPONSIBILITY TO FIND OUT THE MATERIAL COVERED, ANNOUNCED, ASSIGNED, CLASS NOTES, AND TO ARRANGE TO PICK UP ANY ASSIGNMENTS THAT MAY BE HANDED OUT OR RETURNED!

TESTING AND GRADING:

There will be three 100-point exams, and a 150-point final exam (Given *as scheduled* in the current Class Schedule). Except in *extraordinarily rare* circumstances, you will *not* have an opportunity to make up a missed exam. An exception: If you are on an athletic team and on the road during an exam, you will be allowed to make up that exam. Similar activities involving recognized school functions also qualify. Check with me if in doubt. *Tentative* dates for the exams are listed on this document. *You will always have a minimum of five-calendar days notice prior to an exam.* Your homework and in-class minitab projects are counted for 150 points. Collaboration on homework is permitted, but copying is not. Identical homework will not be accepted.

COURSE POINTS:

Announced Homework	150 points
Mid-Term Exams (Three)	300 points
Final Exam	150 points
Total	600 points

The final exam is cumulative.

Average: 100-93 92-90 89-87 86-83 82-80 79-77 76-73 72-70

69-67 66-63 62-60 Below 60

Grade: A A- B+ B B- C+ C C-

D+ D D- F

HOMEWORK/PROJECT POLICY

Homework and project will be assigned in class and the due date will be announced. Working on homework and project is the only way most of us learn to critically analyze and ``solve" problems.

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

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

No late homework or project will be accepted unless you contact me before the due time and provide an acceptable reason.

EXAM POLICY

Because of the timely nature of the exams, no make-ups will be given. For mid-term exam, 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 scores on the remaining exams will be used for the missing score. Final examination policy is as established by the Dean of Students.

WITHDRAWAL

By University policy, you may withdraw by May 12, 2009, by which time you will have a good idea as to how well you are progressing. After this date, however, you must petition the Dean of Admissions for withdrawal. Such withdrawals are granted only in compelling circumstances. (The prospect of receiving a poor grade is not a "compelling circumstance!")

INCOMPLETES:

An "I" is appropriate *only* if you have finished almost all of the course requirements, and have a good chance of completing the course without re-enrolling. (Example: missing the final exam due to illness.) The course must be completed within a year; otherwise, the "I" reverts to an "F."

SCHEDULE OF CLASS TOPICS AND ASSIGMENTS

A tentative list of timing of topic coverage and exams is presented below. Due to the intensive nature of the course, and variability in student backgrounds and interest, we may deviate from this schedule.

Week **Chapters** **Topic**

1 March 30- April 2	1, 2	**(Variables and Processes)** • Types of variables • Roles of variables • Statistics as a four-stage process **(Sampling: which individuals are studied?)** • Sources of bias • Sampling plans, size • From sample to population
2 April 5-9	3, 4	**(Design)** • Observational versus experiments • Surveys • Experimental designs **(Displaying and summarize data)** • Single categorical variable • Single quantitative variable • Center and spread • Normal Distributions
3 April 12-16	5	• Relationships between one C and one Q • Relationships between two C's • Relationships between two Q's • Regression and Correlation
4 April 19-23		***Exam 1!***
5 April 26-30	7, 8	(Random variables and their probability distributions) • Discrete Distributions • Binomial distributions • Continuous distributions and normal distributions (Sampling distributions) • Sample proportion as a random variable • Sample mean as a random variable • Central limit theorem (CLT)
6 May 3-7	9	**(Inference for a single C variable)** • Confidence interval • Hypothesis test

7 May 10-14		***Exam 2!***
8 May 17-21	10	**(Inference for a single Q variable)** • Normal population with standard deviation known • Large sample applying CLT • Small normal population with unknown std dev
9 May 24-28	11	**(Relationships between two C's and two Q's)** • Pair design t • Two-sample design t • Two-sample design Z
10 May 31 June 4		***Exam 3!***
11 June 7-11		Final exam week

Final Exam date will be according to the university schedule.