BIOINFORMATICS AND COMPUTATIONAL BIOLOGY (BCBIO)

Any experimental courses offered by BCBIO can be found at:
registrar.iastate.edu/faculty-staff/courses/explistings/ **(**http://www.registrar.iastate.edu/faculty-staff/courses/explistings/**)**

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 322: Introduction to Bioinformatics and Computational Biology
(Cross-listed with BIOL, GEN). (3-0) Cr. 3. F.
Prereq: BIOL 212
Genome sequencing, assembly, structural and functional annotation, and comparative genomics. Investigating these topics will develop skills in programming and scripting (Perl and/or Python), the use of biological databases, sequence alignment, similarity search, identification of sequence patterns, construction of phylogenetic trees, and comparative genomics.

BCBIO 401: Bioinformatics of Sequences
(Cross-listed with BIOL, COM S, GEN). (3-0) Cr. 3. Alt. F., offered odd-numbered years.
Prereq: (BCBIO 322; [COM S 127 or COM S 227]; [MATH 160 or MATH 165]; [MATH 166 or STAT 301]; [STAT 101 or STAT 104 or STAT 330]) or Permission of Instructor
Application of computer science and statistics to molecular biology with a significant problem-solving component, including hands-on programming using Python to solve a variety of biological problems. String algorithms, sequence alignments, homology search, pattern discovery, genotyping, genome assembly, genome annotation, comparative genomics, protein structure.

BCBIO 406: Bioinformatics of OMICS
(Cross-listed with BIOL, COM S, GEN). (3-0) Cr. 3. S.
Prereq: BIOL 212
Introduction to cutting edge OMICS analyses including transcriptome, proteome, metabolome, DNA-protein interactome, protein-protein interactome and methylome. Genomic analysis including transcriptome analysis, cancer genomics, comparative genomics, and regulatory network analysis.

BCBIO 423: Mathematical Modeling in Biology
(Dual-listed with BCBIO 423). (Cross-listed with MATH). (3-0) Cr. 3. F.
Prereq: MATH 266 or MATH 267
Introduction to mathematical techniques for modeling and simulation, parameter identification, and analysis of biological systems. Applications drawn from many branches of biology and medicine. Apply differential equations, difference equations, and dynamical systems theory to a wide array of biological problems. MATH 265 or equivalent recommended.

BCBIO 442: Bioinformatics and Computational Biology Techniques
(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS.
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. BIOL 314 recommended. Offered on a satisfactory-fail basis only.

BCBIO 442A: Bioinformatics and Computational Biology Techniques: Sequence Database Searching
(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS.
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. BIOL 314 recommended. Offered on a satisfactory-fail basis only.

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.
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. BIOL 314 recommended. Offered on a satisfactory-fail basis only.

BCBIO 442C: Bioinformatics and Computational Biology Techniques: Phylogenetic Analysis
(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS.
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. BIOL 314 recommended. Offered on a satisfactory-fail basis only.

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

(0.2-0.5) Cr. 0.5. Repeatable, maximum of 2 credits. S.SS.

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. BIOL 314 recommended. Offered on a satisfactory-fail basis only.

BCBIO 490: Independent Study

Cr. 1-5. Repeatable, maximum of 9 credits. F.S.SS.

Prereq: BCBIO 322; Junior or Senior classification; Permission of Instructor

Independent research projects for undergraduate students in bioinformatics and computational biology. 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. F.S.SS.

Prereq: BCBIO 322; 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.