



PHE 410/510: Spring 2014

Public Health Genomics, Ethics, and Policy

Genomics” is the systematic study and development of genetic information using tools from the bioinformatic sciences. Genomics is all about looking at hundreds, if not thousands, of genetic interactions simultaneously in order to understand the root causes of disease and to better understand how the human organism works, including its interaction with environmental factors.

This 3-credit course is designed to 1) understand the role genomics plays in the health of individuals, families and communities and 2) explore the current issues and future trends of research in this rapidly developing field and their ethical, social and health policy implications for personal health.

In the words of James Watson, co-discoverer of DNA, *Genomics is a giant resource that will change mankind, like the printing press.*

Using the Learning Management Software, Desire2Learn (D2L), the course introduces students to the emerging field of Public Health Genomics in the following six topical areas:

- Genomics & P4 Medicine (Predictive, Preventive, Personalized & Participatory Medicine)
- Social Epidemiology & Health Care Disparities
- Genetic Epidemiology, Pre-Natal & Newborn Screening
- Genetic Testing & Privacy
- Whole Genome Sequencing & Personalized Medicine
- Epigenomics, Obesity and “The Metabolic Syndrome”

Learning Objectives

By the end of the course each student should be able to:

- Define and interpret the fundamental underpinnings of genetics and

genomics

- Describe the history, terms, and techniques fundamental to understanding the growing field of Public Health and Genomics as reported in the popular and scientific press
- Explain the interplay between scientific understanding of genomic information and its application to the practice of contemporary and future healthcare
- Evaluate the public health, clinical, and social utility of genomics discovery
- Explore the key social and ethical issues raised by genomic science and their implications and challenges for how the “genomic revolution” will affect our personal lives.
- Critically analyze the role of genomic science and its application to “genomic medicine.”

Course (Weekly) Framework

- Depending on topical interest, (410 and 510) students will be divided into collaborating teams in each of the above six teaching modules spread over eight weeks.
- Each weekly team--led by at least one 510 student in each teaching module--will coordinate the weekly online (Monday) and in-class (Friday) discussions aimed at generating a set of “talking points” to questions drawn from:
 1. Weekly instructor-generated introductory teaching essays and associated embedded resources (e.g., videos, websites)
 2. Topic-relevant chapters from the required course textbook: *Public Health Genomics: The Essentials* (Claudia Mikail)
 3. Required readings in the scientific and popular press.
- Team members for each week’s teaching module will email a final list of (5-10) questions to the course instructor--and, when appropriate, the invited resource faculty member(s)--24 hours ahead of the 2-hour Friday in-class session.

- At week 9 of the term, all PHE 410 and 510 team members in each of the course teaching modules will be required to analyze one peer-reviewed primary research paper on genomics following an instructor-generated 10-point set of questions.
- At week 10, each team of PHE 410 and 510 students will develop a 20-minute Powerpoint (“landscape”) presentation of the key scientific, ethical and policy issues in each of the six topics for which they were responsible.
- During finals week, a 2-hour “Genomics Forum” will be convened for the purpose of sharing each team’s perspectives with their student colleagues, instructors, invited resource faculty, health policy makers, and other interested parties, as appropriate.

Course Evaluation

| Activity | Total Points per Activity |
|--|---------------------------|
| Participation in creating the weekly on-line “Talking Points” (1/week) | 30 points |
| Participation in the Friday in-class discussion (1/week) | 20 points |
| Critically Reflective Analysis of Peer-Reviewed Research Paper | 25 points |
| Final PowerPoint Presentation and Participation in the “Genomics Forum” | 25 points |
| Total | 100 points |