

EPID 511 Introduction to Public Health Genetics

Fall, 2008

This is an introductory course in public health genetics for students who lack a strong background in biology, chemistry and biochemistry. This course will provide the basic concepts of human molecular genetics including sections on Mendelian and complex concepts of inheritance, DNA replication, transcription and regulation of gene expression, translation, mutations, non-Mendelian traits, chromosome mechanics, mapping and finding disease genes, genetic testing and gene therapy, all presented in a public health context and presented in terms that do not require a strong background in laboratory science. The schedule includes 21 lectures, plus three review sessions, two mid-term exams and a final exam.

Text: The Human Genome: A User's Guide, Second Edition

By Julia Richards and R. Scott Hawley, available from Michigan Book and Supply
(Be sure you have the second edition, copyright 2005. The first edition cannot be substituted because there are such major differences between the two editions).

Wed. 9/3 Lecture 1: The Concept of the Gene

Lecture by: Richards

Reading: Chapter 3. Mendel and the Concept of the Gene

Mon. 9/8 Lecture 2: Human Mendelian Genetics

Lecture by: Richards

Reading: Chapter 4. Human Mendelian Genetics

Chapter 5. One Man's Trait Is Another Man's Disease

Wed. 9/10 Lecture 3: Genetic Alphabet & Central Dogma of Molecular Biology

Lecture by: MARRS

Reading: Chapter 6. DNA: The Genetic Alphabet

Reading: Chapter 7. The Central Dogma of Molecular Biology: How Genes Encode Proteins

Mon. 9/15 Lecture 4: Gene Expression and Splicing

Lecture by: MARRS

Reading: Chapter 8. Splicing the Modular Gene

Chapter 9. Orchestrating the Human Genome

Wed. 9/17 Lecture 5: Molecular Tools

Lecture by: MARRS

Reading: Chapter 15. How We Detect Mutations

Chapter 26. There's Cloning and Then There's Cloning

Mon. 9/22 Lecture 6: The Central Dogma In The Context of Genetic Variation

Lecture by: MARRS

Reading: Chapter 14. Absent Essentials and Monkey Wrenches

Wed. 9/24 Review

Friday 9/26 Office Hours

For those with questions before the first exam, Dr. Richards will hold office hours from 4-6 PM in Room 4663 SPH-I tower. There will be no lecture or presentation, but you will have the chance to ask questions.

Mon. 9/29 First Exam

Wed. 10/1 Lecture 7: Basic Mutations

Lecture by: *Marrs*

Reading: *Chapter 16. We Are All Mutants*
Chapter 17: What Constitutes Normal?

Mon. 10/6 NO CLASS (SPH symposium)

Wed. 10/8 Lecture 8: Other Types of Mutations

Lecture by: *Richards*

Reading: *Chapter 18. Mutations in Mammoth Genes*
Chapter 19. Expanded Repeat Traits

Mon. 10/13 Lecture 9: Mitosis

Lecture by: *Richards*

Reading: *Chapter 10. So What are Chromosomes Anyway?*
Chapter 11. How Cells Move Your Genes Around

Wed. 10/15 Lecture 10: Chromosomes and Meiosis

Lecture by: *Richards*

Reading: *Chapter 12. Passing Genes Between Generations*

Mon. 10/20 Recess

Wed. 10/22 Lecture 11: Chromosomal Basis of Heredity

Lecture by: *Richards*

Reading: *Chapter 13. The Chromosomal Basis of Heredity*
Chapter 20. The X and Y Chromosomes
Chapter 22. Aneuploidy: When Too Much Or Too Little Counts

Mon. 10/27 Lecture 12: Imitating Heredity

Lecture by: *Richards*

Reading: *Chapter 23: Imprinting*
Chapter 24: Imitating Heredity: One Trait, Many Causes

Wed. 10/29 Review

Friday 10/31 Office Hours

For those with questions before the second exam, Dr. Richards will hold office hours from 4-6 PM in Room 4663 SPH-I tower. There will be no lecture or presentation, but you will have the chance to ask questions.

Mon. 11/3 Second Exam

Wed. 11/5 Lecture 13: Mapping Genes

Lecture by: Richards

Reading: Chapter 28. Finding Genes in the Human Genome

Mon. 11/10 Lecture 14: The Human Genome

Lecture by: Richards

Reading: Chapter 25. The Human Genome Project

Chapter 27. The Human Genome Sequence

Wed. 11/12 Lecture 15: Complex Phenotypes

Lecture by: Richards

Reading: Chapter 29. Genotype: Phenotype Correlations

Chapter 30. How Complex Can It Get?

Mon. 11/17 Lecture 16: Other Complex Phenotypes

Lecture by: Richards

Reading: Chapter 31. Quantitative Traits

Chapter 32. The MAOA Gene: Is There a Genetic Basis for Criminality?

Wed. 11/19 Lecture 17: Cancer Genetics

Lecture by: Marrs

Reading: Chapter 33. Cancer and the Multiple-hit Hypothesis

Mon. 11/24 Lecture 18: Genetic Testing and Screening

Lecture by: Richards

Reading Chapter 34. Genetic Testing and Screening

Wed. 11/26 No Class

Mon. 12/1 Lecture 19: Gene Therapy

Lecture by: Marrs

Reading: Chapter 35. Magic Bullets: The Potential for Gene Therapy

Chapter 36. Heroes Among Us

Wed. 12/3 Lecture 20: Issues in Human Genetic Research Discussion

Discussion lead by: Marrs and Richards

Reading: Chapter 21. Genetics of Sex, Gender and Orientation

Chapter 37. Fears, Faith and Fantasies

Mon. 12/8 Review Session

Office Hours

Students wishing to have additional questions answered prior to the exam should schedule a time to meet with Dr. Richards (richj@umich.edu)

Final Exam Friday 12/12 from 4 pm to 6 pm