

GENOMICS AND COMPUTATIONAL BIOLOGY

(MD) {GCB}

SM 493. (BIOL493) EPIGEN OF HEALTH&DISEASE.

534. (PHRM534) Experimental Genome Science. C Brown, J Murray. Prerequisite(s): Undergraduates and Masters students need BIOL431 or equivalent.

535. (CIS 535, MTR 535) Introduction to Bioinformatics. (B) B Voight. Prerequisite(s): The course will assume a solid knowledge of modern biology. An advanced undergraduate course such as BIOL421 or a graduate course in biology such as BIOL526 (Experimental Principles in Cell and Molecular Biology), BIOL527 (Advanced Molecular Biology and Genetics), BIOL528 (Advanced Molecular Genetics), BIOL540 (Genetic Systems, or equivalent, is a prerequisite. Corequisite(s): Registration for GCB 535-402 (Laboratory) is required. All students are required to bring a laptop to the lab sessions (Fridays). TAs will provide help with the material, but students should be computer-capable with their own laptop, and should be willing/capable to download and install free software from the internet.

This course provides broad overview of bioinformatics and computational biology as applied to biomedical research. A primary objective of this course is to enable students to integrate modern bioinformatics tools into their research activities. Course material is aimed to address biological questions using computational approaches and the analysis of data. Areas include DNA sequence alignment, genetic variation and analysis, motif discovery, study design for high-throughput sequencing, RNA and gene expression, single gene and whole-genome analysis, and topics in systems biology. The relevant principles underlying methods used for analysis in these areas will be introduced and discussed at a level appropriate for biologists without a background in computer science. However, a basic primer in programming and operating in a UNIX environment will be presented.

This course emphasizes direct, hands-on experience with applications to current biological research problems. The course is not intended for computer science students who want to learn about biologically motivated algorithmic problems; BIOL437/GCB 536 and GCB/CIS/BIOL537 are more appropriate.

536. (BIOL437) Computational Biology. (M)

An introductory computational biology course designed for computational scientists. The course will cover fundamentals of algorithms, statistics, and mathematics as applied to biological problems. In particular, emphasis will be given to biological problem modeling. Students will be expected to learn the basic algorithms underlying computational biology, basic mathematical / statistical proofs and molecular biology. Topics to be covered are genome annotation and string algorithms, pattern search and statistical learning, molecular evolution and phylogenetics and small molecule folding.

SM 537. (BIOL537, CIS 635) Advanced Computational Biology. (B) Y Barash, L Wang. Prerequisite(s): GCB536 or equivalent.

567. (BE 567) Modeling Biol Systems.

585. (BMB 585) Wistar Inst Cancer Biol.

SM 752. (CAMB752) Genomics. (B) S Diskin.