

**Pubh 7200 Biostatistics**  
Dept. of Health Science  
AASU

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Location: Hawes Hall 208 G (Economics Department)

**Course Description:**

The course will include entry, analysis, application, and interpretation of biomedical statistics. Topics will include parametric and non-parametric descriptive and inferential statistical methods.

**2. Prerequisites:** Graduate Status.

**3. Student Learning Objectives:**

- [a] Identify and summarize the purpose and value of health research, clinical trials, and criteria for assessing research methods (e.g. sample size, probability data).
- [b] Differentiate descriptive from inferential statistics, distinguish types of variables based on the Stevens Measurement scale.
- [c] Critically evaluate health science studies regarding methodological and statistical strengths and weaknesses.
- [d] Interpret and deduce the results of significance tests.
- [e] Summarize the basics of quantitative analysis
- [f] Able to match appropriate analysis technique with the data type.
- [g] Produce a MS Word document containing SPSS output results.
- [h] Demonstrate the use of computational software (SPSS) and conduct descriptive and inferential analyses.

**4. Assignments:**

There will be nine Lab Assignments, and a data analysis report. Each student will prepare a data analysis report from national health data set. This report will be generated using SPSS, and outputted to MS Word, thus students will learn the full circle of creating a statistical data set, analyzing their data, and outputting results into a MS word report Print out a copy of the Student Learning Manual and put it in a note book for use through the course.

**5. Required Texts:**

1. Available online at Webct. SEE: Text Chapters
2. SPSS Guides. SEE: SPSS Guides ©SPSS.Inc

Special Note: Feedback comments for your assignments are available in the Assignments Dropbox, just click on the word “Grade” under the STATUS column.

## 6. Required Software

Each student is to purchase or have access to SPSS version 13.0. There is a student edition available from the SPSS Inc. (regular Student edition, not graduate pac).

See: <http://estore.e-academy.com>

Click on Software and do a search for SPSS.

(\$45.99 for six months)

## 7. Supplemental Reading List:

Ducan, R.C., Knapp, R. G., and Miller, M.C. (1983). **Introductory Biostatistics for the Health Sciences**, 2<sup>nd</sup> Edition. Albany, NY: Delmar Publishers, Inc.

Bland (2000). **An Introduction to Medical Statistics**. London: Oxford University Press.

Pagano, M, and Gauvreau, K. (1993). **Principles of Biostatistics**. Belmont, CA: Duxbury Press.

Essex-Sorlie, D. (1995). **Medical Statistics and Epidemiology**. Norwalk, CN: Appleton and Lange.

Zar, J. H. (1999). **Biostatistical Analysis**, 4<sup>th</sup> Edition. Upper Saddle River, NJ: Prentice-Hall Inc.

Campbell, M.J, and Machin, D. (1993). **Medical Statistics: A Commonsense Approach**, 2<sup>nd</sup> Edition. West Sussex, England: John Wiley and Sons, Inc.

## 8. Attendance:

For the inclass students class attendance is strongly recommended. Make up exams will only be given in cases of crises. In the case of an emergency, personal illness, death in the family, etc., you will need to provide documentation.

## 9. Academic Honesty

Students are encouraged to do their lab assignments together to facilitate the learning process. Students are expected to do the examinations without assistance from other persons. Any allegations or evidence of violating this prescription will be referred to the Student Affairs Office to be dealt with according to AASU policy.

## 10. Grading System

Students will earn a letter grade based on the combined total points accumulated from all means during the semester. At the end of the semester all points earned will totaled letter grade will be obtained from the grid displayed below. Total points available are 400.

Letter Grade	Total Points Range
A	334-400
B	322-333
C	332-297
D	298-261
F	260-000

### 11. Examinations and Methods of Evaluation:

The following assessment tools will be used to measure the student's progress in achieving the seven learning objectives identified above:

- (1) Lab Work: 1 to 9: (9x15=) 135 points (Obj. 1-6) SEE: WebCt for Schedule
- (2) Midterm-1 70 (Obj. 1-6)
- (3) Final: 100 points (Obj. 1-6)
- (4) Data analysis report: 95 points (Obj. No. 7-8)
- (5) Total Points: 400

The above assessment tools will incorporate measures to evaluate acquisition knowledge and skills of the following:

1. Students will understand the fundamental research concepts of sample size, randomization, power, control or comparison groups, and temporal dimensions.
2. Students will complete calculations for all descriptive measures on several health data sets involving breast cancer and CHD. Calculations will all be done on computer using SPSS, some Excel.
3. Student will gain fundamental understanding of design and variable appropriate data analysis and concepts.
4. Students will demonstrate computer analysis skills using SPSS and produce an analysis report.
5. Students will have to write up interpretations for all inferential results, indicating hypothesis decision, p-values, generated in their laboratory analysis reports.
6. Students distinguish and interpret statistical and practical significance.

7. Students will have to transfer SPSS output into MS Word demonstrating their ability to create reports from computer output.

## **12. Course Units and Topics Outline:**

1. Defining health research, samples and populations and getting started with SPSS.

Readings: Unit 1

SLM: Session 1

2. Descriptive analysis and measures of central tendency

Readings: Unit 2, Unit 3

SLM: Session 2

3. Normalizing Data by Transformation and understanding means

Readings: Biostatistics 101: Data Presentation by Chan

SLM: Session 3

4. Hypothesis testing in the health sciences

Readings: Unit 5, Unit 6, Unit 7, Unit 8, 1.1 Paired T-test, 12. Unpaired T-test,

SLM: Session 4

5. Proportions and approximation to the binomial

Readings: Unit 9, Unit 10, Biostatistics 103: Qualitative Data Tests of Independence, 1.3

Chi-Squared Test,

SLM: Session 5

6. Hypothesis testing categorical data.

Readings: Biostatistics 103: Qualitative Data Tests of Independence by Chan, 2.1 The Sign test, 2.2 Wilcoxon Signed rank Sum test, 2.3 Mann-Whitney U test.

SLM: Session 6

7. More Nonparametric tests

Readings: Biostatistics 102: Quantitative Data, Parametric and Non-Parametric tests

SLM: Session 7

## 8. Correlational and Linear Regression Analysis

Readings: Unit 14, Biostatistics 104: Correlational Analysis by Chan

SLM: Session 8

## 9. Multiple Regression

Readings: Unit 15, Chapter 7: Multiple Regression

SLM: Session 8

## 10. ANOVA (Analysis of Variance)

Readings: Unit 12, Unit 13, Biostatistics 301 and 301A by Chan

SLM: Session 9