26 BE 7064

26 PH 7064

Statistical Genetics

Spring, 2015

Department of Environmental Health

College of Medicine

University of Cincinnati

Instructor: M B Rao

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Lectures: Mondays and Wednesdays: 2:00 - 3:30

Office Hours: Mondays and Wednesdays: 3:30 – 4:30 and by Appointment

Course No.: 26 BE 7064 – 310346

26 PH 7064 - 310434

Text Book: Fundamentals of Modern Genetics

Nan M Laird and Christoph Lange

Springer, 2011

A good part of the material I present in the class is taken from the text book. However, buying the text book is optional. My notes, posted on the blackboard, is
comprehensive.

**Learning Objectives:** Understand and acquire a good degree of familiarity what genetics has got to do with diseases; Learn basic principles of inheritance as propounded by Mendel; Get a good grounding in Population Genetics, Gene Mapping, Linkage Analysis, and Association Studies; Follow the work on Genome Wide Association Studies; Conduct Genetic data analysis using some R packages.

**Course Description:** Genetic diseases; Mendel’s Laws; Population Genetics including Stratification, Admixture, Inbreeding, and Hardy-Weinberg Equilibrium; Gene mapping including Linkage, Association, Disequilibrium, and Marker Maps; Linkage Analysis; Association Studies; Family Designs; Genome Wide Association Studies; Data Analysis using R packages.

**Homework & Project:** 11 homework sheets + 1 project

**Grading:**

- Homework: 40 points
- Midterm: 25 points (March 16, 2015)
- Final: 25 points (April 15, 2015)
- Project: 10 points

**Special needs:** If you need any accommodations based on the impact of a documented disability, contact the instructor privately to discuss your specific needs. You should also contact the relevant office handling disabilities to coordinate special accommodations.

**Tentative Schedule:**

- Week 1: Introduction to Statistical Genetics + R package
Week 2: Principles of Inheritance: Mendel’s laws
Week 3: Population Genetics
Week 4: Aggregation; Heritability; and Segregation Analysis
Week 5: Gene Mapping: Linkage, Association, Disequilibrium, Marker Maps
Week 6: Linkage Analysis
Week 7: Genetic Association Analysis
Week 8: Genetic Association Analysis
Week 9: Population Substructure
Week 10: Family Designs
Week 11: Family Designs – Association Analysis
Week 12: Genome Wide Association Studies
Week 13: Haplotype Analysis
Week 14: Project presentations