BIOS 101:
Principles of Biostatistics and Data Science for Cancer Researchers
University of New Mexico Comprehensive Cancer Center

Fall 2017

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Background

Understanding biostatistics is paramount for cancer research. BIOS 101: Principles of Biostatistics and Data Science for Cancer Researchers at the UNM Comprehensive Cancer Center (UNM CCC) is a diverse program presented in a 9 lecture series. The lectures introduce the basic principles of biostatistics and quantitative data science and are intended for those who are in the process of learning biostatistical applications, or for those who desire a refresher course. Types of data, descriptive statistics, estimation, hypothesis testing, correlation/regression, survival analysis, sample size calculation, and guidelines for statistical genomic data analysis will be taught in this course series. Some classes will introduce the use of basic theory and application through computing as a tool or utilizing free statistical software.

Course Description	This course covers basic statistical methods.
Course Goal	The goal of this class is to introduce the basic statistical concepts and methods for cancer research.
Course Outlines	See the syllabus below
Course Prerequisites	None
Course Format	The course will consist of both lecture and hands-on instruction. The lecture materials (slides) will be posted before the class.
Registration Policy	There is *no fee* for this lecture series. However, students should be registered before October 3rd via email to the administrative assistant. ***Note that some students may want to take only selective lectures, and this will be acceptable as long as registered.**
Who will take this course?	Clinicians, Fellows, Cancer Researchers, and Cancer Biology Students. Note that only UNM Health Science employees are eligible, and exceptional cases should be discussed with the Coordinator prior to the registration deadline.
Where	UNMCCC Boardroom
Time	September 21, 2017 – Nov 16, 2017: Every Thursday 4:00 – 5:00 pm;
Credit policy	No credit for this course.
Home work	Every week there will be a homework assignment (5 questions), and this will be considered as a test to assess if the student understood the material.
Grade	50% Homework, 50% Attendance → Pass (Certification will be provided) or Fail
Certification	The class **certification** will be given to students who completed and passed the course (7 of 9 lectures is required as the minimum attendance).
Course evaluation	At the end of each class, students are recommended to fill **an evaluation** form for the lecture.

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Syllabus for BIOS 101:

Principles of Biostatistics and Data Science for Cancer Researchers
University of New Mexico Comprehensive Cancer Center

# Sequence	Date Room 4-5 PM Thursday	Contents	Goals
1. (LEE)	Sep 21	Introduction	• Understand definition of statistics/statistical inferences • Data types • Descriptive statistics • Distributions (Normal, Binomial, Poisson)
2. (LEE)	Sep 28	Estimation/ Hypothesis Testing and Statistical Inferences	• Understand how to lay out scientific questions with hypotheses • Understand basic statistical inference: p-value, confidence interval, Type I error, & power.
3. (LEE)	Oct 5	Common Statistical Tests **I**	• Association/Group Comparisons • Basic assumptions required for common statistical tests including the t-, paired t-tests, Chi-Square, Fisher's exact test, and the corresponding non-parametric tests
4. (LEE)	Oct 12	Common Statistical Tests **II**	• Linear Regression • ANOVA • 2 x 2 Contingency Tables • Logistic Regression
5. (Kang & Du)	Oct 19	Genomic Data Analysis I	• Principles and Challenges for High Throughput Genomic Data Analysis • Differential Gene Expression Analysis
6. (Kang & Du)	Oct 26	Genomic Data Analysis II	• Clustering and Classification using High Throughput Genomic Data
7. (LEE & Du)	Nov 2	Introduction to Clinical Trials	• Concepts of Phase I, II, III, and IV • Primary and secondary endpoints • Translational study→ Confirmation study • New Trends for Phase I/II
8. (LEE)	Nov 9	Survival Analysis	• Kaplan-Meier Curve with Log Rank Test • Cox Regression Model
9. (LEE)	Nov 16	Sample Size Calculation	• Understand the role of sample size, effect size, variability, and power in study design. • For cell culture experiments what is your sample size?

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Lecture Evaluation Form

This evaluation is anonymous.
DO NOT PUT YOUR NAME ON THIS SHEET.

COURSE: BIOS 101 at UNMCCC, Fall 2016
COURSE SEQUENCE: Check ONLY one box.

Sequence	1	2	3	4	5	6	7	8
Check Box								

Please score 1 (Lowest) – 2 – 3 – 4 – 5 (Highest) for each box

Lecture Content	Organization & Presentation	Overall Rating

COMMENTS:

1.

2.

3.

4.

5.

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