

## BST 233: Methods II

Harvard School of Public Health  
Spring 2018

**Instructor:** Brent Coull  
**TA's:** Ina Jazic  
Emma Thomas  
**Lectures:** MW 8:00 - 9:30am in Kresge 202A  
**Lab:** F 8:00 - 9:30am in Kresge 201  
**Contact information:**

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Office hours: Brent: Wed 1:00-2:00pm, or by appointment.

TA's:  
1/30/2018 Tue 1:00 PM - 2:00 PM KRSG - 205 (Kresge)  
2/6/2018 Tue 1:00 PM - 2:00 PM SPH2 - 401 (Building 2)  
2/13/2018 Tue 1:00 PM - 2:00 PM KRSG - 205 (Kresge)  
2/20/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
2/27/2018 Tue 1:00 PM - 2:00 PM KRSG - 205 (Kresge)  
3/6/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
3/20/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
3/27/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
4/3/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
4/10/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
4/17/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
4/24/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
5/1/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)  
5/8/2018 Tue 1:00 PM - 2:00 PM SPH2 - 428 (Building 2)

Th: 2:00-3:00pm SPH2 - 428 (Building 2)

**Webpage:** <https://canvas.harvard.edu/courses/35994>

### Course description:

BST 233 is an intermediate-level graduate course in the analysis of continuous, categorical, and survival response data. For the most part, the focus is on regression modeling as a tool for data analysis. Throughout estimation and inference will be presented from both the *frequentist* and *Bayesian* perspectives. Specific topics that will be covered include:

- The Bayesian paradigm
- Review of linear regression for continuous response data
- Theory of generalized linear models (GLMs)
- Analysis of binary response data
- Analysis of count response data
- Analysis of polytomous (multinomial) response data
- Analysis of survival response data

### **Learning objectives:**

After completion of this course, students will be able to:

- Understand and describe the Bayesian paradigm of statistical inference, and apply it to analyze data.
- Understand and describe the class of generalized linear models, and apply them to analyze data.
- Analyze continuous and discrete response data, including data on binary, count, categorical, and survival outcomes.

### **Prerequisites:**

The course is intended for graduate students in Biostatistics. BST 232 is a core requirement. Beyond that, familiarity with probability (e.g., BST 230) and some topics from statistical inference (e.g., BST 231) will also be assumed. If you are not a graduate student in the Department of Biostatistics, explicit permission is needed to enroll in the class.

### **Evaluation:**

Evaluation and the course grade will be based on three components:

Homework	30%
Mid-term exam	35%
Final exam	35%

Homework will be assigned approximately every week. Both exams will be in the form of a four-day take home exam which should be worked on individually.

### **Notes and textbooks:**

Electronic copies of course handouts, slides and notes, and homework assignments,

as well as datasets, will be posted on the course website. While there are no required texts, the following are very good references. We will provide pointers to relevant readings for each module of notes.

- Agresti, A. *Categorical Data Analysis*. 2nd Edition. Wiley, 2002.
- Gelman A, Carlin, J, Stern H, Rubin D. *Bayesian Data Analysis*, 2nd Edition. Chapman-Hall, 2003.
- Collet, D. *Modeling Survival Data in Medical Research*. 2nd Edition. Chapman-Hall, 2003.
- McCullagh, P. Nelder, J. *Generalized Linear Models*, 2nd Edition. Chapman-Hall, 1989.
- Faraway J. *Extending the Linear Model with R*. Chapman-Hall, 2006.

**Key dates:**

- February 19<sup>th</sup>: Presidents day (Monday)
- March 12<sup>th</sup>-16<sup>th</sup>: Spring recess
- May 9<sup>th</sup>: Last day of class (Wednesday)