Term: Fall 2011  
Course Number: GENET 236  
Course Title: Genetic Epidemiology and Population Genetics  
Course Director: Dr. Diptasri Mandal  
Time: Tuesdays 9:00 am – 11:00 am; Thursdays 2:00 – 4:00 pm; Fridays 9:00am – 11:00am  
Location: CSRB 752A for Tuesdays, Thursdays (unless indicated by an asterisk) and Fridays  
Course Credits: 3  

Course Description:  An introduction to the fundamental elements of mathematical and population genetics. Topics include probability, Bayes’ theorem, Hardy-Weinberg equilibrium, inbreeding, selection mutation, models for polygenic and multifactorial inheritance, linkage and simple segregation analysis.

Population Genetics

Aug. 23  Intro to population Genetics, Allele frequency estimation, review Hardy-Weinberg Equilibrium [Dr. Mandal]

Aug. 25  Inbreeding, Random Drift, Mutation, Selection, and Migration [Dr. Mandal]

Aug. 30  Bayesian probability  
Genetic counseling [Dr. Mandal]

Sept. 1  Zygosity & Paternity testing [Dr. Mandal]

Sept. 6  Forensic Genetics [Dr. Mandal]

Sept. 8*  Test (*Genetics conference room)

Genetic Epidemiology

Sept. 13  Overview of Genetic Epidemiology [Dr. Mandal]

Sept. 15  Segregation analysis [Dr. Mandal]

Sept. 20  No classes (Study Section meeting)

Sept. 22  Linkage analysis [Dr. Mandal]

Sept. 27  Quantitative trait linkage analysis  
Nonparametric linkage analysis [Dr. Mandal]

Sept. 29  Hapmap project and its applications [Dr. Mandal]
Oct. 4  Genome Wide Association Studies [Dr. Mandal]

Oct. 6  Genetic Epidemiology & Public Health
        Ethical, legal and social issues [Dr. Mandal]

OCT 11-14  No classes (ASHG meeting)

Use of Population genetics & human Genome Epidemiology to improve health

Oct. 18  Models of human diseases [Dr. Pandey]

Oct. 21  Genetic counseling in clinic setting [Chris Dvorak, Certified Genetic Counselor, Tulane]
        (FRIDAY)

Oct. 25  From genetics to therapeutics [Dr. Wang]

Oct. 28  Pharmacogenetics [Dr. Weissbecker, Tulane]
        (FRIDAY)

Nov. 1  Functional studies in disease gene identification [Dr. Liu]

Nov. 3  Test

Nov. 8  Student presentation [Dr. Mandal]

Grading:  Homework (25%)
        Two exams (25%, 40%; 65% total)
        Student presentations (10%)

Texts & Recommended Reading:  The following textbooks are recommended to help you with various topics covered.

Hartl and Clark: Principles of Population Genetics
Haines and Pericak-Vance: Approaches to Gene Mapping in Complex Human Diseases
Rao and Province: Genetic Dissection of Complex Traits
Khoury, Beaty and Cohen: Fundamentals of Genetic Epidemiology
Journal papers from Lancet (Genetic Epidemiology Series) Vol 366, 2005

Student Presentations:
Each student will select a disease or trait and find a recent (within the last 2 years) original research paper from the literature that uses one of the methods taught in the class. The selection must be pre-approved by the instructors. The student will then make a 15-minute power point presentation of the paper to the class at the end of the semester. All students must attend all sessions of student presentations, even if they are not presenting themselves.