

# Biostatistics I (BIOS 806) Syllabus

Fall 2008 (3 credits)

This course is designed to prepare the graduate student to understand and apply biostatistical methods needed in the design and analysis of biomedical and public health investigations. The major topics to be covered include types of data, descriptive statistics and plots, theoretical distributions, probability, estimation, hypothesis testing, and one-way analysis of variance. A brief introduction to correlation and univariate linear regression will also be given. The course is intended for graduate students and health professionals interested in the design and analysis of biomedical or public health studies.

**Class:** Lecture: Thursday 5:30-8:10pm  
Room: SEC 1005

**Instructor:** Kendra Schmid, Ph.D.  
Assistant Professor, Department of Biostatistics  
College of Public Health  
Office: 3029 Student Life Center  
Phone: (402) 559-8117  
Email: [kkschmid@unmc.edu](mailto:kkschmid@unmc.edu)

**Office Hours:** Monday 3:00 to 4:30 or by appointment

**Teaching Assistant:** Chelsey Erpelding  
Office: TBA  
Phone: TBA  
E-mail: [cerpeldi@unmc.edu](mailto:cerpeldi@unmc.edu)

**Office Hours:** Wednesday 1:00 to 3:00 or by appointment (beginning 09/10)

Please feel free to set up an appointment via e-mail if you have a conflict with the above office hour times. Students may call the course instructor and TA only during the scheduled office hour times, unless prior arrangements have been made. Emailed questions will be addressed within 1 business day.

**Required Text:** *Principles of Biostatistics*, Marcello Pagano and Kimberlee Gauvreau. Brooks/Cole, 2<sup>nd</sup> Edition, 2000.

**Optional Materials:** *Principles of Biostatistics Student Solutions Manual*, Kimberlee Gauvreau. Duxbury, 2<sup>nd</sup> Edition, 2001.

SPSS Statistical Software version 16.0 (other versions also acceptable)

- Course Format:** The course format will include 1 lecture per week. The lectures will be supplemented with small group discussions and activities. For graduate level courses, students should plan to spend approximately 3 hours per week outside of class for each credit hour of class.
- Homework:** There will be reading and written homework assignments due roughly each week at the beginning of class. **Late homework will only be accepted if permission has been given by the instructor prior to the due date.** The written homework assignments may involve short exercises, the analysis and interpretation of biomedical and public health data using the computer program SPSS, and reading assignments from outside the text.
- Assignments must be completed in the original word document and put in the digital drop box on blackboard by 5:30 pm on the due date. Answers to homework questions should include **relevant SPSS output and must include interpretation** of SPSS output, graphs, or tables needed to justify your responses. A printout of the entire SPSS session should not be submitted. Submissions consisting only of SPSS output are unacceptable.
- Quizzes:** There will be quizzes periodically throughout the semester.
- Exams:** There will be 2 midterm exams and a final exam. The exams will involve questions regarding the interpretation of data analyses, much like one would find in the published medical or public health literature, as well as questions regarding the analysis of biomedical and public health data. Makeup exams will be granted in exceptional circumstances only. The instructor **MUST** be contacted prior to the exam for permission.
- Project:** There will be a project that will count for a significant portion of the overall grade. More details will be given at a later date.
- Course Website:** <http://my8.unmc.edu> (use your Lotus Notes user name and password). All lecture notes, homework assignments, answer keys, data sets, practice problems and announcements will be posted on the website. Lecture notes and other class materials will be posted by Wednesday at 5 PM for the following Thursday class period. Each class session (except the computing sessions) will be video taped. The video clips are available on the class website, usually within 24 hours after the class session.
- Statistical Software:** The course will use the statistical software package SPSS. There will be 2 SPSS training sessions in the location listed below:

UNMC: Campus Training Center, 701 S. 42nd Street, room 2030.

SPSS is installed on machines in the following computer clusters:

UNMC:           Campus Training Center  
                  Wittson Hall ground floor computer cluster

UNL:            Henzlick Hall computer lab (PCs)  
                  Other UNL lab information can be found at:  
                  <http://www.itg.unl.edu/labs/labs.php>

Copies of SPSS are available for \$96 at the UNMC bookstore for students who would like to purchase the student version of SPSS for their home computer.

University departments and labs interested in purchasing copies of SPSS should contact the UNL bookstore for site license information (1-800-735-6835).

If you are familiar with other statistical software that you would like to use for homework instead of SPSS, please contact the instructor for permission.

**Grading:**

Homework problems will be graded on each homework assignment. Answer keys will be provided and the student can assess performance on the problems not selected to be graded. The relative weight of each course component is as follows:

- 25%   Homework and Quizzes
- 20%   Midterm Exam 1
- 20%   Midterm Exam 2
- 15%   Project
- 20%   Final Exam

The final grade will be computed as the following weighted sum of the percentage of answers correct in the homework, each of the exams, and the percentage of total points scored on the project.

$$0.25*HW \& Q + 0.20*Exam1 + 0.20*Exam2 + 0.15*Project + 0.20*Final$$

The grading scale will be:

Final Percentage	Grade	Grade Point
> 98.0	A+	4.00
93.0 - < 98.0	A	4.00
90.0 - < 93.0	A-	3.67
88.0 - < 90.0	B+	3.33
83.0 - < 88.0	B	3.00
80.0 - < 83.0	B-	2.67
78.0 - < 80.0	C+	2.33
73.0 - < 78.0	C	2.00
70.0 - < 73.0	C-	1.67
68.0 - < 70.0	D+	1.33
63.0 - < 68.0	D	1.00
60.0 - < 73.0	D-	0.67
< 60.0	F	0.00

## **Learning Objectives:**

Upon completion of the course, students will ordinarily be able to:

- Define a problem or research question and identify an appropriate study design to address the problem or question
- Discuss benefits and process of randomization in an experimental study
- Discuss benefits and drawbacks of observational studies including cohort studies, case-control studies, and cross-sectional surveys
- Describe a data set by creating and interpreting summary statistics and descriptive plots
- Compute and interpret confidence intervals for one and two sample problems involving continuous and dichotomous data
- Perform and interpret hypothesis tests for one and two sample problems involving continuous and dichotomous data
- Perform and interpret a simple linear regression and ANOVA analysis for continuous data and Chi-square analysis for dichotomous data of more than two groups
- Use SPSS to store and retrieve data, to apply methods of analysis discussed in class to a dataset, and be able to interpret results

### Course Schedule

THIS SCHEDULE IS FLEXIBLE AND MAY CHANGE AS THE SEMESTER PROGRESSES  
I RESERVE THE RIGHT TO ADD, CHANGE, OR REMOVE HOMEWORK ASSIGNMENTS OR  
QUIZZES AS NECESSARY.

DATE	TOPIC	TEXT CHAPTER	ASSIGNMENT
08/28	Introduction, Types of data, Describing data	2, 3	Read study design supplemental material
09/04	SPSS Lab: Intro and work on Homework #1 Location: Campus Training Center 4:00-5:45pm		
OR	6:00-7:45pm		Quizzes 1&2 due
09/11	Probability, Theoretical distributions	6, 7	Hmwk #1 due
09/18	Theoretical distributions, Sampling Distribution of the mean	7, 8	Hmwk #2 due
09/25	Confidence Intervals	9	Hmwk #3 due
10/02	Hypothesis Testing	10	Hmwk #4 due
10/09	<b>Exam 1</b>		
10/16	Comparison of Two Means	11	
10/23	Analysis of Variance	12	Hmwk #5 due
10/30	Nonparametric Methods	13	Hmwk #6 due
11/06	Inference on Proportions	14	Hmwk #7 due
11/13	Contingency Tables	15	Hmwk #8 due
11/20	<b>Exam 2</b>		
11/27	<b>No Class (Thanksgiving)</b>		
12/04	Correlation	17	
12/11	Simple Linear Regression	18	Project due
12/18	<b>Final Exam</b>		

**Academic integrity and professional conduct:**

The University of Nebraska Medical Center has established a policy on academic integrity and professional conduct. This policy may be found in the [UNMC Student Handbook](#). All graduate students are expected to adhere scrupulously to this policy. Cheating, academic misconduct, fabrication, and plagiarism are viewed as serious matters and will lead to disciplinary action as described in the [UNMC Student Handbook](#) under Procedural Rules Relating to Student Discipline. Additional materials related to Responsible Conduct in Research can be found in the [UNMC Student Handbook](#).

Selected sections from the UNMC Student Handbook pg. 61-62:

**Cheating:** A general definition of cheating is the use or attempted use of unauthorized materials or information for an academic exercise. Examples of cheating include:

1. Using unauthorized materials such as books, notes, calculators or other aids during an examination or other academic exercises;
2. receiving unauthorized assistance from another person during an exam or exercise such as copying answers, receiving answer signals, conversation or having another person take an examination for you;
3. providing assistance to another person during an exam or exercise, such as allowing your answers to be copied, signaling answers or taking an exam for someone else;
4. obtaining answers and/or other information without authorization from someone who has previously taken an examination;
5. including all or a portion of previous work for another assignment without authorization.

**Academic misconduct:** Academic misconduct is defined as the falsification of official documents and/or obtaining records, examinations or documents without authorization. Several examples of academic misconduct are:

1. the unauthorized acquisition of all or part of an unadministered test;
2. selling or otherwise distributing all or part of an unadministered test;
3. changing an answer or grade on an examination without authorization;
4. falsification of information on an official university document such as a grade report, transcript, an instructor's grade book or evaluation file or being an accessory to an act of such falsification;
5. forging the signature of an authorizing official on documents such as letters of permission, petitions, drop/add, transcripts, and/or other official documents;
6. unauthorized entry into a building, office, file or computer data base to view, alter or acquire documents.

**Plagiarism:** Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, i.e. an appropriate attribution or citation. Some examples are:

1. In the methods section of a thesis, a graduate student describes a procedure used in research for the thesis. The procedure was developed by a fellow graduate student in the laboratory of their major professor; however, neither the student who developed this procedure nor the major professor was given credit in the thesis. This implies that the author of these had himself developed the procedure.
2. In the background section of a thesis, a graduate student quotes verbatim the results of a previous investigator's work but fails to credit the individual through citation. The work is recent and thus cannot be considered common knowledge.