16:682:534 Fundamentals of Genomics
Generic Syllabus
Debashish Bhattacharya (DB) & Dana C. Price (DCP)

COURSE SCHEDULE

1: Course Introduction and big picture of evolution (DB)
2: Genome structure in prokaryotes and eukaryotes (DB)
3: Endosymbiosis and the chimeric origin of cells and their genomes (DB)
4: Bioinformatics I (DB)
5: Bioinformatics II (DCP); Sequencing lecture and lab tour
6: Special Lecture (Dan Gheba, PhD, Field Applications Specialist, Illumina, Inc.): A history of sequencing, applications of current technology, and prospects for the future
7: Genome assembly and gene prediction methods (DCP)
8: Sequence alignment (DB)
9: Phylogenetics (DB)
10: Phylogenomics (DCP)
11: Horizontal gene transfer in prokaryotes and viruses (DB)
12: Horizontal gene transfer in eukaryotes (DCP)
13: Genome reduction (DB): Pre-proposals due
14: Functional genomics (RNA-Seq) (DCP)

15: Midterm exam

16: Debate 1 – Does horizontal gene transfer disqualify the concept of a tree of life?
17: Role of small RNAs in the genome (DB)
18: Single cell genomics (DCP)
19: Human disease genomics (DB)
20: Debate 2 – Does DNA provide the blueprint of life?
21: Metagenomics (biomes, amplicons, and sequence assembly) (DB)
22: Student presentations
23: Student presentations
24: Student presentations
25: Student presentations
26: Student presentations
27: Student presentations

28: Final exam

Evaluation and Grading: Midterm: 20%, Pre-proposal: 5%, Final exam: 20%, Presentation: 20%, Final Essay: 15%, Research proposal: 20%