BIOSTATISTICS 600 - PRINCIPLES OF STATISTICAL INFERENCE
Spring 2009

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Course Description:

Bios 600 is an introductory course in probability and statistical inference. This course serves as an introduction to the collection, summarization, analysis and presentation of data. Topics include sampling, experimentation, measurement, descriptive statistics, correlation, probability, confidence intervals, tests of hypotheses, 2-way tables, chi-square distribution and a simple linear regression. Upon completion, students will have an understanding of some of the main areas of probability and statistics including a working knowledge of basic summary statistics, graphs, simple statistical tests for hypothesis testing, analysis of categorical data and regression analysis. Students will be able to evaluate straight-forward statistical usage in everyday life and their own discipline, especially in relevant research publications, and interact knowledgeably with statisticians in planning, conducting, analyzing and reporting research projects.

Prerequisites:

Students are required to have a basic understanding of algebra and arithmetic. This math competency can usually be demonstrated by a college-level algebra course or precalculus course. More information about math competency is available in the "Quantitative Self-Test" in the course documents in Blackboard. This document contains math review questions and resources for math review.

Students must be familiar with a basic calculator. Students are not required to have experience in Excel, however familiarity with Excel would be helpful. Excel tutorials will be provided. Coursework may be completed using other statistical software (such as SAS, Splus, or R) if the student already has experience with this software. No previous course work in probability and statistics is required.

Textbook:

Required: Introduction to the Practice of Statistics, Moore and McCabe, **** 6th ****edition. This edition has a orange/yellow cover. ACCEPTABLE: hard-back, paper-back, or cloth version, extended or standard edition. [For example, ISBN 1-4292-1621-2 or 1-4292-1622-0]

(Very Optional: Study Guide with Solutions Manual for Moore and McCabe's Introduction to the Practice of Statistics, 6th edition)

The textbook (standard/ paperback edition) is available at the UNC Health Affairs Bookstore (www.store.unc.edu/hab) and may be shipped. The books are also available at most online bookstores (like amazon.com). Students are responsible for obtaining the textbook within the first week of class.

SPRING 2009 SCHEDULE				
Unit/ (Chapter)	**Format/ Topic**	**% Course Grade**	**Available Online**	**Due Date**
Unit 1 (Chapter 3/ supplements)	1: Short Test SAMPLING and SURVEYS	5	Thursday Jan 22	Monday Jan 26 10 AM EDT
Unit 2 (Chapter 1)	2: Long Test DESCRIPTIVE STATISTICS	20	Thursday Feb 5	Monday Feb 9
Unit 3 (Chapter 4)	3: Short Test PROBABILITY and RANDOM VARIABLES	10	Thursday Feb 19	Monday Feb 23
Unit 4 (Chapter 3/ supplements)	4: Small Group Discussion Forum STUDY DESIGN and ETHICS	5	Thursday March 5	Tuesday* March 10
Unit 5 (Chapter 5)	5: Short Test BINOMIAL DISTRIBUTION and SAMPLE MEAN DISTRIBUTION	10	Thursday March 19	Monday March 23
Unit 6 (Chapters 6 and 7)	6: Long Test INFERENCE, Part 1 (t-tests and binomial distribution)	20	Thursday April 2	Monday April 6
Unit 7 (Chapters 8 and 9 and 2.5)	7: Small Group Discussion Forum INFERENCE II (2-way tables and chi-square distribution)	5	Thursday April 16	Tuesday April 21
Unit 8 (Chapters 2 and 10)	8: Long Test (Final Exam) LINEAR REGRESSION and CORRELATION	25	Thursday April 30	Wed May 6
	TOTAL	100		

The course has eight units. A graded assignment follows each unit: a short test, a long test, or a small group discussion forum. Each test (and each discussion forum) will provide you with some weekday time and some weekend time to complete the assignment.

* If needed, you may complete the assignment before spring break.

GRADED ASSIGNMENTS:

Short Tests: The short tests are multiple-choice tests following Units 1,3 and 5. On the day listed in the Schedule, the test paper with most of the test questions will be posted in Blackboard. When the test is posted, you may download the test paper and print it out. You can work the problems on the test paper any time before the due date. After completing the problems on the test paper, you will submit those answers within Blackboard by the due date/time. Most of the test questions will be on the test paper which you complete 'off- line'. When you submit those answers within Blackboard, you will be asked a few additional multiple-choice questions that you will need to answer while you are online. In other words, 'short tests' are completed in two parts: most multiple-choice questions completed off-line and a few additional questions that you must answer while on-line. When you log on to Blackboard to submit your answers, allow time to submit the answers to the questions you've already completed from the distributed test paper as well as the additional questions available while online only.

You should study for the test before starting the test just as you would an in-class test. Taking a short test, including completing the test and submitting the answers, should take less than an hour. These tests are open book/ open notes but no help from other individuals.

Long Tests: The long tests are MS Word documents for you to complete and email back. The question format will be varied: discussion, graphs, short answer, multiple choice, etc. Many of the questions may be associated with a journal article that you will be asked to read. There are three long tests; the last long test is the final exam. They follow Units 2, 6 and 8.

A link button for a long test will appear within Blackboard in the appropriate unit on the date noted in the schedule. You will have about 4 days to complete the test – you can spend as much or as little time on the test as you want during this four day period. However, the test must be turned in (emailed) by the due date and time. Long tests are open-book, open-note. You may **not** discuss the test in any way with other individuals. The long tests are graded *by the instructor* and returned to students with comments. An extensive answer key will be provided.

Suggestion: Although it is not required, I feel that the best way to complete the long tests is to study for them as you would an in-class, timed exam. Then, work on the exam in a closed book fashion. After attempting the entire exam, you could then open notes, text, etc. to complete the exam. Again, this method is not required, but I feel it provides greater understanding.

[A "short test" is like a quiz in a residential class, and a "long test" is like a take-home test in a residential class.]

Small Group Discussion Forums: Two graded small group discussion forums (following Units 4 and 7) are required. The students will be divided up into small groups of about 5-6 students. The first small group discussion forum will be 'Introductions' – during the first few weeks of class - which is not graded.

On the dates indicated in the Schedule, the small group discussion forum questions will be posted on the website. You'll be notified via email the expectations for participation in the small group discussion forum. Each small group will be given a scenario or a public health journal article. Several questions will be posed by the instructor to be discussed by members of the small group during the period of about six days.

The discussion forum is not 'live' or 'instant message'; students post comments at different times during the week as their schedule permits. Group members can then read other members' comments and respond to them when it is convenient. It is more of a 'bulletin board' rather than a 'chat'. Each student is required to post comments several times during the discussion period. Exact instructions and expectations will be distributed before the first discussion forum. Grading is primarily based on participation.

ASSIGNMENT OF COURSE LETTER GRADES:

A student's letter grade will be determined based on the entire class performance, which is, in part determined by the difficulty of the exams for a particular semester. In other words, there is no strict cutoff between an "H" and a "P" grade predetermined at the beginning of the semester. The cutoff will be determined after the final exam by examining the student's performance compared to other students' performances. In order for the grade "H" to be meaningful, the "H" letter grade will not be given to more than 30-35% of the students. Because previous classes have been quite motivated and the graded assignments are straightforward, the cutoff score has tended to be high, usually in the mid 90's.

Students are urged to drop the course instead of receiving an "F". Please contact the instructor if your average during the course drops below a 75. We can discuss the options to avoid any grades of "L" or "F" being given.

LATE EXAMS/ SCHEDULING ISSUES:

There is a penalty for turning in exams late. After 24 hours, the grade is 0 if the student has not contacted the instructor. If a student has significant lingering technical problems, or will be out of town on business for an extended time, that student should ask the professor by email or telephone for special permission for an extension BEFORE the exam becomes available. Informing the instructor after the exam due date is unacceptable except for a situation like an emergency or sudden serious illness. Extensions and special consideration will be given only to students who are otherwise keeping up with the class.

STUDENT HONOR CODE:

Each test must be completed without the assistance of any other person. Do not consult other persons taking this course, or not taking this course, about any graded material like tests or discussion forums. You may contact the instructor if you have questions. Do not consult previous tests. Take this seriously!! Any suspicion of violations of the honor code will be taken to the Honor Court.

Honor Court sanctions can include receiving a zero for the assignment, failing the course and/or suspension from the university. Students in this course in previous semesters have been suspected of academic misconduct and prosecuted by the Honor Court on several of occasions. Students have been found guilty of academic misconduct in my sections of this online course and serious penalties have been imposed for that conduct. For more information on the UNC Honor Code and the Honor Court see http://honor.unc.edu/honor/index.html.

LEARNING MATERIALS:

The learning methods for Bios 600 will consist of a combination of readings, tutorials, homework exercises. Other optional material is available to reinforce the required material.

Reading: (Required) Most readings are in your textbook Introduction to the Practice of Statistics ** **6th** **edition by D. S. Moore and G. P. McCabe. Both the readings and tutorials are important to your understanding. I suggest doing the reading first, followed by the tutorials. The timing (reading before tutorial vs. tutorial before reading) is not as important as just doing both. Other readings, such as journal articles, will appear in some units.

Tutorials: (Required) The tutorials are a series of narrated PowerPoint slides. Print out the tutorial slides at the beginning of each tutorial so that you can take notes on the slides.

Some tutorials will go slower or faster than you may like. Feel free to repeat or pause slides as needed. Online 'self-quizzes' are provided in Blackboard immediately after many of the lessons to reinforce the main ideas from the tutorial. These self-quizzes are for your information and are not graded. The self-quizzes provide the student with a chance to test his or her knowledge of the presented material with immediate feedback.

IMPORTANT: You are **REQUIRED** to listen to the tutorial, not just read the slides and transcript. The transcript is provided for your information, but **does not eliminate** the need for listening to the tutorial.

Homework Exercises: (Required) Exercises from the textbook provide an opportunity to practice the concepts presented in the tutorials and readings. The homework exercises are not graded, but are enormously important. Odd answers are provided in the back of the textbook. Even answer will be provided. Some solutions appear in the supplementary Study Guide with Solutions Manual. (You are not required to buy this study guide.). Some answers may be on the textbook website (see below). The study guide includes detailed/worked out answers to some assigned exercises, and they are a bit more in depth than the webpage's answers. The teaching assistant can also provide worked answers and explanations of other questions about the homework.

OPTIONAL MATERIALS:

CD: (Not required but helpful) The CD provided with your textbook contains additional examples, quizzes and other information. Please feel free to utilize the CD on your own as you have time. The CD contains the data sets that are referenced in the textbook as Excel files for many homework problems, so you don't need to type in the data sets.

Textbook Webpage: (Not required) For more examples and worked out answers go to the publisher/textbook's webpage for worked out answers to problems from the textbook as well as additional quizzes and answers and other information. The URL is www.whfreeman.com/ips6e.

Feel free to try "Supplementary Exercises" and the "Online Quizzes" (they give good explanations of why your answer is right or wrong). The "Statistical Applets" will help to further test your knowledge and then to gain further knowledge through interactive activities.

Videos: (Not required- just if you want more examples, etc. For the really eager student!) If more examples and explanation of the material presented in each unit is desired, on campus students can view videos that parallel the material covered in each unit. David Moore, the author of the course textbook, created these videos. The videos are very creative and present many examples of how statistics are used in real life. These videos can be seen at the undergraduate library and also at Duke University. You will not be at a disadvantage if you don't have access to them.

GETTING HELP:

Instructor and TA: If you have questions about the course, email Jane Monaco, bios600w@bios.unc.edu or Joe Rigdon, jrigdon@email.unc.edu. We will make every attempt to return email within one day. *Our TA primarily handles questions about homework and sometimes course material concepts. The instructor primarily handles questions not related to homework – such as scheduling, grading and statistical concepts taught in the course.* If your questions are not answered sufficiently by the TA, then the instructor will be happy to answer any questions. (Unless a student specifically requests that the question and answer not be shared, any questions to the instructor may be sent to all students through email, so that all may benefit from the answer). You are also encouraged to meet with the TA or instructor in person if you are near campus. Phone conferences may often be beneficial. (Email the instructor or TA to set up a phone conference or a meeting.) We have used other methods to communicate with students such as webcam online sessions, faxing or emailing pdf files with explanations. We will work with your preferences and technologic capabilities to help you.

Tests are graded by the instructor with comments about your answers, if needed. After each graded assignment (tests and discussion forums) you will receive a painfully complete answer key.

Other important contacts: If you have questions about your ONYEN, or general computer problems or Blackboard questions - please contact 962-HELP or help.unc.edu. For more information about the status of Blackboard (sometimes it goes down) or frequently asked questions about Blackboard, visit www.unc.edu/cit/bb/bbnews. If you don't know where to start with your questions, contact your instructor at bios600w@bios.unc.edu.

Problem Sessions: We will have online problem sessions. Dates and times will be announced in the first week of class. Adobe Connect will be used to facilitate live discussions to answer homework or other questions. The live discussions are not required and will be recorded so that they may be replayed for students who are unable to participate. More information about these problem sessions will be provided when the course begins.

Frequently Asked Questions: More information about the administration of this course is available in the FAQ document in Blackboard. Please refer to the FAQ's document in Blackboard for many topics of interest including: software and operating system compatibility, configuring your account to receive email from Blackboard, pacing of the lessons, and using previous edition of the textbook.

SUMMARY:

I am glad you are in the course! In the beginning, there is a lot of administration to get familiar with how the course is set up, but there is plenty of help available. I am eager for you to have a good experience in the course. Please don't hesitate to contact me, Jane Monaco, at bios600w@bios.unc.edu if you have questions.

UPDATED: January 9, 2009