Math 130: Introductory Statistics

Spring 2010: MRC 314; MWF 8:00-8:50 p.m.
Professor: Timothy K. Tucek
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Office hours: By Appointment Only
Final Exam: Friday 05/14 9:50-11:50 a.m.

Course Description: An introductory statistics course dealing with the organization and processing of various types of data, normal and binomial distributions, estimation theory, hypothesis testing, correlation and regression.
Prerequisite: acceptable placement score (MATH 110, 130, 155 are all considered to be the same "level" of readiness) or a grade of C or higher in Math 001.

Text: *Elementary Statistics (11th Edition)*, by Mario Triola (Pearson/Addison-Wesley, 2010)

Core Abilities
This course qualifies as a general education course (G9) since it addresses the following core abilities:
1.*Thinking*: Students engage in the process of inquiry and problem solving that involves both critical and creative thinking.
A. Reason deductively by learning general principles; which are then applied to specific problems.
B. Reason inductively by studying examples, seeing the common characteristics, and broadening the solution to the generic case.
C. Learn to use the statistical process as one of the means of answering a question or supporting a position/hypothesis.

2. *Life Value Skills*: Students analyze, evaluate and respond to ethical issues from an informed personal value system.
A. Learn of some classic examples of the misuse of statistics and its consequences.
B. Acquire an appreciation for the importance of honesty in the presentation of all (not just favorable) outcomes of statistical research.

3. *Communication Skills*: Students communicate orally and in writing in an appropriate manner both personally and professionally.
A. Read text and reference materials outside of class.
B. Observe examples and discuss questions and solutions in class.
C. Communicate solutions to statistical problems in writing on assignments, quizzes, exams, and course project in appropriate statistical format.
These abilities will be assessed using a combination of evaluation of performance on exams, quizzes, oral in-class contributions.

General Course Objectives:
This course is designed to help students learn basic concepts in descriptive and inferential statistics including introductory probability. Students demonstrate knowledge of these concepts by solving numerous assigned homework problems, and by providing written solutions to exam problems in accepted statistical format.
Introductory Statistics is a support course for a number of disciplines in the health and social science fields. We will look at how to organize and represent data (descriptive statistics) and how to test hypotheses and draw conclusions based on the data (inferential statistics). We will also focus on the theory behind the procedures, at an introductory level.
Viterbo University has a site license for the statistical package SPSS. We will learn how to use this software in class in order to solve some of the statistical problems within this course. It is not a requirement to use or learn this software. However, when exam time arrives, students will be allowed to use SPSS and/or any calculator of the students choosing; thus, getting to know SPSS could be a fairly valuable tool. (Students who are majoring in the social sciences – psychology, sociology, social work – will find it useful to learn how to use SPSS because it is the tool of choice in those fields for doing statistical research. If you envision going to graduate school you might want to try to get comfortable with SPSS.)
This course carries a MATH prefix and in fact will satisfy your math competency requirement.

Course Procedures:

Attendance: I do not take attendance; but I can assure you that regular attendance is very important to being successful in this course. I include a detailed schedule so that if you do have to miss a class you can keep up with the material, but it's not the same – you simply miss out on a key part of the learning process. It is also important that when you are in class you need to actively engage in what the class is doing. My course is run similarly to an open forum; you can ask questions at any time and I may call upon you at any time. As mentioned in the General Course Objectives, we will learn how to use SPSS within classtime.

Blackboard: Because we meet three times per week I will make extensive use of Blackboard. I will store a copy of the syllabus there, under Course Documents. I will make occasional announcements through Blackboard. I will be making SPSS assignments available that you may work through if you'd like. Finally, I will use it to make available your

in-progress grade throughout the semester.

Homework: You will note that I have listed for each section some of the odd problems (the answers to the odd problems are in the back of the book). I encourage you to work as many problems as needed until you are comfortable with what you are doing. Like most mathematics courses, this course is all about solving problems and you just can't learn how to do them unless you do them! On occasion I will have assigned homework, which you will have to turn in to me for grading purposes.

Academic Honesty: Cheating will not be tolerated. Exam questions and problems will be open-ended rather than multiple-choice. I generally ask you to show your work to receive full credit on a problem (where showing work is necessary). If I detect cheating on an exam you will be given a score of ZERO for that exam. I will also notify Viterbo University of any such behavior and further actions may come from Viterbo.

Exams: When you take exams you may use your technological tool of choice, either a calculator or SPSS, and you may also construct a 1-page (both sides OK) set of notes. You may also use the insert from your text. For the comprehensive exam you may use all of the notes from all your previous exams as well as the card from the text.

Help: The learning center makes tutoring help available, including drop-in math. The Learning Center details are located on blackboard under Course Information. If you seek tutoring help, make sure that you do not rely on it to the extent that you aren't working problems on your own. The tutor won't be at your side during an exam. Also, I am here to help you; feel free to call or email me if you are having difficulty and we can set up a time to meet.

Grading: I generally use a typical scale: 90% for an A, 80% for a B, 70% for a C and 60% for a D. We will have 550 points of exams (4 unit exams @100 points each and a final exam @ 150 points) during the semester, and some additional quizzes or problem sets along the way. When it comes to the end of the semester, I may look at attendance/participation as well as the final exam in order to scale your grade upward for borderline cases. For example, if your overall percentage is 89% but you did well on the final exam and were an active participant in class discussions; you can probably expect an A.

Disability Statement: If you are a person with a disability and require any auxiliary aids, services or other accommodations for this class, please see me and/or Jane Eddy, the campus ADA coordinator (Learning Center, 796-3194), within ten days to discuss your needs. I want to include taking exams in the learning center under this category; you will need a written request from Jane Eddy before I will allow you to take exams there.
Disclaimer: I reserve the right to make adjustments to the schedule and the syllabus in general as we move through the course.

Math 130: Spring 2010 Schedule

Jan. 18 [1-2] Introduction, Statistical Thinking
Read Sections [1-1], [1-2], [1-3], [1-4]
Homework: page 9 #1-14, 19-22, 23, 25

Jan. 20 [1-3], [1-4] Types of Data, Critical Thinking
Homework for January 22nd
Read Section [1-5]
Problems page 16 #1-27 odd; page 23 #1-25 odd

Jan. 22 [1-5] Collecting Sample Data
Homework for January 25th
Read Sections [2-1], [2-2], [2-3]
Problems: page 34 #1-25 odd

Jan. 25 [2-2], [2-3] Frequency Distributions, Histograms
Homework for January 27th
Read Sections [2-4], [2-5]
Problems: page 52 #1-23 odd; page 57 #1-7 odd

Jan. 27 [2-4], [2-5] Statistical Graphics, Bad Graphs
Homework for January 29th
Read Sections [3-1], [3-2], [3-3]

	Problems: page 67 #1-15 odd; page 73 #1-9 odd
Jan. 29	[3-2], [3-3] Measures of Center and Variation
	Homework for February 1st
	Read Section [3-4]
	Problems: page 94 #1-21 odd page 109 #1-21 odd
Feb. 1	[3-4] Measures of Relative Standing (z-score, percentile)
	Homework for February 3rd
	Problems: page 126 #1-27 odd
Feb. 3	Review Forum
Feb. 5	Exam #1 Chapters 1-3
	Homework for February 8th
	Read Sections [4-1] through [4-4]
Feb. 8	[4-1] through [4-4] Basic Concepts of Probability
	Homework for February 10th
	Read Sections [5-1], [5-2], [5-3]
	Problems: page 147 #1-15 odd; page 157 1-11 odd, 15, 27-32 page 167 #1-17 odd
Feb. 10	[5-2], [5-3] Random Variables, Binomial
	Homework for February 12th
	Read Section [5-4]
	Problems: page 214 #1-17 odd; page 225 #1-31 odd
Feb. 12	[5-4] Mean, Variance, Standard Deviation for Binomial Distribution
	Homework for February 15th
	Read Sections [6-1], [6-2], [6-3]
	Problems: page 231 #1-15 odd
Feb. 15	[6-2], [6-3] Normal Distribution
	Homework for February 17th
	Read Section [6-5]
	Problems: page 261 #1-31 odd page 271 #1-21 odd
Feb. 17	[6-5] Central Limit theorem
	Homework for February 19th
	Read Sections [7-1], [7-2]
	Problems: page 295 #1-15 odd
Feb. 19	[7-2] Confidence Interval for a Population Proportion
	Homework for February 22nd
	Read Sections [7-3], [7-4]
	Problems: page 339 #1-35 odd
Feb. 22	[7-3], [7-4] Estimating a Population Mean
	Homework for February 24th
	Read Section [7-5]
	Problems: page 351 #1-23 odd; page 365 #1-19 odd
Feb. 24	[7-5] Estimating a Population Variance
	Homework for February 26th
	Read Section [8-2]
	Problems: page 377 #1-19 odd
Feb. 26	Review Forum
Mar. 1	Exam #2 Chapters 4-7
	Homework for March 5th
	Read Sections [8-2], [8-3]
Mar. 3	[8-2] Basics of Hypothesis Testing
	Homework for March 1st
	Problems: page 409 #1-27 odd
Mar. 5	[8-2], [8-3] Testing a Claim about a Proportion
	Homework for March 15th
	Read Section [8-4]
	Problems: page 420 #1-19 odd

	Problems: page 429 #1-15 odd
Mar. 8	SPRING BREAK (no class)
Mar. 10	SPRING BREAK (no class)
Mar. 12	SPRING BREAK (no class)
Mar. 15	[8-4] Testing a Claim of Mean (σ known)
	Homework for March 17th
	Read Section [8-5]
	Problems: page 423 #25-31 odd; page 431 #17-19 odd
Mar. 17	[8-5] Testing a Claim about a Mean (σ unknown)
	Homework for March 19th
	Read Section [9-2]
	Problems: page 438 #1-19 odd
Mar. 19	[8-6] Testing a claim about a Variance
	Homework for March 22nd
	Read Section [9-1], [9-2]
	Problems: 1-13 odd
Mar. 22	[9-2] Inferences about Two Proportions
	Homework for March 24th
	Read Section [9-3]
	Problems: page 468 #1-21 odd
Mar. 24	[9-3] Inferences about Two Means – Independent Samples
	Homework for March 26th
	Read Section [9-4]
	Problems: page 482 #1-13 odd
Mar. 26	[9-4] Inferences from Matched Pairs (Dependent Samples)
	Homework for March 29th
	Read Section [9-5]
	Problems: page 493 #1-15 odd
Mar. 29	SPSS Demonstration
Mar. 31	[9-5] Comparing Variation in Two Samples
	Homework for April 7th
	Problems: page 502 #1-15 odd
Apr. 2	EASTER BREAK (no class)
Apr. 5	EASTER BREAK (no class)
Apr. 7	Review Forum
Apr. 9	Exam #3 Chapters 8-9
	Homework for April 12th
	Read Section [10-2]
Apr. 12	[10-2] Correlation
	Homework for April 14th
	Read Section [10-3]
	Problems: page 530 #1-15 odd
Apr. 14	[10-3] Regression
	Homework for April 16th
	Read Section [10-4]
	Problems: page 547 #1-21 odd
Apr. 16	[10-4] Prediction Intervals
	Homework for April 19th
	Read Section [10-6]
	Problems: page 557 #2,5,7
Apr. 19	[10-6] Modeling

	Homework for April 21st
	Read Section [11-2]
	Problems: page 573 1-11 odd
Apr. 21	[11-2] Multinomial Experiments: Goodness-of-Fit
	Homework for April 23
	Read Section [11-3]
	Problems: page 593 #1-11 odd
Apr. 23	[11-3] Contingency Tables
	Homework for April 26th
	Read Section [12-2]
	Problems: page 606 #1-13 odd
Apr. 26	[12-2] One-way Analysis of Variance
	Homework for April 28th
	Read Section [12-3]
	Problems: page 639 #1-13 odd
Apr. 28	[12-3] Two-way Analysis of Variance
	Homework for April 30th
	Problems: page 649 #1-13 odd
Apr. 30	Review Forum
May 3	Exam #4 Chapters 10-12
May 5	Final Review Forum
May 7th	To be Determined.