

Mathematics 311—Statistical Concepts and Methods

MTWR 9-9:50 Black137

F 9-9:50 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:

1. *Discovering Statistics*, by James S. Hawkes and Williman H. Marsh. ***Reading in advance of the text material is essential to good performance in this course.*** Calculators with statistical functions are required. TI83 or 84 and statistical software MINITAB will be explored and used extensively.
2. *Course pack with lecture notes*, by Chueh, available at CWU Wildcat shop (book store).

COMPUTER:

We will use MINITAB extensively. 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 1-12. There will be homework assigned. In addition, there will be several worksheets or labs to turn in from your course pack. I will *not collect Exercise Problems* but I will grade *Assigned Homework*. You should, however, work these exercise problems in order to succeed in the

course. *The best possible indication of our test problems is given by class examples, worksheets and labs, as well as sample questions in the course pack.*

EXERCISES TO BE WORKED:

Chapter	Exercises to be Worked
1	1, 3, 5 page 15-16
2	1, 3, 5 page 54-56; 1, 3, 5, 7 page 56-57
3	1-13 (odd) page 99-105; 1-9 (odd) page 106-109
4	1-13 (odd) page 163-166; 1-9 (odd) page 166-168; 1-11(odd) page 169-171; 1-9 (odd) page 171-174; 1-5 (odd) page 174-175
5	All odd page 220-231
6	All odd page 270-279
7	All odd page 314-322
8	All odd page 362-371
9	All odd page 409-416
10	All odd page 450-457
11	All odd page 501-509
12	All odd page 544-558

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 tests, and a 100-point final exam. Except in *extraordinarily rare* circumstances, you will *not* have an opportunity to make up a missed test. An exception: If you are on an athletic team and

on the road during an exam, you will be allowed to make up that test. Similar activities involving recognized school functions also qualify. Check with me if in doubt. *Tentative* dates for the tests are listed on this document. 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:

Homework	150 points
Mid-Term Tests (Three)	300 points
Final Exam	100 points
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Total	550 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				

EXAM POLICY

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

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 ASSIGNMENTS

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.

<u>Week</u>	<u>Chapters</u>	<u>Topic</u>
1 Jan 4-6	1, 2	(Statistics & problem Solving) • Statistics as a four-stage process (Data Type) • Types of variables • Roles of variables
2 Jan9-13	3, 4	(Displaying and summarize data) • Single categorical variable

		<ul style="list-style-type: none"> • Single quantitative variable • Center and spread
3 Jan 16-20	5	(Linear Regression) <ul style="list-style-type: none"> • Bivariate data • Linear relationships between two Q's <ul style="list-style-type: none"> • Model fitting • Regression and Correlation
4 Jan 23-27		TEST 1!
5 Jan 30-Feb3	6, 7	(Random variables and their probability distributions) <ul style="list-style-type: none"> • Discrete Distributions • Binomial distributions • Continuous distributions and normal distributions
6 Feb 6-10	8, 9	(Sampling distributions) <ul style="list-style-type: none"> • Sample proportion as a random variable • Sample mean as a random variable • Central limit theorem (CLT)
7 Feb 13-17	10	TEST 2! (Constructing Confidence Intervals) <ul style="list-style-type: none"> • Interval estimation • Required sample size
8 Feb 20-24	11	(Inference for a single Q variable) <ul style="list-style-type: none"> • Normal population with standard deviation known • Large sample applying CLT • Small normal population with unknown std dev
9 Feb 27-Mar 2	12	(Inference between two variables) <ul style="list-style-type: none"> • Pair design t • Two-sample design t • Two-sample design Z
10 Mar 5-9	Review	TEST 3!
11 Mar 12-16		Final exam week

Final Exam date will be according to the university schedule.
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