

COURSE SYLLABUS

Topics in Biostatistics (STAT 436) – Fundamentals of Applied Statistics

Spring Semester, 2014; Tuesdays and Thursdays 2.30 – 3.45pm in Life Science Building (LSB), Room 212

Prerequisites: Some exposure to basic statistical/biostatistical methods (e.g. as covered in BIOL/STAT335) including ANOVA and regression; maturity to move quickly through somewhat sophisticated material.

Text: T.E. O'Brien, *Intermediate Methods in Applied Statistics & Biostatistics* (©2014), Springer manuscript.

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Office Hours: Tuesdays and Thursdays 1.00-2.00pm and 5.00-5:30pm, and by appointment

Course Web Page: <http://webpages.math.luc.edu/~tobrien/courses/newab/course-homepage.html>

Course Overview

Basic courses in statistics and biostatistics prepare individuals to perform the simplest statistical analyses such as simple linear regression or correlation, paired or two-sample t-tests, one- or two-way ANOVA, and analysis of covariance. However, practitioners are often faced with more sophisticated datasets for which these methods are invalid. Fortunately, basic statistical techniques have been adapted and generalized to handle categorical data, generalized and nonlinear regression, repeated-measures and survival analysis methods, and these latter techniques are the focus of this course. Each of these methods is motivated in this course using real-life examples. As such, the focus throughout this course is on applications; mathematical theory and derivations will only be discussed and emphasized as needed.

This course covers the basics of experimental design and analysis, simple and multiple linear regression, generalized linear and nonlinear regression, statistical bioassay and drug synergy, repeated measures, and censored data analysis and survival statistics methods (e.g., Cox proportional odds, log-rank tests, Kaplan-Meier estimation). Students will be required to analyze real-life data sets using the Minitab, R and SAS statistical packages. Grading will be based on participation, homework assignments, and exams.

Homework and Exams

Homework assignments will be given at least once every week, graded and returned to students in a timely manner to give students needed feedback. The three 75-minute semester exams are scheduled for Thursday February 6th, Thursday March 20th, and Tuesday April 15th. The (comprehensive) final exam will take place on Thursday May 1st from 9.00am to 11.00am.

Grading Scheme

Homework	12%
Exam 1 (Thursday, February 6)	20%
Exam 2 (Thursday, March 20)	20%
Exam 3 (Tuesday, April 15)	20%
Comprehensive Final Exam	25%
Class Participation	3%

Final course (letter) grades will be awarded according to the following grading scheme:

[92.5 , 100] = A

[90.0 , 92.5) = A-

[87.5 , 90.0) = B+

[82.5 , 87.5) = B

[80.0 , 82.5) = B-

[77.5 , 80.0) = C+

[72.5 , 77.5) = C

[70.0 , 72.5) = C-

[67.5 , 70.0) = D+

[60.0 , 67.5) = D

[0.0 , 60.0) = F

Participation

Students are expected to actively participate in class discussion. To the extent possible, students should read the lecture material before class so as to best benefit from the class lecture and discussion.

Computing

Students will develop the ability to analyze data sets using the Minitab, R and SAS software packages, although no previous exposure to these packages is needed. Students are required to have/use a calculator.

Academic Honesty

It is presumed and required that students do their own work on the homework assignments and all exams. Discussing homework problems with others is encouraged; however, submitting work as your own which is copied or paraphrased from someone else is not permitted. Neither discussing nor copying related to exam questions is permitted. Cheating includes, but is not limited to, illegal collaboration, copying, using materials not permitted on tests, and assisting others on tests. Anyone found cheating will not be permitted to withdraw and will receive an “F” grade for the course. Your academic dean will be informed and a statement will be placed in your permanent file.

Tentative Semester Schedule (Text Chapters) – this schedule is subject to change

Monday	Wednesday
1/14 – Review (Ch. 1)	1/16 – Lin. Regression (Ch. 2)
1/21 – Lin. Regression (Ch. 2)	1/23 – Design (Ch. 3)
1/28 – Design (Ch. 3)	1/30 – Design (Ch. 3)
2/04 – Design (Ch. 3)	2/06 – GDLM (Ch. 4)
2/11 – Exam #1	2/13 – GDLM (Ch. 4)
2/18 – GDLM (Ch. 4)	2/20 – GDLM (Ch. 4)
2/25 – NL Regression (Ch. 5)	2/27 – NL Regression (Ch. 5)
3/04 – No class – Spring Break	3/06 – No class – Spring Break
3/11 – NL Regression (Ch. 5)	3/13 – Bioassay (Ch. 6)
3/18 – Bioassay (Ch. 6)	3/20 – Exam #2
3/25 – Bioassay (Ch. 6)	3/27 – Bioassay (Ch. 6)
4/01 – Repeated (Ch. 7)	4/03 – Repeated (Ch. 7)
4/08 – Repeated (Ch. 7)	4/10 – Survival (Ch. 8)
4/15 – Exam #3	4/17 – Survival (Ch. 8)
4/22 – Multivariate (Ch. 9)	4/24 – Multivariate (Ch. 9)
	The comprehensive Final Exam will be held our classroom on Thursday May 1st 9.00-11.00am

Note #1: The first three exams are 75-minutes in length the final exam is 2 hours; the final exam is comprehensive.

Note #2: The last day that a student may withdraw without a penalty grade of “WF” is Monday, March 24th.