

STATISTICS 112
STATISTICS AND THE MEDIA

BULLETIN INFORMATION

STAT 112: Statistics and the Media (3 credit hours)

Course Description:

Statistical and information literacy. Experimental and survey design; descriptive statistics; basic probability; simple confidence intervals and hypothesis tests; statistical software; collection, management, and evaluation of information; and presentation of statistics in the media. Credit given for only STAT 110 or STAT 112

SAMPLE COURSE OVERVIEW

To introduce students to basic statistical concepts and methods; to teach students modern methods for collecting information with regard to statistical studies from a variety of sources and to appropriately critique and report findings from those studies.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of STAT 112, students will be able to:

1. Identify and describe basic principles of study/experimental design.
2. Demonstrate use of key concepts and search terms to find available online and print resources in the University library to gather information for bibliographies and well-articulated written reports.
3. Demonstrate ability to determine the nature and extent of information needed to conduct in-depth research surrounding a statistical study reported in the media. Identify applicable sources of information, evaluating these for credibility, reliability, and timeliness.
4. Summarize data using basic statistical terminology, descriptive statistics, and charts and graphs, employing appropriate technologies.
5. Recognize and evaluate the association between two variables through correlation, regression or contingency table analysis; explain why correlation does not imply causation.
6. Solve basic probability problems and problems related to social and physical phenomena utilizing properties of the normal curve.
7. Construct simple confidence intervals. Draw conclusions from simple confidence intervals and significance test results; recognize common misuses and misinterpretations of these in the media.
8. Compose a report that critically evaluates claims based on statistical reasoning from survey and experimental results found in the media and proposes a research question for a related statistical study. Employ appropriate conventions for citing sources of information, respecting intellectual property rights.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. *Seeing Through Statistics* (3rd Edition) by Jessica M. Utts. Brooks/Cole Cengage Learning, 2005.
2. Calculator - Each student will need a scientific calculator. Cell phone calculators are not permitted for use on exams.
3. Computer Facilities - Homework requires the use of a computer with internet access and the statistical software package, Minitab. Computers are available for student use through the Mathematics and Statistics (MS) domain in LeConte 124 and LeConte 303A. Check these locations for hours. An account will be set up for you.

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. **Two Reports:** Reports will be submitted in stages and due dates will be announced in class. Completing stages of the report by the due date is part of the grading rubric. For the final draft. Individual work is required on the reports. Students may proof-read each other's papers, but original writing is required from each student.
 - a. **Report 1:** In section 2.3 of *Seeing Through Statistics*, Jessica Utts identifies Seven Critical Components to a statistical study. Find an article of interest that includes a reported statistic in the mass media (newspaper, television, magazine, website, etc.). Evaluate the article by discussing how well the report addresses these seven components. Research the original source of the report and discuss any misrepresentations reported in the media.
 - b. **Report 2:** Find an article of interest that includes a reported statistic in mass media (newspaper, television, magazine, website, etc.). Find the original sources of the report and an additional two quality sources detailing studies related to the topic. Propose an idea for a similar study. Your paper will include:
 - i. A bibliography
 - ii. A literature review (a summary/comparison of the existing sources including their shortcomings)
 - iii. A proposal for a hypothetical similar study including
 - iv. Your research question
 - v. How your study is similar and how it is different from the ones you have already discussed
 - vi. Description of your population of interest
 - vii. A data collection plan (explanation of how your sample will be selected (specifically), what variables will be measured, and how the variables will be measured)
 - viii. What statistical analysis will be used for the data that you collect
2. **Mid-semester Exam and a Final Exam:** Individual work is required on all exams. Make-up exams will be considered only in extreme circumstances and documentation will be required. Also, you must notify the instructor prior to the exam if you think your

situation merits a make-up. If you miss an exam for a valid reason but do not notify the instructor in a timely manner, then you will receive a zero on the exam.

3. **Class Activities:** There will be several unannounced brief activities in class that count towards a class activity grade. These will typically consist of discussing and evaluating a news article or website relevant to current course content. You may miss two class activities without penalty.
4. **Homework:** There will be ten homework assignments. Homework will consist of problems from the book covering statistical concepts as well as reading or watching assigned news reports and relating them to current course topics.
 - a. The due date for each assignment will be announced in class. Students may discuss the homework problems with each other but each student should submit their answers individually.

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

Timeline for Content and Evaluation	Chapters	Time
Introduction to statistical terms and data in the news. What is information and how does it differ from data?	1, 2	.67 week
Measurement	3	.33 week
Homework 1: How does information differ from data? Statistical terminology, measurement.		
Sampling and Experimental Design; Case Studies in the Media	4,5,6	2.33 weeks
Homework 2: Identify and describe basic principles of study/experimental design.		
Graphical Displays and Numerical Summaries	7,9	1.67week
Homework 3: Summarize data using basic statistical terminology, descriptive statistics, and charts and graphs, employing appropriate technologies.		
Methods for researching information, writing reports and appropriate citation (assessed in Reports 1 and 2)	(Library*)	1.33 weeks
The Normal Distribution	8	.67 week
Homework 4: Solve problems related to social and physical phenomena utilizing properties of the normal curve.		
Bivariate relationships between continuous variables	10, 11	1 week

Bivariate relationships between categorical variables	12.1	.33 week
Homework 5: Recognize and evaluate the association between two variables through correlation, regression or contingency table analysis; explain why correlation does not imply causation.		
Report 1: Use key concepts and search terms to find available online and print resources in the University library to gather information for well-articulated written reports. Identify applicable sources of information, evaluating these for credibility, reliability, and timeliness. Compose a report that critically evaluates claims based on statistical reasoning from survey and experimental results found in the media. Employ appropriate conventions for citing sources of information, respecting intellectual property rights. Report 1 will be submitted and graded in stages over several weeks: (1) selected article; (2) bibliography; (3) rough draft; (4) final report.		
Mid-semester exam: Identify and describe basic principles of study/experimental design. Summarize data using basic statistical terminology, descriptive statistics, and charts and graphs. Recognize and evaluate the association between two variables through correlation, regression or contingency table analysis; explain why correlation does not imply causation. Solve problems related to social and physical phenomena utilizing properties of the normal curve.		
Elementary Probability	16	.67 week
Sampling Distributions	19	.67 week
Homework 6: Solve probability problems including those related to social and physical phenomena utilizing properties of the normal curve.		
Confidence intervals for proportions	20	.67 week
Homework 7: Construct simple confidence intervals. Draw conclusions from simple confidence intervals; recognize common misuses and misinterpretations of these in the media.		
Additional methods for literature reviews (assessed in Report 2)	(Library**)	.67 week
Confidence intervals for a population mean and to compare treatments	21	.67 week
Homework 8: Construct simple confidence intervals. Draw conclusions from simple confidence intervals.		
Significance Testing for proportions and means, and to compare treatments	22,23,24	1.33 weeks

Homework 9 and 10: Draw conclusions from significance test results; recognize common misuses and misinterpretations of these in the media.

Report 2: Use key concepts and search terms to find available online and print resources in the University library to gather information for bibliographies and well-articulated written reports. Determine the nature and extent of information needed to conduct in-depth research surrounding a statistical study reported in the media. Identify applicable sources of information, evaluating these for credibility, reliability, and timeliness. Compose a report that critically evaluates claims based on statistical reasoning from survey and experimental results found in the media and proposes a research question for a related statistical study. Employ appropriate conventions for citing sources of information, respecting intellectual property rights. Report 2 will be submitted and graded in stages over several weeks: (1) selected topic; (2) bibliography; (3) rough draft; (4) Final report.

Final Exam: Solve basic probability problems. Construct simple confidence intervals. Draw conclusions from simple confidence intervals and significance test results; recognize common misuses and misinterpretations of these in the media.