

**BIOE 825 Bioinformatics for Epidemiologists**  
**Syllabus**  
**Spring 2005**

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**Meeting:** Lectures will be held in room 645 (conference room on the 6<sup>th</sup> floor) of the Doctors Office Building; Tuesdays 10.30-11:20 am.

**Course Schedule**

*Each lecture listed below is 50 min long. The class is scheduled on Tuesdays at 10.30 am.*

**January 4. Lecture 1.** Introduction to the course. Definition and overview of bioinformatics. Relevance of bioinformatics to epidemiology research. Introduction to molecular biology and genetics at the nucleic acid and protein level.

**January 11. Lecture 2.** Introduction to genetics at the genome level. Introduction to genetic linkage.

**January 18. Lecture 3.** Introduction to population genetics.

**January 25. Lecture 4.** Molecular evolution. DNA and protein sequence homology.

**February 1. Lecture 5.** Genetic markers. Introduction to genomics.

**February 8. Lecture 6. Guest lecturer: Dr. Ronald Adkins.** Molecular biology databases and Web sites relevant to epidemiology research.

**February 15. Homework #1 is due. Lecture 7.** Quantitative and qualitative traits. Introduction to genetic linkage analysis.

**February 22. Lecture 8.** Linkage analysis (continued).

**March 1. Lecture 9.** Association analysis. Single nucleotide polymorphisms.

**March 8. Lecture 10.** Haplotype analysis.

**March 15. No lecture (Spring Break).**

**March 22. Lecture 11.** Introduction to DNA and protein sequence analysis. Distance measures. Sequence alignment. Similarity searches. Restriction analysis.

**March 29. Homework #2 is due. Lecture 12.** Phylogenetic analysis. Comparative genomics.

**April 5. Lecture 13.** Contig assembly. Gene prediction. Software for sequence analysis useful for epidemiology research.

**April 12. Lecture 14.** Bioinformatics analysis of gene expression data

**April 19. Lecture 15.** Introduction to proteomics.

**April 26. Homework #3 is due. Lecture 16.** Elucidation of gene regulatory networks and metabolic pathways. Future directions of bioinformatics and its use in epidemiology studies.

**May 3. Receive final exam assignment** (take home).

**May 10. Final exam is due** (10:30 am).