COMPUTATIONAL BIOSCIENCE (CPBS)

CPBS 7001 - Computer Science for Biologists (5 Credits)
This course is an introduction to the fundamental concepts of computer science, the central ideas of computing, and the practices of computational thinking; designed for th ebasic cience PhD programs. It will engage students in activities that allow them to competently apply CS tools to their field.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

CPBS 7605 - Ethics in Bioinformatics (1 Credit)
Discussions of professional conduct, social implications of research and questions raised by biomedical research, with an emphasis on topics relevant to computational biologists. Active student participation is required. Offered every other year.
Grading Basis: Letter Grade
Typically Offered: Fall, Spring.

CPBS 7606 - Statistics for the Basic Sciences (3 Credits)
This course provides an overview of fundamental concepts in statistics such as hypothesis testing and estimation and it provides an overview of statistical methods (for example, regression and analysis of variance) that apply to many areas of science. Crosslisted Course: BIOS 6606.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

CPBS 7620 - Advanced Genome Analysis (2 Credits)
Introduction to genomics emphasizing gaining familiarity with: analysis, utilization of genomic data. Topics: sequencing, mapping genomes, transcriptomics, human genome, evolution, genomic disorders, bioinformatics, statistics, population variation, epigenomics, proteomics, metagenomics, microbiome analysis, functional genomics, ethics.
Crosslisted Course: HMGP 7620, STBB 7620, and MICB 7620
Grading Basis: Letter Grade
Typically Offered: Spring.

CPBS 7630 - Computational Methods for Data Challenges in Biomed (3 Credits)
Covers three computational data modules: Bioinformatics, Clinical Informatics, and Public Health Informatics. Cases are from three biomedical big data initiatives; the Grand Opportunity Exome Sequencing Project (GO-ESP), The Cancer Genome Atlas (TCGA), and Library of Integrated Network-Based Cellular Signature (LINCS). Prerequisite: CPBS 7711 & CPBS 7712
Grading Basis: Letter Grade
Typically Offered: Fall.

CPBS 7640 - Bioinformatics in Linguistics (3 Credits)
This course will be structured around understanding problems, understanding algorithms, and working through solutions from bioinformatics, computational biology, natural language processing, and linguistics. Prerequisite: CPBS 7711; corequisite: CPBS 7712
Grading Basis: Letter Grade
Typically Offered: Spring.

CPBS 7650 - Research in Computational Bioscience (1-5 Credits)
Research work in Computational Bioscience. Prereq: Consent of instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 5.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 7655 - Statistical Methods in Genetic Association Studies (3 Credits)
This course is designed to give an introduction to statistical methods in genetic association studies.Topics include an introduction to population genetics topics relevant to genetic association studies, design strategies, and analysis methods for case-control and family data. Prereq: BIOS 6612 or permission of instructor. Crosslisted Course: BIOS 6655.
Grading Basis: Letter Grade
Typically Offered: Fall.

CPBS 7659 - Statistical Methods in Genomics (3 Credits)
This course will give an introduction to statistical methods for analyzing molecular sequences and genomic data. Topics include hidden Markov models for sequence alignment, molecular evolution and gene expression data analysis. Prereq: BIOS 6611 or equivalent graduate level statistics course with consent of instructor. Crosslisted Course: BIOS 6659 (sponsoring department) / BIOS 7659
Grading Basis: Letter Grade
Typically Offered: Spring.

CPBS 7660 - Analysis of Genomics Data Using R and Bioconductor (2 Credits)
This course provides students with hands on experience in solving real life biological problems using the statistical software R and Bioconductor. Students will work and communicate with participating researchers and clinicians on their case studies of genomics data. Pre/Corequisite BIOS 6602 or 6612, or consent of instructor.
Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

CPBS 7711 - Methods and Tools in Biomedical Informatics (4 Credits)
An introduction to algorithms for the theory and practice of bioinformatics and computational biology. Topics include:1) Experimental design; 2) Statistical concepts; 3) Sequence alignment; 4) networks and systems biology.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

CPBS 7712 - Research Methods in Biomedical Informatics (4 Credits)
This course focuses on application of algorithms to analysis of different types of big data and provides training in how to plan, develop, execute and report on research in computational biology. Topics include: 1) Molecular Data; 2) Biomedical data; 3) Drug/disease data.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

CPBS 7785 - Independent Study in Computational Bioscience (1-3 Credits)
This course is listed for the benefit of the advanced student who desires to pursue one or more topics in considerable depth. Supervision by a full-time faculty member is necessary. Prerequesite: Permission of Instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 7791 - Readings in Computational Bioscience (1 Credit)
A seminar course in which students read and present recent publications from the primary computational bioscience literature. Prereq: Consent of instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 1.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 7792 - Special Topics in Computational Bioscience (1-3 Credits)
Topic varies by semester. Designed to give students a chance to evaluate critically some practical or theoretical problem under faculty supervision and to present results of their thinking to fellow students and instructors for critical evaluation. Prerequesites: Permission of Instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 8990 - Doctoral Thesis (1-10 Credits)
Doctoral Thesis work in Computational Bioscience. Prerequisites: Permission of instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 10.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.