

## Math 130: Introductory Statistics

Fall 2010: MRC 314; TR 3:30-4:50

Professor: Timothy K. Tucek

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Office hours: MRC377 MWF 9-11 a.m. or by appt.

Final Exam: Thursday 12/16 12:50 – 2:50 p.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 091.

**Text:** *Elementary Statistics (11<sup>th</sup> 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, and 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 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 take attendance; however, I do not formally use attendance as part of the grading system, 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 store the text publisher's power-point files there as well. 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 and/or SPSS. You may also construct a 1-page (both sides OK) set of notes. You may also use the card (book insert) from your text. For the comprehensive exam you may use all of the notes from all of your previous exams as well as the card from the text and of course technology.

Help: The learning center makes tutoring help available, including drop-in math. 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 130.004: Fall 2010 Schedule

- Aug. 31 [1-2] Introduction, Statistical Thinking  
[1-3], [1-4] Types of Data, Critical Thinking  
Read Sections [1-1], [1-2], [1-3], [1-4], [1-5]  
Homework: page 9 #1-14, 19-22, 23, 25  
Problems page 16 #1-27 odd; page 23 #1-25 odd
- Sept. 2 [1-5] Collecting Sample Data  
Homework for January 26th  
Read Sections [2-1], [2-2], [2-3], [2-4], [2-5]  
Problems: page 34 #1-25 odd
- Sept. 7 [2-2], [2-3] Frequency Distributions, Histograms  
[2-4], [2-5] Statistical Graphics, Bad Graphs  
Homework for January 28th  
Read Sections [3-1], [3-2], [3-3]  
Problems: page 52 #1-23 odd; page 57 #1-7 odd  
Problems: page 67 #1-15 odd; page 73 #1-9 odd
- Sept. 9 [3-2], [3-3] Measures of Center and Variation  
Homework for February 2nd  
Read Section [3-4]  
Problems: page 94 #1-21 odd page 109 #1-21 odd
- Sept. 14 [3-4] Measures of Relative Standing (z-score, percentile)  
Review Forum  
Homework for February 4th  
Problems: page 126 #1-27 odd
- Sept. 16 Review First Half  
**Exam #1** Chapters 1-3  
Homework for February 9th  
Read Sections [4-1] through [4-4]
- Sept. 21 [4-1] through [4-4] Basic Concepts of Probability  
Homework for February 11th  
Read Sections [5-1], [5-2], [5-3], [5-4]  
Problems: page 147 #1-15 odd; page 157 1-11 odd, 15, 27-32 page 167 #1-17 odd
- Sept. 23 [5-2], [5-3] Random Variables, Binomial  
[5-4] Mean, Variance, Standard Deviation for Binomial Distribution  
Homework for February 16th  
Read Sections [6-1], [6-2], [6-3]  
Problems: page 214 #1-17 odd; page 225 #1-31 odd  
Problems: page 231 #1-15 odd
- Sept. 28 [6-2], [6-3] Normal Distribution  
Homework for February 18th  
Read Section [6-5]  
Problems: page 261 #1-31 odd page 271 #1-21 odd

- Sept. 30 [6-5] Central Limit theorem  
Homework for February 23rd  
Read Sections [7-1], [7-2], [7-3], [7-4]  
Problems: page 295 #1-15 odd
- Oct. 5 [7-2] Confidence Interval for a Population Proportion  
[7-3], [7-4] Estimating a Population Mean  
Homework for February 25th  
Read Section [7-5]  
Problems: page 339 #1-35 odd  
Problems: page 351 #1-23 odd; page 365 #1-19 odd
- Oct. 7 [7-5] Estimating a Population Variance  
Review Forum  
Homework  
Problems: page 377 #1-19 odd
- Oct. 12 Review First Half  
**Exam #2** Chapters 4-7  
Read Section [8-2], [8-3]
- Oct. 14 [8-2] Basics of Hypothesis Testing  
[8-3] Testing a Claim about a Proportion  
Homework  
Read Sections [8-4], [8-5]  
Problems: page 409 #1-27 odd  
Problems: page 420 #1-19 odd  
Problems: page 429 #1-15 odd
- Oct. 19 [8-4] Testing a Claim of Mean ( $\sigma$  known)  
[8-5] Testing a Claim about a Mean ( $\sigma$  unknown)  
Homework for March 18th  
Read Section [8-6]  
Problems: page 423 #25-31 odd; page 431 #17-19 odd  
Problems: page 438 #1-19 odd
- Oct. 21 [8-6] Testing a claim about a Variance  
Homework for March 23rd  
Read Section [9-1], [9-2], [9-3]  
Problems: 1-13 odd
- Oct. 26 [9-2] Inferences about Two Proportions  
[9-3] Inferences about Two Means – Independent Samples  
Homework for March 25th  
Read Section [9-4]  
Problems: page 468 #1-21 odd  
Problems: page 482 #1-13 odd
- Oct. 28 [9-4] Inferences from Matched Pairs (Dependent Samples)  
SPSS Demonstration  
Homework for March 30th  
Read Section [9-5]  
Problems: page 493 #1-15 odd

Nov. 2 [9-5] Comparing Variation in Two Samples  
Homework for April 6th  
Problems: page 502 #1-15 odd

Nov. 4 Review Forum

Nov. 9 **Exam #3** Chapters 8-9  
Homework for April 13th  
Read Sections [10-2], [10-3]

Nov. 11 [10-2] Correlation  
[10-3] Regression  
Homework for April 15th  
Read Section [10-3]  
Problems: page 530 #1-15 odd  
Problems: page 547 #1-21 odd

Nov. 16 [10-4] Prediction Intervals  
Homework for April 20th  
Read Section [10-6], [11-2], [11-1]  
Problems: page 557 #2,5,7

Nov. 18 [10-6] Modeling  
[11-2] Multinomial Experiments: Goodness-of-Fit  
Homework for April 22nd  
Read Section [11-3], [12-1], [12-2]  
Problems: page 573 1-11 odd  
Problems: page 593 #1-11 odd

Nov. 23 [11-3] Contingency Tables  
[12-2] One-way Analysis of Variance  
Homework for April 27th  
Read Section [12-3]  
Problems: page 606 #1-13 odd  
Problems: page 639 #1-13 odd

Nov. 25 THANKSGIVING BREAK

Nov. 30 [12-3] Two-way Analysis of Variance  
Review Forum  
Homework for April 29th  
Problems: page 649 #1-13 odd

Dec. 2 Review Forum  
Dec. 7 **Exam #4** Chapters 10-12  
Dec. 9 Final Review Forum