

**University of Arkansas for Medical Sciences**  
**Fay W. Boozman College of Public Health**  
**Department: Biostatistics**  
**Semester: Fall 2011**

**Course Information**

Course number: PBHL 5033  
Course name: Biostatistics III  
Meeting time: Thursdays 1-4  
Meeting place: COPH 3204

**Instructor Information**

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**Course Description**

This course is designed to give students an overview of applied multivariate analysis. Some of the topics include principal component analysis, exploratory/confirmatory factor analysis, path analysis, discriminant analysis and classification, clustering methods and algorithms, Hotelling's T-square, MANOVA, and non-linear models.

**Prerequisites**

PBHL 5013 Biostatistics I  
PBHL 5023 Biostatistics II

Course Objectives

1. Describe selected inferential statistical procedures. (Maps to Departmental Objectives 1 and 3)
2. Choose and perform appropriate statistical procedures for a given data set. (Maps to Departmental Objectives 1, 3 and 4)
3. Identify assumptions and limitations of selected inferential statistical procedures. (Maps to Departmental Objectives 1, 3 and 4)
4. Obtain proficiency with statistical calculations with tools such as calculators and / or selected statistical software packages. (Maps to Departmental Objectives 3 and 4)

## Biostatistics Departmental Objectives

1. Evaluate the research question(s) and recommend the appropriate experimental design and statistical analysis techniques. Grounded in the basics of statistical theory, the student will determine the types of data needed (discrete or continuous), the best way to acquire the data (sampling and sample design), the most appropriate analysis techniques (classical inference, nonparametric, and/or statistical modeling) and the best way to report results (tables, graphs, and appropriate statistics).
2. Determine the best way to collect and store data. With a fundamental knowledge of data management techniques, students will be able to work with all types of data including the large and intricate federal and state databases often used by public health researchers.
3. Perform basic data analysis and modeling. A concentration in biostatistics provides the student with skills to do descriptive and inferential analysis and the ability to work with Masters and Ph.D. biostatisticians on more complex analysis projects.
4. Assist with the technical programming required. Students will have hands on experience with popular statistical programs such as SAS and SPSS and be able to use them in future projects. More importantly, students in the program will have the statistical foundation to provide full time programmers with the algorithms needed for more complex design and analysis projects.
5. Apply their skills and experience as health policy analysts, researchers and statisticians in academic, consulting, clinical, industrial and public sector careers.

## Required Course Materials

1. SAS LE or SAS statistical software.
2. Methods of Multivariate Analysis (Alvin C. Rencher)
3. A Step-by-Step Approach to Using SAS for Factor Analysis and SEM (Larry Hatcher)

## Assignments and Grading

Exam 1	30%	Final Exam	40%
Exam 2	30%		

### *Grading Policies*

Testing materials will be weighted (using the scale above) and the final grade will be assigned as follows:

≥ 90	A
80-89	B
70-79	C
60-69	D
<60	F

## College of Public Health Policies

### *Attendance*

Students are expected to be diligent in the pursuit of their studies and in their class attendance. Students have the responsibility of making arrangements satisfactory to the instructor regarding all absences. Such arrangements should be made prior to the absence if possible. Policies of making up work missed as a result of absence are at the discretion of the instructor, and students should inform themselves at the beginning of each semester concerning the policies of their instructors.

### *Students with a disability*

It is the policy of the UAMS College of Public Health to accommodate students with disabilities pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a documented disability who needs accommodation should request to meet with the course instructor or the Associate Dean for Student and Academic Affairs no later than within the first 14 days (two weeks) following the first class meeting to develop an accommodation plan. Any student with a documented disability who determines later in the semester to seek accommodation or who develops a disability during the semester should refer to the procedures outlined in the college catalogue. Failure to follow these procedures may be construed as a waiver of your rights under the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

*Plagiarism:* Plagiarism is defined as adopting, appropriating for one's own use and/or incorporating in one's own work, without acknowledgement, passages, tables, photographs, models, figures, and illustrations from the writings or works of others; presenting parts of passages of other's writing as products of one's own mind. Any student who plagiarizes may be subject to receiving a zero on the written work and may be dismissed from the College of Public Health.

The College of Public Health subscribes to a web-based plagiarism detection and prevention system that is used by colleges and universities nationwide. The system works by scanning the student's document and matching the document against databases of texts, journals, electronic and web sources (including web sites that distribute or sell pre-written essays or term papers). Course instructors may, at their discretion, submit students' written work to the plagiarism detection system for the purpose of evaluating whether students have plagiarized. *If the instructor of a CPH course opts to use the plagiarism detection system, he or she will inform students of this, and will instruct students about how to submit their written work to the system.*

**Course Schedule (subject to change)**

**CLASS SCHEDULE**

<b><u>DATE</u></b>	<b><u>TOPIC</u></b>
Class Meeting 1, Aug 25	Matrix Algebra/SAS IML
Class Meeting 2, Sept 1	Characterizing and Displaying Multivariate Data/ Multivariate Normal Distribution (Computer Lab)
Class Meeting 3, Sept 8	Test on One or Two Mean Vectors
Class Meeting 4, Sept 15	Multivariate Analysis of Variance
Class Meeting 5, Sept 22	<b>Exam 1</b>
Class Meeting 6, Sept 29	Principal Component Analysis
Class Meeting 7, Oct 6	Exploratory Factor Analysis
Class Meeting 8, Oct 13	Canonical Correlation
Class Meeting 9, Oct 20	Discriminant Analysis and Classification (LDA & QDA)
Class Meeting 10, Oct 27	Discriminant Analysis and Classification ( <i>k</i> NN)
Class Meeting 11, Nov 3	<b>Exam 2</b>
Class Meeting 12, Nov 10	Cluster Analysis
Class Meeting 13, Nov 17	Path Analysis
Nov 24	<b>THANKSGIVING - No Class</b>
Class Meeting 14, Dec 1	Confirmatory Factor Analysis
Class Meeting 15, Dec 8	SEM
Class Meeting 16, Dec 15	<b>Final Exam</b>

**Important Dates:**

August 26<sup>th</sup> – last day to drop a course with a 100% refund

September 16<sup>th</sup> – last day to drop without a “W” in the Fall

November 18<sup>th</sup> – last day to drop a course in the Fall