BIOINFORMATICS AND COMPUTATIONAL BIOLOGY (BCB)

BCB 701. Genome Sciences Seminar Series. 1 Credit.
Open to bioinformatics students only. Diverse but current topics in all aspects of bioinformatics. Relates new techniques and current research of notables in the field of bioinformatics and computational biology.
Repeat rules: May be repeated for credit.
Grading status: Letter grade.

BCB 702. Genome Sciences Seminar Series. 1 Credit.
Open to bioinformatics students only. Diverse but current topics in all aspects of bioinformatics. Relates new techniques and current research of notables in the field of bioinformatics.
Repeat rules: May be repeated for credit.
Grading status: Letter grade.

BCB 710. Bioinformatics Colloquium. 1 Credit.
The goal of this course is to expose students to the research interests of BCB faculty and to provide an opportunity for students to present their own work and receive input from their peers and faculty.
Grading status: Letter grade.

BCB 712. Databases, Metadata, Ontologies, and Digital Libraries for Biological Sciences. 1 Credit.
Course introduces the basic information-science methods for storage and retrieval of biological information.
Grading status: Letter grade.

BCB 715. Mathematical and Computational Approaches to Modeling Signaling and Regulatory Pathways. 1 Credit.
The course provides an introduction to the basic mathematical techniques used to develop and analyze models of biochemical networks. Both deterministic and stochastic models are discussed.
Grading status: Letter grade.

BCB 716. Sequence Analysis. 1 Credit.
Course designed to introduce students to the computational analysis of nucleic acids sequences, including sequence comparison, alignment, and assembly.
Grading status: Letter grade.

BCB 717. Structural Bioinformatics. 1 Credit.
Course introduces methods and techniques for protein modeling.
Grading status: Letter grade.

BCB 718. Computational Modeling Laboratory. 1 Credit.
This course provides a practical introduction to computational modeling of cellular systems. We will focus on how to choose and implement different modeling techniques-deterministic, stochastic, and inferential-to describe the same biological phenomenon. Although no formal mathematical or computational background is required, the course will involve a fair amount of programming in MATLAB.
Grading status: Letter grade.

BCB 720. Introduction to Statistical Modeling. 3 Credits.
This course introduces foundational statistical concepts and models that motivate a wide range of analytic methods in bioinformatics, statistical genetics, statistical genomics, and related fields. Students are expected to know single-variable calculus, be familiar with matrix algebra, and have some programming experience.
Grading status: Letter grade.

This short course will cover methods of inferring/estimating natural selection, including the Dn/Ds ratio, the McDonald-Kreitman test, and the Poisson Random Field model. The course will feature discussions of high-profile publications that describe the application of these methods to yield insights into the forces that have shaped organismal evolution.
Grading status: Letter grade.

BCB 723. Topics in Statistical Genetics and Genomics. 1 Credit.
This module introduces selected concepts and techniques in statistical genetics and genomics.
Grading status: Letter grade.

BCB 725. Introduction to Statistical Genetics. 3 Credits.
Covers statistical methods for the analysis of family and population-based genetic data. Topics include classical linkage analysis, population-based and family-based association analysis, haplotype analysis, genome-wide association studies, basic principles in population genetics, imputation-based analysis, pathway-based analysis, admixture mapping, analysis of copy number variations, and analysis of massively parallel sequencing data.
Grading status: Letter grade.

BCB 850. Training in Bioinformatics and Computational Biology Teaching. 3 Credits.
Principles of bioinformatic and computational biology pedagogy. Students are responsible for assistance in teaching BCB and work under the supervision of the faculty, with whom they have regular discussion of methods, content, and evaluation of performance.
Repeat rules: May be repeated for credit.
Grading status: Letter grade.

BCB 891. Special Topics. 1-3 Credits.
Advance topics in current research in statistics and operations research.
Repeat rules: May be repeated for credit; may be repeated in the same term for different topics.
Grading status: Letter grade
Same as: MATH 891, GNET 891.

BCB 899. Special Topics in Bioinformatics and Computational Biology. 1-6 Credits.
Special topics course in the Bioinformatics and Computational Biology Curriculum. Topics will vary.
Repeat rules: May be repeated for credit. 9 total credits. 9 total completions.
Grading status: Letter grade.

BCB 905. Research in Bioinformatics and Computational Biology. 1-8 Credits.
Credit awarded to students for research in bioinformatics and computational biology.
Repeat rules: May be repeated for credit.
Grading status: Letter grade.

BCB 993. Master's Research and Thesis. 3 Credits.
Students are not accepted for master's program.
Repeat rules: May be repeated for credit.

BCB 994. Doctoral Research and Dissertation. 3 Credits.
Credit for work done towards doctorate.
Repeat rules: May be repeated for credit.