

## Introduction to Medical Statistics (II)

**Classroom:** Room 201, college of Public Health Building

**Time:** 9:10 – 12:00, Monday

**Course number:** 801 21200 ; 842 U3220

### Outline:

The main theme of this course is regression analysis and its extension. I will start with simple linear regression model and then proceed to multiple linear regression. The topics include the specification of regression model, construction of covariates, inference of parameters of interest, diagnostics, matrix representation, random effects, and extensions to discrete and longitudinal data. Various examples will be introduced for illustrations. There will be several classes for computer labs. Two statistics packages used in this course are R and SAS.

### Topics to be covered:

1. Simple linear regression model
2. Inference in regression and correlation
3. Diagnostics and residual analysis
4. Matrix representation of simple linear regression model
5. Multiple linear regression analysis
6. Types and usages of covariates
7. Model selection, diagnostics and residual analysis
8. Random effect model
9. Logistic regression, Poisson regression, and generalized linear models
10. Survival analysis and its applications

### Textbook and references:

1. M. H. Kutner and C. J. Nachtsheim, J. Neter, and W. Li (2005). Applied Linear Statistical Models. McGraw Hill.
2. Survival Analysis: A Self-Learning Text, Second Edition by David G. Kleinbaum and Mitchel Klein. New York: Springer-Verlag.
3. M. Pagano and K. Gauvreau (2000). Principles of Biostatistics. 2<sup>nd</sup> edition, Duxbury Press. Chapters 17-21.

**Grades:** Homework 40% , two exams 2×20% (4/2 and 5/14), final exam (20%) on 6/26.

## Schedules:

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<b>Dates</b>	<b>Topics</b>
2/26	Correlation and covariance, and review
3/5	Simple linear regression
3/12	Computer Lab 1 (graphics with SAS, regression in SAS) & Multiple linear regression
3/19	Computer Lab 2 (graphics with R, regression in R) & Types and effects of covariates, interpretation, tests, & multicollinearity
3/26	Computer Lab 3 (more about regression) & Regression models for quantitative and qualitative predictors
4/2	<b>First exam</b>
4/9	Model selection, diagnostics, residual analysis
4/16	Model selection, diagnostics, residual analysis matrix representation
4/23	Computer Lab 4 (diagnosis of regression) & Logistic regression & Poisson regression
4/30	Logistic regression & Poisson regression
5/7	Computer Lab 5 (logistics regression and Poisson regression) & Generalized linear model
5/14	<b>Second exam</b>
5/21	Computer Lab 6 (generalized linear model) & Survival analysis
5/28	Computer Lab 7 (survival analysis) & Survival analysis
6/4	Quality-adjusted survival analysis
6/11	Computer Lab 8 (survival analysis) & Research Trends in Biomedical Statistics and Bioinformatics
6/18	<b>Holiday</b>
6/25	<b>Final exam</b>

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