

Course Description of Biostatistics 600

BIOS 600 is an introductory course in probability and statistical inference. This course introduces students to the collection, summary, analysis, and presentation of data. At the conclusion of this class, students should meet the expectations established by The School of Public Health for the Biostatistics core. The following list of expectations comes from the School of Public Health's self-study report as part of the accreditation process with the Council on Education for Public Health.

Biostatistics

Upon graduation a student with an MPH should be able to...

1. Describe the roles biostatistics serves in the discipline of public health
2. Distinguish among the different measurement scales and the implication for selection of statistical methods to be used based on these directions
3. Apply descriptive techniques commonly used to summarize public health data
4. Describe basic concepts of probability, random variation and commonly used probability distributions
5. Apply common statistical methods for inference
6. Describe preferred methodological alternatives according to the type of study design for answering a particular research question
7. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question
8. Interpret results for statistical analysis found in public health
9. Develop written and oral presentations based on statistical analyses for public health professionals and educated lay audiences
10. Apply basic informatics techniques with vital statistics and public health records. In the description of public health characteristics and in public health research and evaluation

Syllabus for Biostatistics 600-001 Fall 2011

Instructor & TAs:	Thomas Stewart, tgs@email.unc.edu Gene Urrutia, urrutia@email.unc.edu Christopher Bryant, cbryant@bios.unc.edu
Lectures:	Rosenau 133 at 9:30 - 10:45am on Tuesdays and Thursdays
Website:	blackboard.unc.edu (login with onyen credentials)
Text:	Biostatistics: A Guide to Design, Analysis, and Discovery by Ronald N. Forthofer, Eun Sul Lee, and Michael Hernandez
Honor Code:	I do not tolerate any dishonest academic conduct. If I suspect that a student has violated the honor code, I will report the incident to the Department Chair and the Honor Court. See honor.unc.edu for the UNC Honor Code.
Prerequisites:	College level algebra and arithmetic.
Grading:	<p>Your grade in BIOS 600 is based on the completion of specific 'Core Competencies' and course projects. The table on the next page lists which core competencies and projects you must complete to earn an L, P, or H (or equivalent). To complete a specific core competency, you must pass its quiz and exam section. Quizzes are offered at the start of class on Tuesdays. The final exam is offered in class. (See the course calendar for specific dates.) Quizzes and test sections are graded as pass/fail. If you fail a quiz or test section, you may retake it twice. Quiz retakes are offered during recitation sessions.</p> <p>I grade a missed quiz or test as a fail, but you will still have two opportunities to retake it.</p> <p>The best way to learn the material in this class is to complete homework problems. I have assigned homework problems, and I will post homework solutions. I will not collect the homework or grade it, but I strongly encourage you to complete the homework.</p>
Recitations:	<p>Recitation sessions are optional. Quiz retakes are administered at the start of each recitation session. After students complete their quizzes, the instructor and TAs will spend time helping students. The recitation sessions are:</p> <ul style="list-style-type: none">• Mondays from 11:15am – 12:00pm in McG 1304• Mondays from 12:00 – 12:50pm in McG 1304• Mondays from 4:00 – 5:00pm in McG 2301 (Preference for Computer Help)• Thursdays from 11:00 – 11:50am in McG 1302
Global Topics:	To enrich your understanding of global public health issues, global content will be incorporated in this class in a variety of ways, including Global Topics Group Activities, readings, lecture examples, and test examples.

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Core Competencies and Projects		
Grade	Core Competencies	Projects
L or C	Data Types Summary Methods Basic Probability Probability Distributions Central Limit Theorem Study Designs Sampling Bias Measures of Association Hypothesis Tests Contingency Tables ANOVA Linear Regression	
P or B	All of the above, and ... Reading Statistics in the Literature Study Power	Sampling Group Project Global Topics I Group Project Global Topics II Group Project
H or A	All of the above, and ... Nonparametric Hypothesis Tests	Computer Skills and Data Analysis Project

The **Sampling Group Project** is an opportunity for you to complete a data collection and data analysis project with your peers. The details of the project can be found on the course website. The **Global Topics Group Projects** will offer you an opportunity to read, discuss and interpret applied research. The papers will focus on global public health issues, as part of the School of Public Health's global topics initiative. These projects are graded pass/fail.

The **Computer Skills and Data Analysis Project** project is an opportunity for students to learn basic statistical computation. Students can complete independent study materials to learn the basics of a statistical software. Lecture time will not be spent on computer instruction, but students may seek help from the TAs or instructor during recitation sessions. At the conclusion of the semester, students will work with a real data set and demonstrate many of the topics covered in this course. The assessment is graded pass/fail. Please note that this project separates an H grade and a P grade, and I will grade this project with very high standards.

Calendar for Biostatistics 600-001 Fall 2011

	S	M	T	W	T	F	S		
AUG	21	22	23	24	25	26	27		
	28	29	30	31	1	2	3		Data Types
SEP	4	5	6	7	8	9	10		Summary Methods
	11	12	13	14	15	16	17		Basic Probability
	18	19	20	21	22	23	24		Probability Distributions & CLT
	25	26	27	28	29	30	1		Study Designs, Sampling Bias
OCT	2	3	4	5	6	7	8		Measures of Association
	9	10	11	12	13	14	15		Take Home Quiz: Hyp. Tests
	16	17	18	19	20	21	22		Nonparametric Tests
	23	24	25	26	27	28	29		Study Power
	30	31	1	2	3	4	5		Contingency Tables
NOV	6	7	8	9	10	11	12		ANOVA
	13	14	15	16	17	18	19		Linear Regression
	20	21	22	23	24	25	26		Reading the Literature
	27	28	29	30	1	2	3		
DEC	4	5	6	7	8	9	10		
	11	12	13	14	15	16	17		

The final exam will be offered 1 December, 6 December, and 15 December. The exams on the 6th and 15th are your retake opportunities. You do not need to attend class on the 6th or 15th unless you want to retake the final.

Please note that the exam on 15 December is during the university assigned final exam period. The test is at 8:00am.

Lecture Topics for Biostatistics 600-001 Fall 2011

Lecture	Material
23 Aug	Chapter 1: What is Biostatistics?
25 Aug	Chapter 2: Data
30 Aug	Chapter 3: Summary Methods
1 Sep	Chapter 3: Graphical Summary Methods
6 Sep	Chapter 4: Basic Probability
8 Sep	Chapter 4: Basic Probability, part 2
13 Sep	Chapter 5: From Histogram to Probability Distributions
15 Sep	Chapter 5: CLT & Sampling Distributions
20 Sep	Chapter 6: Study Design
22 Sep	Chapter 6: Sampling
27 Sep	Review (kind of)
29 Sep	Chapter 7: Estimation (Point & Interval)
2 Oct	Chapter 8: Hypothesis Tests for One Variable
6 Oct	Chapter 8: Hypothesis Test for Two Variables
11 Oct	Chapter 9: Nonparametric Tests
13 Oct	Chapter 9: Nonparametric Tests, part 2
18 Oct	Chapter 10: Contingency Tables
25 Oct	Chapter 10: Contingency Tables, part 2
27 Oct	Review
1 Nov	Chapter 12: ANOVA
3 Nov	Chapter 12: ANOVA, part 2
8 Nov	Chapter 13: Linear Regression
10 Nov	Chapter 13: Linear Regression, part 2
15 Nov	Writing Statistics, Statistics in the News
17 Nov	Putting it all together
22 Nov	Global Topics & Ethics in Biostatistics
29 Nov	Review
1 Dec	1 st Exam Opportunity
6 Dec	2 nd Exam Opportunity
15 Dec	**** 8:00am **** Final Exam Opportunity

Homework for Biostatistics 600-001 Fall 2011

Chapter	Problems
1	1.2, 1.3
2	2.1, 2.2, 2.3, 2.8
3	3.2, 3.3, 3.5, 3.8, 3.9, 3.10, 3.13, 3.15 (a)
4	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.11, 4.13
5	5.1, 5.3, 5.5, 5.6, 5.7, 5.8, 5.10, 5.11
6	6.1, 6.3, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.13, 6.14
7	7.3, 7.6, 7.7, 7.8, 7.9, 7.10, 7.12, 7.14
8	8.1, 8.2, 8.5, 8.7, 8.8, 8.9, 8.10, 8.12, 8.15, 8.16
9	9.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8
10	10.1, 10.3, 10.4, 10.5, 10.6, 10.8
12	12.1, 12.2, 12.5
13	13.1, 13.2, 13.3, 13.5