

**STATISTICS 201
ELEMENTARY STATISTICS**

BULLETIN INFORMATION

STAT 201: Elementary Statistics (3 credit hours)

Prerequisite: MATH 111 or 115 or STAT 110, or consent of department

Course Description:

An introductory course in the fundamentals of modern statistical methods. Topics include descriptive statistics, probability, random sampling, simple linear regression, correlation, tests of hypotheses, and estimation.

SAMPLE COURSE OVERVIEW

TBA

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Statistics 201, students will be able to:

1. Demonstrate recall of basic statistical terms with the ability to express them in the correct context.
2. Demonstrate appropriate methods for collecting data in simple laboratory experiments.
3. Apply basic concepts of probability including properties of sampling distributions, the normal distribution and the binomial distribution.
4. Demonstrate appropriate descriptive and inferential statistical methods for univariate and bivariate data.
5. Use statistical software to apply descriptive and inferential statistical analyses including numerical summaries, graphical displays, linear regression, hypothesis testing and confidence intervals.
6. Effectively explain findings from graphical displays, descriptive statistics and elementary inferential statistical analyses.
7. Compose a technical report for a laboratory experiment explaining data collection methods, statistical methods, and interpretation of results.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. *Statistics: The Art and Science of Learning from Data* (2nd ed.), by Agresti and Franklin, Pearson Education, Inc.
2. Calculator - Each student will need a scientific calculator. Cell phone calculators are not permitted for use on exams.

SAMPLE ASSIGNMENTS AND/OR EXAM

- 1. In-Class Exams:** There will be 3 in-class exams. Make-up exams will be considered only in extreme circumstances and documentation will be required. Also, you must notify me prior to the exam or the day of the exam if you think your situation merits a make-up. Exam dates are on the schedule at the end of the syllabus. If you miss an exam for a valid reason but do not notify me of your situation in a timely manner (prior to or the day of the exam), then you will receive a zero on the exam. Individual work is required on exams.
- 2. Final Exam:** A comprehensive final exam will be given according to the University's exam schedule (see next page). Individual work is required on the final exam. Make-up final exams will be considered only in extreme circumstances and documentation will be required. Also, you must notify me prior to the final exam or the day of the final exam if you think your situation merits a make-up. If you miss the final exam for a valid reason but do not notify me of your situation in a timely manner (prior to or the day of the exam), then you will receive a zero on the final exam. If the score on the final exam is higher than the score of the lowest regular exam, then it will be used to replace the regular exam score. Students may not exempt the final exam.
- 3. Class Participation:** There will be several unannounced brief activities in class that count towards a class participation grade. You must be present in class to receive credit for these activities. If you miss an activity because you are late to class, then you will not receive credit for that activity. You may miss two class activities without penalty.
- 4. Regular Assignments:** Homework testing the concepts taught in lecture will be posted in Course Compass throughout the semester. Students will submit their answers online and receive feedback on responses: you are allowed three tries for any question, and if still unsuccessful you may touch the "Similar exercise" button and start over. A date and time for closing each assignment will be announced in class and appear on each assignment. Some written homework problems from the textbook (e-book) may also be assigned and collected. Expect 11 assignments worth 9 points each. The lowest homework grade will be dropped. Students may discuss the homework problems with each other but each student should submit their answers individually (do not copy or allow others to do the work for you). A 30% penalty will be imposed on all late assignments and these will only be accepted up to 3 days after the due date (you will need this password for late assignments: *toolate*). If you have technical difficulties with Course Compass, you must notify me 24 hours before the assignment is due to receive consideration for an extension.
- 5. Lab Quizzes:** You will be given a short quiz at the beginning of nine of the eleven labs, all but the first and last. Questions about concepts previously covered in lecture that are related to the lab will be asked. Each quiz will be worth 5 points. The lowest three quiz grades will be dropped. Students who arrive late to lab will not be permitted to take the quiz. Individual work is required on the lab quizzes.

- 6. Short Answer Writing Assignments – SAWA** For all lab sessions, you will be required to complete a series of short answer questions to be collected. Each SAWA will be completed and turned in at the lab meeting. In the event that the lab runs long, the lab instructor may extend the assignment. The lowest SAWA grade will be dropped. If you miss a lab, then that is the SAWA grade that will be dropped. Students may work together in answering SAWA questions, but each student must turn in an assignment to receive credit.
- 7. Extended Writing Assignment – EWA** - For Lab Session 8, an extended writing assignment (EWA) will be assigned. This is a detailed technical writing report that discusses the lab experiment, statistical methods, and results. Greater detail on this paper will be provided later. It is *very important* for you to attend this lab which is scheduled on November 15, 2011. The EWA is due on November 22, 2011. If you miss this lab for a valid reason but do not notify me of your situation in a timely manner (prior to or the day of the lab), then you will receive a zero on the EWA. A 25% penalty will be imposed on all late papers and these will only be accepted up to a week after the due date. Individual work is required on the EWA. Students may proof-read each other's papers, but original writing is required from each student.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

- Week 1:** Introduction, statistical terms and graphical displays; assignments 1 (class survey), 2
 LAB 1: Introduction to StatCrunch
 AF 1
 Descriptive statistics; assignment 3
 LAB 2: Descriptive statistics and graphical displays
 AF 2
 1.1, 1.2, 2.1, 2.2, 2.3
- Week 2:** Simple linear regression and correlation; assignment 4
 LAB 3: Simple linear regression and correlation
 AF 3
 2.4, 2.5, 3.1, 3.2; HW1, 2 due
 3.3, 3.4, 5.1, 5.2; HW3 due
- EXAM I:** Recall basic statistical terms with the ability to express them in the correct context, select appropriate descriptive statistical methods for univariate and bivariate data, effectively explain findings from graphical displays and descriptive statistics
- Week 3:** Basic probability: sample space, laws of probability, conditional probability, tree diagrams, and independence; assignment 5
 Lab 4: Probability
 AF 5

Lab 1 due; HW4 due

- Week 4:** Discrete random variables, binomial distribution; assignment 6
Lab 5: Binomial Experiment
AF 6
Lab 2 due
5.3, 5.4
- Week 5:** Continuous random variables, normal distribution; assignment 7
AF 6
Lab 3 due; HW5 due
6.1, 6.2
- Week 6:** Sampling distribution of sample mean, central limit theorem
Lab 6: Sampling distribution of a sample mean
AF 7
Lab 4 due
6.2, 6.3
- Week 7:** Sampling distribution of a sample proportion
Lab 7: Sampling distribution of a sample proportion
AF 7
Lab 5 due; HW6 due
Review; 7.1; HW7 due
- Week 8:** Point and confidence interval estimation of population proportion; assignment 8
AF 8
7.2, 7.3, 8.1, 8.2
- EXAM II:** Apply basic concepts of probability including properties of the normal and binomial distributions
- Week 9:** One sample hypothesis test for population proportion; assignment 9
Lab 8: Inference for a population proportion
AF 9
Lab 6 due; HW8 due
9.1, 9.2
- Week 10:** Point and confidence interval estimation of mean, t distribution;
AF 8
Lab 7 due; HW9 due
- Week 11:** One sample hypothesis tests for mean, errors in hypothesis testing; assignment 10

Lab 9*: Inference for a population mean
AF 9
Lab 8 due
Review

Week 12: Comparing two population means, dependent sample design
Lab 10: Comparing two population means, dependent sample design
AF 10

EXAM III: Apply properties of sampling distributions to solve probability problems, select and apply appropriate inferential statistical methods for univariate data, effectively explain findings from inferential statistical analysis for univariate data

Week 13: Comparing two population means, independent sample design; assignment 11
Lab 11: Comparing two population means, independent sample design
AF 10
9.3, 9.4, 9.5, 10.4

Week 14: Lab 9; HW10 due
10.2, 10.3

Week 15: Lab 10; EWA due!

Week 16: Lab 11; HW11 due
10.1, Review

Comprehensive Final Exam: Material from exams I, II, and III, and also: the t-distribution; point and confidence interval estimation and hypothesis testing for the population mean; select appropriate descriptive and inferential statistical methods for comparing two populations means; effectively explain findings from inferential statistical analyses for comparing two populations.

Final exam according to university exam schedule