

Math 507M

Statistics for Medical and Public Health Researchers

Classes Time: Spring 2017, Wed. 9 -11:30 am.

Classes Location: Farell Teaching and Learning Center, Room 213

Instructor: Jimin Ding

Office: Cupples I, Room 112A;

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Office hours: Wed. 3-4:30 pm. & Fri. 10:30-11:30am. or by appointment.

Topics covered:

This course is an introduction to basic statistical analysis for graduate students in medicine, biology, and public health. In the first month of the semester, students will be introduced to core statistical tools used to study human health outcomes. Topics include: measurement, descriptive analysis, correlation, graphical analysis, hypothesis testing, confidence intervals, analysis of variance, and regression analysis. In the second and third months, advanced statistical models will be discussed and in-class consulting will be implemented. Optional topics include logistic regression, generalized linear models, mixed-effects models, semiparametric survival models, principal components analysis, functional principal components analysis, discrimination analysis, independent components analysis, smoothing techniques. The final choice will depend on the related in-class consulting and students' interest.

Course may not be used for credit in undergraduate math major/minor programs, nor in any Mathematics or Statistics graduate programs. Prerequisite: Current graduate enrollment in a program in DBBS, medicine or public health, or permission of instructor.

Study Goal:

Major components of the course include learning how to collect, manage, and analyze real life research data using computer software, and how to effectively communicate to others results from statistical analyses. The second aspect of the course is focused on the statistical package R, which is the most powerful, extensively featured, and capable statistical computing tool available.

Reference books:

1. Michael J. Campbell, David Machin, Stephen J. Walters (2007). *Medical Statistics, 4th edition*, Wiley, ISBN 0470025190.
2. Shahbaba, B. (2011) *Biostatistics with R*, Springer, ISBN 146141301X
3. Faraway, J. (2016) *Extending the linear model with R, 2nd edition*, Chapman and Hall/CRC, ISBN 149872096X

Exams and Homework:

There will be one in-class midterm on March 8 (Wed.) and take-home final due on May 4th (Thursday). You may take 1 page (letter size, double-sided) note for the in-class midterm. Make-up exams are strongly discouraged. If you are aware of a conflict, please inform the instructor before the exam. Make-up exam will only be given if (1) within 1 week of the standard exam and (2) suitable documentation is provided within 2 days. Take-home projects will be assigned monthly and collected electronically through bb.wustl.edu. Late homework will only be accepted within 48 hours of due time and the grade will be scaled by 70% as a penalty.

There will be three in-class presentations. Presentation materials, such as handout and slides, should be submitted to blackboard after the presentation.

Collaboration:

Collaboration on homework is allowed and can be helpful (and fun). However, you must do all written work by yourself, both answers to homework questions and computer programs. If you collaborate with someone on a homework, list his or her name in a note at the top of the first part of your homework. **There should be NO COLLABORATION on exams. Following ["the academic integrity policy"](#), academic misconducts and dishonesty will be reported to the university academic integrity office and seriously affect the grade.**

Attendance:

Class attendance is encouraged. Experience has shown that students who attend class regularly perform better on average. Lectures will involve discussion of topics and usually help students understand the material. Completing the reading assignments is not a substitute for attending lecture, nor is attending lecture a substitute for completing the reading assignments.

Grades:

Your grade will be based on the take-home projects, in-class presentations, the in-class midterm, and the final project in the proportions.

Take-home projects	30%
Presentations	30%
Midterm exams	15%
Final Project	25%

Then your final letter grade is determined as follows. The A range will be 85 to 100, the B range will be 70 to 85, the C range will be 60 to 70, and the D range will be 50 to 60, with plus and minus grades given to the top 10% and bottom 10% students in each of these ranges. (If you elect ``Credit/No Credit", Cr means D or better.)