

PH.140.752 - Advanced Methods in Biostatistics II

Instructor:

Dr. Martin Lindquist
Office: 615 N. Wolfe Street, E3634
Phone: 410-614-5107
E-mail: mlindqui@jhspk.edu
Office hours: By appointment

Teaching Assistant:

Zeyi Wang
E-mail: zwang107@jhmi.edu

Course Schedule:

This class consists of two lectures per week during the second quarter of the JHSPH academic year. Lectures are held on Tuesdays and Thursdays between 10:30 - 11:50am in W2015 (615 N. Wolfe Street).

Prerequisites:

140.751 - Advanced Methods in Biostatistics I

Course Description:

Introduces students to applied statistics for biomedical sciences, with a particular focus on linear models. Requires students to present results in both written and oral form, which in turn requires them to learn the software package R.

Materials:

There is no textbook, but notes will be provided online. There are also many excellent books on this subject that can be used as reference, including "*Linear Statistical Inference and its Applications*", by C. R. Rao, "*Linear Models*", by S. R. Searle, "*Theory and Application of the Linear Model*", by F. A. Graybill, "*Plain Answers to Complex Questions: The Theory of Linear Models*", by R. Christiansen, and "*Linear Models with R*", by J. Faraway.

Analysis Software:

We will be using the statistical software package R, which is freely available at <https://www.r-project.org>.

Homework:

There will be four homework sets. Students will be encouraged to work together on homework sets. However, submitted work must be written and completed by each student separately.

Evaluation:

Students will be evaluated by homework and a final exam. Class grading will consist of homework (50%) and final exam (50%).

Tentative course topics:

1. Testing for Linear Models
2. Confidence Intervals
3. Likelihood ratio tests and F tests
4. Residuals and diagnostics
5. Prediction
6. Asymptotics for the linear model
7. Model Misspecification
8. Time Series Regression
9. High dimensional predictor spaces
10. Linear Mixed Effects Models
11. Bayesian Analysis