

Palestine Polytechnic University

College of Medicine

19033 - Biostatistics for Medicine

Summer Semester 2019-2020

Course Name	: (19033) Biostatistics for Medicine.
Class Schedule	: Section 1+4: Sun. Mon. Tues. Wed. 9:30-10:45. : Section 2: Sun. Mon. Tues. Wed. 8:00-9:15. : Section 3: Sun. Mon. Tues. Wed. 13:00-14:15.
Instructor	: Name: Monjed H. Samuh E-mail: monjedsamuh@ppu.edu Website: http://staff.ppu.edu/monjedsamuh
Office	: B+503.
Office Hours (Virtual)	: Sat. 20:00-21:00 (E-Class). : Tues. 20:00-21:00 (E-Class). : or by appointment (via email).

Required Texts and References

1. Cohen, Y. & Cohen, J.Y. (2008). [Statistics and Data with R: An applied approach through examples](#). John Wiley & Sons.
2. Daniel, Wayne W. & Cross, Chad L. (2018). [Biostatistics: A Foundation for Analysis in the Health Sciences \(11th Edition\)](#). John Wiley & Sons.
3. Pagano, M. & Gauvreau, K. (2000). [Principles of biostatistics](#). Duxbury.
4. Rosner, B. (2016). [Fundamentals of Biostatistics \(8th Edition\)](#). Cengage.
5. Samuels, M.L., Witmer, J.A. & Schaffner, A. (2015). [Statistics for the Life Sciences \(5th Edition\)](#). Pearson.
6. Shahbaba, B. (2012). [Biostatistics with R: An Introduction to Statistics Through Biological Data](#). Springer.
7. Triola, M.M. & Triola, M.F. (2019). [Biostatistics for the Biological and Health Sciences \(2nd Edition\)](#). Pearson.

Required Software and Studio

- Program R and supporting materials available for free from www.r-project.org;
- RStudio, available for free download at <https://www.rstudio.com>.

Course Website

- The course website is on Moodle through E-Class.
- Access can be found at <http://eclass.ppu.edu/> (you must log in with your PPU username and password).
- Enrollment key:
 - **Section 1+4:** Biostat19033Sec1.
 - **Section 2:** Biostat19033Sec2.
 - **Section 3:** Biostat19033Sec3.
- E-Class allows for the distribution of static content (e.g., syllabi, schedules, announcements, and lecture notes), and also provides access to interactive tools (e.g., discussions, live chat, and online assessments).
- E-Class facilitates communication between the instructor and the students, as well as encouraging discussions among students.

Course Description This course is aimed to help students learn the basic statistical methods that are commonly used in medicine and biomedical research. Topics include tools for describing data; theoretical probability distributions; methods for performing statistical inference; Epidemiological measures; Non-parametric methods; Contingency tables; etc. Moreover, students will get an introduction to R language. Program R helps students better understand how statistics is actually working. Throughout the course, real-life applications from medicine and life sciences will be used.

Intended Learning Outcomes After the completion of this course, students should be able to:

1. Understand the basic concepts and terminology of biostatistics, including the various kinds of variables, measurement, and measurement scales.
2. Summarize, and present data using appropriate methods, such as joint frequency table, frequency histogram and various types of bar charts.
3. Describe data using numerical measures and understand how they are applied in decision-making situations.
4. Discover how to use R and RStudio for data analysis.
5. Apply the common rules of probability and to identify the types of processes that are presented by some theoretical probability distributions.
6. Learn methods of sampling and sampling distribution.
7. Estimate the sample size that is needed to conduct a research study.

8. Perform statistical inference (Estimation and hypothesis testing).
9. Understand the concepts of correlation and regression.
10. Perform linear regression model and use it to make predictions.
11. Analyze the differences between group means and their associated procedures.
12. Analyze contingency tables.
13. Calculate and interpret epidemiological measures.
14. Perform simple and multiple logistic regression model.
15. Calculate and interpret a wide variety of nonparametric tests commonly used in practice.

Course Outline and Calendar

Topics	HOURS
Topic 1: Introduction	1
Topic 2: Exploratory Data Analysis	3
Topic 3: Probability, Densities and Distributions	5
Topic 4: Point and Interval Estimation	3
Topic 5: Hypothesis Testing	3
Topic 6: Power Analysis and Sample Size Determination	3
Topic 7: Analysis of Variance	2
Topic 8: Simple Linear Regression	2
• Topic 9: Multiple Linear Regression	2
Topic 10: Analysis of Contingency Tables	5
Topic 11: Epidemiological Measures	4
Topic 12: Simple Logistic Regression	3
Topic 13: Multiple Logistic Regression	2
Topic 14: Analysis of Survival Data	3
Topic 15: Nonparametric Methods	3
Topic 16: Analysis of Covariance	2
Topic 17: Clustering	2

Course Policies

- Please do the reading from the sections to be covered before coming to class each day. Your instructor will be planning class activities assuming you have done the reading.
- **Slides:** Presentation slides will be made available on the class website prior to the lecture.
- **Homework:** There will be two types of homework assignments.

1. **Mini Homework:** these are problems which arise while lecturing. I will assign a mini homework almost every class day.
 2. **Major Homework:** these are set of problems assigned at the end of each chapter.
- You may collaborate on homework, but you must write your submitted work in your own words. All steps are required, this includes showing calculations, derivations, and proofs.
 - You have to devote to this class several hours per week of concentrated attention to understand the subject enough so that standard problems become routine. If you think that coming to class and reading the examples while also doing something else is enough, you're in for an unpleasant surprise on the exams.
 - Attending classes is compulsory; according to the University regulations, a student who misses more than 4 lectures will be prevented from entering the final exam.
 - In the event that a student has to miss a class, he is responsible to get caught up with the materials covered and homework assigned.
 - No make-up tests will be hold in any circumstance, any student with accepted excuse will be given the grade of the final transferred to appropriate weight. Make-up of the final test will follow the university regulations.
 - All students are expected to be in the classroom on time. **Being late will be treated as being absent.**
 - It is the **student's responsibility to observe the academic calendar for important dates.**
 - It is the **student's responsibility to be knowledgeable about the rules and regulations that govern your study at the university.**
 - I assume, the students come to class to learn, I come to class to teach.
 - We will be respectful of everyone in class.
 - Mobiles should be turned off before the beginning of each class, no exceptions.
 - There will be no talking in class, except to ask instructor questions or share comments with the entire class. Talking is disruptive to the class and disrespectful to the Instructor.
 - There will be no texting, reading, eating, etc., while in class.
 - Lectures will be recorded via Moodle and will remain feasible for two or three weeks. Thus, it is recommended that you take notes in class and ask questions when something is not clear, and actively participate in the in-class discussions and activities.
 - Cheating will be dealt with according to the University rules.
 - Wastah is the thing that the Instructor hates the most!. Definitely, No grade will be changed because of Wastah.

Teaching Methods

- Explaining concepts and applications through PDF Lecture slides.
- Lecture slides and other resources will be uploaded on the course website.
- Problems and exercises will be assigned from the text on each section at the time of discussing the section.

Grade Distribution

- Your final grade will depend on the following components with these proportions:
 - **Assignments** (25%).
 - **Participation** (10%).
 - **Project** (20%).
 - **Final Exam** (45%): To be announced by the University.
- You need to achieve at least 60% in order to pass the course.