NYU Masters Program in Global Public Health
Genetic Epidemiology

Course Information: U10.2420.001
Wednesdays 6:45PM – 8:25PM
NYU SoM Parasitology Seminar Room, 341 E 25th Street, 1st Floor

Instructor: Karen Day, PhD
Office Hours: By Appointment
Email: karen.day@med.nyu.edu

TA: TBD
Office Hours: By Appointment
Email:

Course Description
This course will examine the impact of genetic diversity on global health. It will provide the training to allow an investigator to explore why we are not equally susceptible to the same diseases and to incorporate genetics into epidemiologic analyses. Its aim is to provide the necessary background in genomics, bioinformatics and population genetics to practice genetic epidemiology. The course will teach basics in genomics and bioinformatics to utilize both pathogen and human genome diversity data. The principles of population genetics will be taught in the context of epidemiological analyses. Epidemiologic designs and statistical methods required for linkage studies and mapping genetic traits (both simple and complex) will be defined.

Objectives
By the end of the course, students will:
1. Have a working knowledge of the basic language of population genetics necessary to understand genetic diversity in relation to public health
2. Understand evolutionary relationships via phylogenetics and phylogenomics
3. Define human genetic diversity in a framework that is useful to a public health professional
4. Understand the genetic basis of susceptibility to infection and non-communicable disease
5. Understand the use of molecular epidemiology in infectious disease surveillance.
6. Critically read and evaluate genetic epidemiology studies.

Course Structure and Requirements
This course has four main components: lectures; 1 long essay from a selection of 3 topics (these will take place outside of class time); 2 practical classes; and a project. Each student is required to attend lectures and participate in a tutorial to design a genetic epidemiology project.

1. Students are expected to attend all lectures and practicals. On-time attendance is greatly appreciated in order to avoid disrupting the lecture and classroom activities. If you can not attend a practical, please notify the TA beforehand, or in the case of an emergency, immediately upon return.
2. Complete reading assignments prior to class.

NOTE: All assignments must be typed (1” margins, Times New Roman 12pt or Arial 11pt font). Calculations may be neatly handwritten. Your name must be on the top of each page that you hand in.
Grading
1. Long essay 20%
2. Project 40%
3. Lab practicals 30%
4. Class participation 10%

Readings
Readings will be assigned for each specific lecture topic or as part of various homework assignments; these will be made available to students via the class blackboard at least one week prior to class.

As background to the course and the introductory lecture:

1. NCBI Science Primer “What is a genome?”
   [http://www.royalsoc.ac.uk/displaypagedoc.asp?id=23244](http://www.royalsoc.ac.uk/displaypagedoc.asp?id=23244) (this is a large report so we might just ask that they read chapters 1 – 3)

Lecturers
Oralee Branch, Stuart Brown, Jane Carlton, Karen Day, Peter D'Eustachio, Delores Malaspina, Cheongeun Oh, Silvia Priori

Syllabus* (practicals to be added)

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Details of Coursework:

1. **Essays**: Students will be asked to choose 1 essay from 3 topics that apply genetic epidemiological techniques to questions of global public health importance.

2. **Project**: Students will be asked to write a grant proposal on a genetic study design to test a hypothesis of relevance to global health.

3. **Lab practicals**: Students will be required to complete lab practicals applying genetic epidemiological principles.