

# SYLLABUS

## ***Advanced Biostatistics (BIOL/STAT 336) – Topics in Biostatistics (STAT 436)***

**Spring Semester, 2008**, Tuesdays and Thursdays, 8:30 – 9:45am in Damen Hall, Room 730.

**Prerequisites:** Some exposure to basic statistical methods or biostatistics (e.g. Stat 203 or 335) including ANOVA and regression and maturity to move quickly through sophisticated material.

**Text:** there is no required text for this course; however, students are required to purchase *Course Notes*, to be distributed in class.

**Instructor:** Dr. Timothy E. O'Brien

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**Office Phone:** (773) 508-2129

**Office Hours:** Tuesdays 10 – 11am, Thursdays 10 – 11am and 1 – 2pm, and by appointment

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

### **Course Overview**

Basic courses in statistics and biostatistics prepare students and researchers to perform simple statistical analyses such as simple linear regression or correlation, paired or two-sample t-tests, one- or two-way ANOVA, and analyses of covariance. However, practitioners are often faced with other types of data for which these methods are invalid. These basic statistical analyses have been adapted and generalized to categorical data techniques, generalized and nonlinear regression, multivariate methods and repeated-measures techniques, and survival analysis, and these methods are the focus of this course. Each of these methods will be motivated with real-life examples. The focus throughout this course will be on applications, and, as such, theory will not be emphasized.

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, multivariate analysis including MANOVA, 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 and SAS statistical packages. Grading will be based on homework assignments and three exams.

### **Homework and Exams**

Homework assignments (group projects for undergraduates) will be given approximately every other week, graded and returned to students in a timely manner. The first exam will take place on 28 February, the second exam on 3 April, and the final exam on 3 May; all exams will be open book – open notes.

### **Grading Scheme**

Homework	30%
First Exam	22.5%
Second Exam	22.5%
Final Exam	25%

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 attend all classes and to actively participate in classroom discussion. It is expected that students will read the lecture material before class so as to better benefit from the class lecture and discussion.

## Computing

Students will develop the ability to analyze data sets using the Minitab and SAS software packages, although no previous exposure to these packages will be assumed. Students are required to have a calculator (needed for homework and exams).

## 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. This means students may discuss homework problems, but each G student or UG student group must write up his/her/it's solutions alone and in one's own words. 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.

## Preliminary Semester Schedule (Text Chapters)

<b>Tuesday</b>	<b>Thursday</b>
15 Jan – Review (1) and Simple Linear Regression (2)	17 Jan – Simple Linear Regression (2)
22 Jan – Simple Linear Regression (2)	24 Jan – Experimental Design (3)
29 Jan – Experimental Design (3)	31 Jan – Experimental Design (3)
5 Feb – Experimental Design (3)	7 Feb – Generalized Linear Models (4)
12 Feb – Generalized Linear Models (4)	14 Feb – Generalized Linear Models (4)
19 Feb – Generalized Linear Models (4)	21 Feb – Nonlinear models (5)
26 Feb – Nonlinear models (5)	28 Feb – <b><i>First Exam</i></b>
4 Mar – <b><i>No class – Spring Break</i></b>	6 Mar – <b><i>No class – Spring Break</i></b>
11 Mar – Nonlinear models (5)	13 Mar – Bioassay and Synergy (6)
18 Mar – Bioassay and Synergy (6)	20 Mar – Bioassay and Synergy (6)
25 Mar – Bioassay and Synergy (6)	27 Mar – Mixed models and RMD's (7)
1 Apr – Mixed models and RMD's (7)	3 Apr – <b><i>Second Exam</i></b>
8 Apr – Mixed models and RMD's (7)	10 Apr – RMD's (7) and Survival Analysis (8)
15 Apr – Survival Analysis (8)	17 Apr – Survival Analysis (8)
22 Apr – Multivariate Methods (9)	24 Apr – Multivariate Methods (9)
<b><i>Final Exam – Saturday 3<sup>rd</sup> May from 9.00am to 11.00 am – the Final Exam is comprehensive</i></b>	

**Note #1:** All three exams will be open book-open notes and in-class – 75-minutes in length for the first two exams and 2 hours for the final exam. The final exam will be comprehensive.

**Note #2:** The last day that a student may withdraw without a penalty grade of "WF" is Monday, March 24<sup>th</sup>.