# Biostatistics in Public Health

**Course no.:** PUBH 5305  
**Course CRN:** 13639  
**Semester/year:** Fall Semester 2017  
**Graduate credit hours:** 3  
**Class location:** Miners Hall (MNRS) 201  
**Class meeting time:** Tuesdays 5p-750p  
**Class instructor:** Dr. Oralia Loza, Ph.D.  
**Office location:** HSN 405  
**Phone:** 915.747.7232  
**Email:** oloza@utep.edu  
**Office hours:** Tuesdays 1130a-1p and Thursdays 1130a-1p  
**Preferred contact method:** email

**Course description:** Core course focuses on the analysis, interpretation, and presentation of public health data. Overview of measurement methods, descriptive statistics, confidence intervals and bivariate hypothesis testing using t-tests, Chi-Square test analysis of variance and multiple comparisons, correlation and their non parametric test equivalents.

**Course prerequisites:** One prior UG or GR statistics course with grade of B or better.

**Required textbooks:** Essentials of Biostatistics for Public Health, Second Edition [Paperback]  
Authors: Lisa M. Sullivan  
Publisher: Jones & Bartlett Learning  
[http://www.jbpub.com/essentialpublichealth/sullivan/2e](http://www.jbpub.com/essentialpublichealth/sullivan/2e)

**Required software:**  
- Microsoft Office  
- IBM® SPSS® Statistics: data management and statistical analysis software  
Access is available for free to UTEP students under [MY.APPS.UTEP.EDU](http://www.jbpub.com/essentialpublichealth/sullivan/2e)

**Supplemental reading:** The Practice of Statistics in the Life Sciences, Second Edition  
Authors: Brigitte Baldi and David S. Moore  
Publisher: W. H. Freeman  

Authors: Andy Field  
Publisher: SAGE Publications Ltd  
[http://www.uk.sagepub.com/books/Book238032](http://www.uk.sagepub.com/books/Book238032)
### Additional Resources:
- Health Science Librarians
  - [http://libguides.utep.edu/public_health](http://libguides.utep.edu/public_health)
  - Harvey Castellano hcastell@utep.edu
- Technology Support Center (TSC)
  - Workshops: [tsc.utep.edu/workshops](http://tsc.utep.edu/workshops)
  - Report issues to: [https://servicedesk.utep.edu](https://servicedesk.utep.edu) or Mr. Frank Poblano fpoblano@utep.edu
- Statistical Consulting Laboratory @ UTEP Bell Hall 131 (not for tutoring)

### Course format:
Course combines in-class lectures and homework exercises. Although students may sometimes work in groups while in the class, please note that all work done outside the class should be completed on an individual basis including homework exercises.

Lecture notes, course material, assignments, graded assignments (with feedback), grades, and other selected materials will be available in class or on BlackBoard (BB).

### Major learning objectives:
**Course Objectives:** Upon completion of this course the student will learn the appropriate use of statistical methods for the analysis of data, with continuous and categorical responses, using statistical analysis software SPSS Statistics. These objectives should contribute to student’s ability to critically review the public health and epidemiologic literature, and to carry out statistical analyses. Students will learn to:
1. identify sources of health related data and statistics including sources such as the CDC, and Healthy People 2020
2. utilize biostatistical terminology in written and oral interpretations of statistical test results
3. write clear and concise interpretation of statistical analyses results in public health studies
4. utilize appropriate mathematical equations and equations for hypothesis testing
5. describe model assumptions for statistical tests
6. select the appropriate statistical methods (e.g., descriptive or analytic, parametric or parametric)
7. demonstrate technical skills needed to view, summarize, and analyze data using SPSS output.
8. read tables and graphs from manuscripts and/or reports
9. develop written and oral presentation of a complete descriptive and bivariate statistical analyses.

### Assessment strategies:
1. **Bivariate Analysis Project (BAP):** Students will identify a dataset and develop and test three hypotheses. This project will be completed in separate assignments then presented in a final 10-minute presentation and a report.
   - BAP 1: Selecting Dataset
   - BAP 2: Selecting Variables
   - BAP 3: Univariate Analyses
   - BAP 4: Stating the Hypotheses
   - BAP 5: Bivariate Analyses
   - BAP Final Presentation
2. **SPSS Modules:** These modules include screen shots with directions to generate univariate and bivariate descriptive statistics, plots, and tests.
3. **Word Problems from the Textbook**
4. **Exams on general course material:** Students will also be tested on the course material in quiz and exam format.
<table>
<thead>
<tr>
<th>Program Competencies (core competency area must be identified &amp; number according to that listed by the MPH program)</th>
<th>Learning objectives</th>
<th>Assessment strategies</th>
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</thead>
<tbody>
<tr>
<td>This course meets the following MPH degree &amp; graduate certificate in public health competencies</td>
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<tr>
<td><strong>BIOSTATISTICS CORE COMPETENCIES</strong></td>
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<tr>
<td>1. Describe the roles biostatistics serves in the discipline of public health.</td>
<td>1, 3, 8, 4</td>
<td>1, 2, 3, 4</td>
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<td>2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions.</td>
<td>4, 3, 4</td>
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<td>3. Describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.</td>
<td>6, 1, 4</td>
<td>1, 2, 3, 4</td>
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<td>4. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.</td>
<td>6, 1, 2, 3, 4</td>
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<tr>
<td>5. Apply descriptive techniques commonly used to summarize public health data.</td>
<td>6, 7, 9, 1, 2, 3, 4</td>
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<td>6. Apply common statistical methods for inference.</td>
<td>6, 7, 1, 2, 3, 4</td>
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<td>7. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.</td>
<td>6, 7, 9, 3, 4</td>
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<td>8. 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.</td>
<td>7, 1</td>
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<td>9. Interpret results of statistical analyses found in public health studies.</td>
<td>1, 2, 8, 3, 4</td>
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<td>10. Develop written and oral presentations based on statistical analyses for both public health professionals and educated lay audiences.</td>
<td>2, 3, 9, 1</td>
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<tr>
<td><strong>EPIDEMIOLOGY CORE COMPETENCIES</strong></td>
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<tr>
<td>1. Identify key sources of data for epidemiologic purposes.</td>
<td>1, 8, 1</td>
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<td>7. Calculate basic epidemiology measures.</td>
<td>4, 3, 4</td>
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<td><strong>HISPANIC/BORDER HEALTH CONCENTRATION-SPECIFIC COMPETENCIES</strong></td>
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<td>5. Identify and access the major sources of public health data that pertain to Hispanic and border communities (e.g., vital statistics and disease registries, health and nutrition surveillance databases, census data, national surveys).</td>
<td>1, 8, 1</td>
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<td><strong>Grading scale &amp; criteria</strong></td>
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<td>Student performance will be evaluated on:</td>
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<tr>
<td>• Assignments (30%)</td>
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<td>• Quizzes, Midterm Exam, and Final Exam (30%)</td>
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<td>• Bivariate Analysis Project (BAP) (35%)</td>
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<td>• Class Participation (5%)</td>
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<td>Grading Scheme: A (&gt; 90%), B (80-89%), C (70-79%), D (60-69%), and F (&lt; 60%)</td>
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<td><strong>Incomplete policy:</strong></td>
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<td>Incomplete assignments will be graded. Partial credit will be provided.</td>
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## Course/Instructor & Institutional Policies

| Attendance: | It is UTEP policy that all students attend **ALL** scheduled classes. Attendance will be taken at each class. When a student registers for a course, it is assumed that she/he has made arrangements to avoid such conflicts. Students are responsible for any information or activities presented in class discussions, lectures, assignments, and/or readings. If you are unable to attend class, it is your responsibility to inform the instructor before the respective class session. Students may be administratively withdrawn for excessive unexcused absences (**3 classes**). Compliance to due dates, in class presentations, homework, exams and other activities is mandatory. **All emergency-related absences must be verified.** Chronic tardiness not only reflects lack of commitment and professional behavior but also is disruptive to your classmates and the instructor. You are expected to be in class on time. |
| Reading assignments: | All assigned readings need to be completed prior to coming to the next scheduled class session. Example: the reading assignments for week 2 need to be completed prior to coming to the week 2 class session. |
| Writing standards | Effective public health leaders and practitioners are also effective written as well as oral communicators. Written communication is a critical element of the communication process. Our MPH graduate program both recognizes and expects good writing to be the norm for course work. Please feel free to seek out assistance from the UTEP Writing Center. It is free and they are very helpful. |
| Policy for late assignments | Late work will receive point reduction: **50% within two days of deadline. Submission will receive no credit, if submitted after two days.** |
| Permission to record lectures & discussions | Not permitted without express permission of the instructor |
| Cellphone/electronic tablet/ use policies: | Please note that all cellular telephones, pagers, headphones, iPods, iPads, mp3 players, earpieces, laptops, and other forms of communication and entertainment technology equipment must be powered off and put away during the class period. If a situation should arise which necessitates a student to be contacted by a physician or family member, the instructor shall be notified and cell phone can be set to “vibrate.” Please be advised that students who use unauthorized technology during class time will be dismissed from that week’s class session. |
| Field trip policies: | N/A |
| Class participation: | **Active student participation in this course is very important. Students must be prepared to come to class to discuss, answer questions, and participate in all class activities.** |
| Special accommodations: | If you have or suspect a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 915.747.5148, cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, visit [http://sa.utep.edu/cass/](http://sa.utep.edu/cass/). CASS’ Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities. |
| Student conduct: | Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. “Scholastic dishonesty includes but is not limited to cheating, plagiarism,
collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another student, any act designed to give unfair advantage to a student or the attempt to commit such acts.” Regent’s Rules and Regulations, Part One, Chapter VI, Section 3.2, Subdivision 3.22. Since scholastic dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. From the UTEP Dean of Student Affairs (http://studentaffairs.utep.edu/Default.aspx?tabid=4386) “It is an official policy of university that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts”.

Examples of “cheating” include:

- Copying from the homework, in-class work or exam paper of another student, engaging in written, oral, or any other means of communication with another student during an exam or homework assignment, or giving aid to or seeking aid from another student during a test;
- Possession and/or use during an exam or home test of materials which are not authorized by the person giving the test, such as class notes, books, or specifically designed “crib notes”;
- Using, obtaining, or attempting to obtain by any means the whole or any part of non-administered test, test key, homework solution, or computer program; using a test that has been administered in prior classes or semesters but which will be used again either in whole or in part without permission of the instructor; or accessing a test bank without instructor permission;
- Collaborating with or seeking aid from another student for an assignment without authority;
- Substituting for another person, or permitting another person to substitute for one's self, to take a test;
- Falsifying research data, laboratory reports, and/or other records or academic work offered for credit.

“Plagiarism” means the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own academic work offered for credit, or using work in a paper or assignment for which the student had received credit in another course without direct permission of all involved instructors. NOTE: This includes cutting-and-pasting and photocopying from on-line and other material.

“Collusion” means the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on scholastic dishonesty.
# TENTATIVE COURSE SCHEDULE *

<table>
<thead>
<tr>
<th>Dates</th>
<th>MATERIAL: Chapter Lectures (READ CHAPTER BEFORE CLASS), SPSS Modules, and Bivariate Analysis Project (BAP)</th>
<th>SPSS &amp; BAP Assignments DUE</th>
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</thead>
</table>
| **WEEK 1** Aug 29 | Introduction to Biostatistics (Chapter 1)  
SPSS 1. Introduction to SPSS and Importing data  
**Special Topics:** Sources of Data  
**Speaker:** SPH Officer Presentation |  |
| **WEEK 2** Sept 5 | Study Designs (Chapter 2)  
SPSS 2. Entering Data and Defining Variables  
**Special Topics:** Paso del Norte Healthy Communities Network  
**Speaker:** Darlene Muguiro, IHS PHD Program |  |
| **WEEK 3** Sept 12 | Summarizing Data (Chapter 4 – categorical)  
SPSS 3. Data Manipulation  
SPSS 4. Introduction to Graphing |  |
| **WEEK 4** Sept 19 | Summarizing Data (Chapter 4 – continuous)  
SPSS 5. Univariate Descriptive Statistics and Plots |  |
| **WEEK 5** Sept 26 | Probability (Chapter 5 – categorical)  
SPSS 6. One-Sample Binomial Test |  |
| **WEEK 6** Oct 3 | Probability (Chapter 5 – continuous)  
SPSS 7. One-Sample t-Test |  |
| **WEEK 7** Oct 10 | Probability (Chapter 5 – categorical) – con’t  
Probability (Chapter 5 – continuous) – con’t  
Midterm Exam Practice Questions from Textbook |  |
| **WEEK 8** Oct 17 | MIDTERM  
BOOK CHAPTERS: 2, 4, 5  
SPSS: 1-7 |  |
| **WEEK 9** Oct 24 | SPSS 8. Bivariate Descriptive Statistics and Plots  
**BAP:** Guidelines and Hypotheses |  |
| **WEEK 10** Oct 31 | Hypothesis Testing Procedures (Chapter 7 – One Sample Tests)  
SPSS 9. Two-Sample t-Tests and Paired t-Test  
SPSS 12. Correlation |  |
| **WEEK 11** Nov 7 | Hypothesis Testing Procedures (Chapter 7 – Chi-Square Tests)  
SPSS 11. Chi-square Analysis and Odds Ratios |  |
| **WEEK 12** Nov 14 | Hypothesis Testing Procedures (Chapter 7 – t-tests and ANOVA)  
SPSS 10. One-Way ANOVA and Multiple Comparisons  
SPSS 13. Nonparametric tests |  |
| **WEEK 13** Nov 21 | **Special Topics:** Reports and Summary Tables  
**BAP:** Work Session |  |
| **WEEK 14** Nov 28 | **BAP:** Presentations (10 minutes/student or team) |  |
| **WEEK 15** Dec 5 | **BAP:** Presentations (10 minutes/student or team)  
Final Exam Practice Questions from Textbook |  |
| **WEEK 16** Dec 12 | **FINAL EXAM:** Tuesday, Dec 12th 4p – 6p  
BOOK CHAPTERS: 7  
SPSS: 8-13 |  |

* Syllabus is subject to change. Assignments and due dates provided on BlackBoard.  

**NOTE:** the instructor reserves the right to change the syllabus during the semester (e.g., deadlines, grading scheme). In the event that a change is made, you will be notified.