Advanced Electives for BIC Majors - SPRING 2018

Two seats in each of the approved 400-level Biology courses below have been reserved for BIC majors. BIC majors will be able to register for these courses beginning Wed Feb 28, 2018 at 9am.

BIC majors may use ONE approved 300-level biology course as one of their 5 advanced electives.

Advanced Electives for BIC Majors

Chemistry Courses

CH 410  Application of Quantum Chemistry. 4 Credits (Hendon)
This course provides an overview of contemporary computational chemistry techniques used to model both single molecule and extended solids. Computations will be conducted on the new University of Oregon super computer, Talapas.

CH 410 Design Principles of Dynamic Biological Systems. 4 Credits (Hansen)
This course will cover major technological advances over the past 30 years that accelerated scientific discovery at the interface between cell biology and biochemistry. Emphasis will be placed on defining the relationships between protein structure, function, and emergent properties in complex biological systems. Pre req CH 461; MATH 253

CH 413. Physical Chemistry. 4 Credits. (Marcus)
Methods of physics applied to chemical problems, including inorganic, organic, and biochemistry. Introduction to quantum chemistry. Prereq: two years of college chemistry (except for physics majors), PHYS 201, 202, 203; MATH 253; MATH 256, 281, 282 strongly recommended.

CH 419. Physical Chemistry Laboratory. 4 Credits. (Nazin)
Experiments on spectroscopy, quantum chemistry, and laser-excited chemical and physical processes to illustrate theoretical principles. Prereq: CH 417; pre or coreq: CH 413.

CH 421. Physical Organic Chemistry II. 4 Credits. (Pluth)
Modern physical organic chemistry including tools to study reaction mechanisms, kinetic analysis, isotope effects, and qualitative molecular orbital theory. Sequence with CH 420/520. Prereq: CH 420/520.

CH 429. Instrumental Analysis. 5 Credits. (Prell)
Use of instrumental methods for quantitative determinations of unknown chemical samples. Prereq: CH 417.

CH 433. Inorganic Chemistry. 4 Credits. (Page)
Solid-state inorganic chemistry: solid-state structure and its determination; the electrical, magnetic, and mechanical properties of materials and their physical description. Prereq: CH 431 recommended.

CH 443. Quantum Chemistry and Spectroscopy. 4 Credits. (Wong)
Experimental spectra of atomic and molecular systems and surfaces. Prereq: CH 442 or equivalent.

CH 445. Statistical Mechanics. 4 Credits. (Cina)
Molecular basis of thermodynamics. Applications to the calculation of the properties of noninteracting and weakly interacting systems. Prereq: CH 413 or equivalent.

CH 464. RNA Biochemistry. 4 Credits. (Hawley)
Introduction to the diverse field of RNA biochemistry. Prereq: CH 463 or BI 320.
Biology Courses

**BI 322. Cell Biology. 4 Credits. (Powell)**
Eukaryotic cell nuclear structure and exchange, protein trafficking, endocytosis, chaperones, cytoskeletal functions, intercellular junctions, extracellular materials, signaling, cell division mechanics and controls, aging and death. Lectures, discussions. Prereq: BI 214 or BI 282H; CH 331 recommended.

**BI 360. Neurobiology. 4 Credits. (Bishop)**
Function of the nervous system from the single neuron to complex neural networks. Topics range from molecular and cellular neurobiological mechanisms to systems and behavioral analyses. Lectures, discussions. Prereq: BI 214 or BI 282H.

BI 410 Biology of Aging (Herman)
This course will use primary literature to examine the molecular and cellular mechanisms that regulate aging and to explore approaches that slow or reverse the aging process. Suggested pre-req: BI 320 Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 410 Matlab for Biologists (Niell)
Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 410 Analysis Neural Data (Ahmadian)
Analysis of Neural Data provides an introduction to statistical and visualization methods for analysis of neuroscientific data using the Matlab programming environment. Students will learn basic concepts and methods from statistics and linear algebra for analysis of high-dimensional data, and learn how to apply these to experimental data by writing Matlab programs. No previous programming experience is required. Pre-reqs: BI 211-214 or BI 281H -283H; and Math 246-247 or Math 251-252. (Suggested additional pre-reqs either Math 243 or BI 399 Intro Experimental Design & Stats.)

BI 410 Intro Programming Bio (Conery)
Prereq: MATH 246-247 or 251-252 Prereq: BI 212 and BI 213 and BI 214 or BI 283H.

BI 422. Protein Toxins in Cell Biology. 4 Credits. (Washbourne)
Mechanisms used by protein toxins to kill other organisms and how they have been used as molecular scalpels to dissect pathways in cell and neurobiology. Lectures, discussions. Prereq: BI 322, BI 356, or BI 360.

BI 424. Advanced Molecular Genetics. 4 Credits. (Selker)
Structure and function of chromosomes with emphasis on unsolved genetic problems such as genomic imprinting, position effects, and gene silencing. Lectures, discussions. Prereq: BI 320.

BI 486. Population Genetics. 4 Credits. (Singh)
Analysis of the genetic mechanisms of evolutionary change. Study of artificial and natural selection, mutation, migration, population structure, and genetic drift. Lectures.

**Students may use ONE approved 300-level biology course (BI 322 or 360) as one of their 5 advanced electives.**