

Bioinformatics and Computational Biology (BCBIO)

Courses primarily for undergraduates:

BCBIO 110. BCBIO Orientation.

(1-0) Cr. 0.5. F.

First 8 weeks. Orientation to the area of bioinformatics and computational biology. For students considering a major in BCBIO. Specializations and career opportunities. Offered on a satisfactory-fail basis only.

BCBIO 211. Introduction to Bioinformatics and Computational Biology.

(3-0) Cr. 3. S.

Perl programming, molecular biology, biological databases, sequence alignment, homology search, identification of sequence patterns, construction of phylogenetic trees, gene function prediction, gene structure prediction, genomic annotation and comparative genomics.

BCBIO 401. Fundamentals of Bioinformatics and Computational Biology I.

(3-0) Cr. 3. F. Prereq: BCBIO 211 and basic programming experience (e.g. COM S 207, COM S 208, COM S 227 or permission of instructor)

Application of computer science to molecular biology. String algorithms, sequence alignments, indexing data structures, homology search methods, pattern recognition, fragment assembly, genome annotation, construction of bioinformatics databases, and gathering and distribution of biological information with the Internet.

BCBIO 402. Fundamentals of Bioinformatics and Computational Biology II.

(3-0) Cr. 3. S. Prereq: BCBIO 401

Genomics: Gene structure prediction, gene function prediction and comparative genomics. Post-genomics: Gene expression studies, DNA microarrays, next-generation sequencing of transcriptome. Structural biology: Protein and RNA structure predictions, structure representation, comparison and visualization. Systems biology: Signal transduction pathway inference, biological networks and systems.

BCBIO 442. Bioinformatics and Computational Biology Techniques.

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS. Prereq: BIOL 314 recommended

Modular minicourses consisting of guided tutorials and hands-on computer software exercises focused on fundamental problems, approaches, and software applications in bioinformatics and computational biology. Offered on a satisfactory-fail basis only. Nonmajor graduate credit.

BCBIO 442A. Bioinformatics and Computational Biology Techniques: Sequence Database Searching.

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS. Prereq: BIOL 314 recommended

Modular minicourses consisting of guided tutorials and hands-on computer software exercises focused on fundamental problems, approaches, and software applications in bioinformatics and computational biology. Offered on a satisfactory-fail basis only. Nonmajor graduate credit.

BCBIO 442B. Bioinformatics and Computational Biology: Protein Structure Databases, Visualization, and Prediction.

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS. Prereq: BIOL 314 recommended

Modular minicourses consisting of guided tutorials and hands-on computer software exercises focused on fundamental problems, approaches, and software applications in bioinformatics and computational biology. Offered on a satisfactory-fail basis only. Nonmajor graduate credit.

BCBIO 442C. Bioinformatics and Computational Biology Techniques: Phylogenetic Analysis.

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS. Prereq: BIOL 314 recommended

Modular minicourses consisting of guided tutorials and hands-on computer software exercises focused on fundamental problems, approaches, and software applications in bioinformatics and computational biology. Offered on a satisfactory-fail basis only. Nonmajor graduate credit.

BCBIO 442D. Bioinformatics and Computational Biology Techniques: Microarray Analysis.

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS. Prereq: BIOL 314 recommended

Modular minicourses consisting of guided tutorials and hands-on computer software exercises focused on fundamental problems, approaches, and software applications in bioinformatics and computational biology. Offered on a satisfactory-fail basis only. Nonmajor graduate credit.

BCBIO 444. Introduction to Bioinformatics.

(Cross-listed with BCB, BIOL, COM S, CPR E, GEN). (4-0) Cr. 4. F. Prereq: MATH 165 or STAT 401 or equivalent

Broad overview of bioinformatics with a significant problem-solving component, including hands-on practice using computational tools to solve a variety of biological problems. Topics include: database searching, sequence alignment, gene prediction, RNA and protein structure prediction, construction of phylogenetic trees, comparative and functional genomics, systems biology. Nonmajor graduate credit.

BCBIO 490. Independent Study.

Cr. 1-5. Repeatable, maximum of 9 credits. F.S.SS. Prereq: BCBIO 211, junior or senior classification, permission of instructor

Students in the College of Liberal Arts and Sciences may use no more than 9 credits of BCBIO 490 and 491 toward graduation.

BCBIO 491. Team Research Projects..

Cr. 1-5. Repeatable, maximum of 9 credits. Prereq: BCBIO 211, junior or senior classification, permission of instructor

Research projects in bioinformatics and computational biology done by teams of students. Students in the College of Liberal Arts and Sciences may use no more than 9 credits of BCBIO 490 and 491 toward graduation.