INTEGRATIVE BIOLOGY,  
SCHOOL OF

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http://sib.illinois.edu/

Students in Integrative Biology (http://sib.illinois.edu/undergraduate/programs) focus on the disciplines of genetics, physiology, behavior, ecology and evolution. In Integrative Biology, the emphasis is on bringing multiple disciplines to bear on complex scientific questions. From genomics to global change, Integrative Biology seeks to discover the complex interrelationships between organisms and the physical and biological environment in which they live. This major prepares students for careers in medicine and the health professions, research, organisms, and the environment. The School of Integrative Biology also sponsors two minors. The Minor in Integrative Biology is designed for students intending to have a career for which a background in integrative biology is complementary, e.g. law, technology, bioinformatics, business, scientific writing, and engineering. The Minor in Ecology and Conservation Biology prepares students for diverse careers, including environmental lawyer, environmental consultant, conservation technician, environmental educator, and environmental engineer.

For the Degree of Bachelor of Science in Liberal Arts and Sciences

Major in Sciences and Letters Curriculum

Students must select one concentration.

- Integrative Biology Concentration (http://catalog.illinois.edu/undergraduate/las/academic-units/integrative-bio/integrative-biology-concentration)
- Integrative Biology Honors Concentration (http://catalog.illinois.edu/undergraduate/las/academic-units/integrative-bio/integrative-biology-honors-concentration)
- Minor in Integrative Biology (http://catalog.illinois.edu/undergraduate/las/academic-units/integrative-bio/integrative-biology-minor)
- Minor in Ecology and Conservation Biology (http://catalog.illinois.edu/undergraduate/las/academic-units/integrative-bio/ecology-conservation-biology-minor)

IB Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/IB)

Courses

IB 100 Biology in Today's World  credit: 3 Hours.
Introduction to biology for the non-major. In-depth focus on three contemporary problems: maintaining a livable environment, issues of human health, and evolution. Lecture and discussion. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 103 Introduction to Plant Biology  credit: 4 Hours.
Basic principles of growth and form, physiology, genetics, evolution, and ecology in plant biology. Lecture and laboratory. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 104 Animal Biology  credit: 4 Hours.
Introductory zoological concepts with emphasis on the diversity and comparative anatomy of animals and the fundamentals of physiology, genetics, evolution, and behavior. Lecture and laboratory. The laboratory includes vertebrate dissection. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 105 Environmental Biology  credit: 3 Hours.
Introduction to ecological principles in relation to understanding environmental problems; lecture and discussion emphasize impacts upon ecosystems by human activities such as air and water pollution, usage of pesticides and pest control measures, expansion of agriculture in tropics and arid regions, harvesting the oceans, and development of energy sources. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 106 Extinction: Dinosaurs to Dodos  credit: 3 Hours.
Examines the role of extinction in shaping the history of life on Earth. Explores the "big five" extinction events - including the two mass extinctions that mark the rise and fall of the dinosaur - and other periods of rapid ecological change. Lecture and discussion examine the causes of these mass extinctions on the past, and studies how animal and plant life recovered from them. A major theme of the course will be the ongoing modern extinction crisis, the lessons we can learn from the past when addressing modern biodiversity loss, from the loss of the dodo bird in the 17th century to the threat of extinction faced by polar bears and other plants and animals today. Same as ESE 126 and GEOL 106. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 107 Global Warming, Biofuels, Food  credit: 3 Hours.
Introduction for non-science majors to the biology and ecology underlying the likely impacts of global change on our society this century. Lecture and discussion emphasize: global warming, alternative biofuels, future food security, and conservation of biodiversity. For non-majors only. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 108 Food Security, Ecosystems, and Energy  credit: 3 Hours.
Basic principles of growth and form, physiology, genetics, evolution, and ecology in plant biology. Lecture and laboratory. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 109 Insects and People  credit: 3 Hours.
Fundamentals of insect biology as reflected in human culture; insect physiology, ecology, and behavior discussed in the context of art, literature, movies, medicine, sports, law, and history. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 110 Organismal & Evolutionary Biol  credit: 4 Hours.
Introduction to physiology, genetics, and evolution of organisms, and their ecology and diversity. This course satisfies the General Education Criteria for:
UIUC: Life Sciences

IB 111 Organismal & Evol Biol Lab  credit: 1 Hour.
Topics follow lecture topics in IB 110 and include labs in ecology, plant and animal function, and genetics and evolution. Designed for non-majors needing a year of biology with lab. Credit is not given for IB 111 for Integrative Biology or Molecular and Cellular Biology majors. Prerequisite: Credit or concurrent registration in IB 110.

Information listed in this catalog is current as of 04/2016
IB 199 Undergraduate Open Seminar  credit: 0 to 5 Hours.
Approved for both letter and S/U grading. May be repeated to a maximum of 5 hours.

IB 202 Anatomy and Physiology  credit: 3 OR 4 Hours.
How animals function in acquiring, processing, and allocating resources in the face of environmental constraints. The inquiry-based laboratory emphasizes testing of hypotheses related to functioning of anatomical and physiological components of the basic systems of animals. Lecture only, 3 hours; with laboratory, 4 hours. Students must complete the laboratory portion of the course to receive 4 hours of credit. The laboratory includes vertebrate dissection. Prerequisite: IB 150 and MCB 150.

IB 203 Ecology  credit: 4 Hours.
The links between evolution and ecology, population dynamics, community structure and function, and ecosystem function on local and global scales. Basic ecology needed to understand environmental problems and to conserve biodiversity. Investigations in both field and laboratory included. Prerequisite: IB 150 and MCB 150. This course satisfies the General Education Criteria for: UIUC: Advanced Composition

IB 204 Genetics  credit: 3 OR 4 Hours.
The fundamentals of inheritance, with an emphasis on eukaryotes. Major topics include transmission genetics, quantitative genetics, cytogenetics, genomics, genetics of development and behavior, and population genetics. Laboratory emphasizes an experimental, inquiry-based approach to modern and classical genetics. Lecture only, 3 hours; with laboratory, 4 hours. Students must complete the laboratory portion of the course to receive 4 hours of credit. Prerequisite: IB 150 and MCB 150. This course satisfies the General Education Criteria for: UIUC: Life Sciences

IB 220 Applied Entomology  credit: 3 Hours.
Same as CPSC 270 and NRES 270. See CPSC 270. This course satisfies the General Education Criteria for: UIUC: Life Sciences

IB 270 Evolution of Molecules & Cells  credit: 5 Hours.
The major evolutionary transitions of biomolecules and cells including: energy acquisition and metabolism; information inheritance, regulation, and genomes; the origin of life and of the prokaryotic cell, eukaryotic cell, and multicellularity. Lecture and laboratory. Credit is not given for both IB 270 and either MCB 250 or MCB 252. Prerequisite: Admission to the IB honors biology option; credit or concurrent registration in organic chemistry.

IB 271 Organismal Biology  credit: 5 Hours.
Integrated study of the diversity and structure and function of plants and animals in evolutionary and environmental contexts. Conceptual themes and techniques of molecular and cellular levels of biological organization will be integrated as well. Lecture and laboratory. The laboratory includes vertebrate dissection. Credit is not given for both IB 271 and IB 202. Prerequisite: IB 270; good standing in the honors biology option. This course satisfies the General Education Criteria for: UIUC: Advanced Composition

IB 299 Undergraduate Special Course  credit: 0 to 5 Hours.
Approved for letter and S/U grading. May be repeated in the same term; may be repeated in separate terms to a maximum of 6 hours.

IB 302 Evolution  credit: 4 Hours.
Broad introduction to evolutionary biology, including natural selection and microevolution, phylogeny, speciation, molecular evolution, macroevolution and the fossil records. The laboratory emphasizes a survey of biodiversity and processes and patterns of evolution. Prerequisite: IB 204 or consent of instructor.

IB 329 Animal Behavior  credit: 3 Hours.
Introductory course emphasizing how patterns of behavior promote survival, change through evolution, and are modified by the environment. Same as ANSC 366 and ANTH 342. Credit is not given for both IB 329 and ANSC 363. Prerequisite: IB 150 and MCB 150; or consent of instructor.

IB 335 Systematics of Plants  credit: 4 Hours.
Introduces the principles and methods of the identification, naming, classification, systematics, and evolution of flowering plants; includes a survey of selected flowering plant families with information on their interrelationships. Prerequisite: One of the following: IB 100, IB 101, IB 102, IB 103, or IB 150; consent of the instructor.

IB 348 Fish and Wildlife Ecology  credit: 3 Hours.
Same as NRES 348. See NRES 348.

IB 360 Evolution and Human Health  credit: 3 Hours.
Our health is inseparably tied to our evolutionary history. As a result, evolution is an important underpinning discipline for health professionals. This course first provides an overview of evolutionary processes, molecular evolution, human evolution, life history theory, and evolutionary-developmental biology. Second, it illustrates the application of these principles to our understanding of nutrition and metabolism, reproduction, disease and stress, and behavior. Third, it shows in practical terms how the principles of evolutionary medicine can be applied in medical practice and public health. Same as ANTH 360. Prerequisite: IB 302 or MCB 250 or MCB 244, or consent of instructor.

IB 361 Ecology and Human Health  credit: 3 Hours.
Exploration of the emergence of infectious diseases and other human health issues from an ecological perspective, including vector-borne diseases, diseases spread from wildlife in terrestrial and aquatic ecosystems, and the role of pathogens and parasites in community and population ecology, food webs, and ecosystem functioning. Attention will be placed on how current and future global change and biodiversity loss will contribute to the increasing prevalence of human emerging diseases. Same as ANTH 361. Prerequisite: IB 203 or consent of instructor.

IB 363 Plants and Their Uses  credit: 3 Hours.
Consideration of plants which are useful or harmful: their origins and history, botanical relationships, chemical constituents which make them economically important, and their roles in prehistoric and modern cultures and civilizations. Same as ANTH 378. Prerequisite: IB 102, IB 103, or IB 150; or consent of instructor.

IB 364 Genomics and Human Health  credit: 3 Hours.
Highlights advances in understanding the human genome, by utilizing the latest techniques in bioinformatics, i.e. acquiring, analyzing, storing, and displaying the information from the entire genome and protein sequences. The course describes the theory and practices behind modern sequencing techniques and explores the genome with a particular emphasis on the use of extensive online databases and software. Students will analyze one human disorder using bioinformatics software and databases in order to update older published literature about the genomics underpinning the disorder. Prerequisite: IB 204 or consent of instructor.

Information listed in this catalog is current as of 04/2016
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>IB 368</td>
<td>Vertebrate Natural History</td>
<td>credit: 4 Hours.</td>
<td>Introduction to the classification, life histories, adaptations, and ecology of fishes, amphibians, reptiles, birds, and mammals. Focus is on species of the Midwest region. Laboratory emphasizes identification and distribution of Illinois' vertebrate fauna. Some Saturday field trips are required. Same as NRES 368. Prerequisite: IB 203 or NRES 219 or consent of instructor.</td>
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<tr>
<td>IB 372</td>
<td>Ecology and Evolution</td>
<td>credit: 5 Hours.</td>
<td>Integrated study of ecology, population genetics, and evolution. Conceptual themes and techniques from the molecular, cellular, and organismal levels of biology will be integrated as well. Lecture, laboratory, and field work. Credit is not given for both IB 372 and either IB 203 or IB 302. Prerequisite: IB 271; good standing in the IB honors biology option.</td>
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<tr>
<td>IB 390</td>
<td>Introductory Research</td>
<td>credit: 1 to 5 Hours.</td>
<td>Laboratory and/or field research and/or reading supervised by faculty members in the School of Integrative Biology. Approved for S/U grading only. May be repeated. Credit is not given for more than a combined maximum of 10 hours of IB 390 or IB 490 towards graduation for IB majors. Prerequisite: Consent of instructor.</td>
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<tr>
<td>IB 401</td>
<td>Introduction to Entomology</td>
<td>credit: 3 or 4 Hours.</td>
<td>Integrated studies of the principal morphological, physiological, ecological and behavioral relationships among insects. Lecture and laboratory. 3 or 4 undergraduate hours. 3 or 4 graduate hours. An insect collection will be required for 4 hours credit. Prerequisite: IB 150; or consent of instructor.</td>
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<tr>
<td>IB 403</td>
<td>Behavioral Inference &amp; Fossils</td>
<td>credit: 3 or 4 Hours.</td>
<td>Same as ANTH 446. See ANTH 446. Study of the genetics of natural populations, stressing empirical observations and experiments. Emphasis on recent theories of genotype/environmental interactions and their relationship to evolutionary processes. Offered in alternate years. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 204; or consent of instructor.</td>
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<tr>
<td>IB 405</td>
<td>Ecological Genetics</td>
<td>credit: 3 Hours.</td>
<td>Study of the genetics of natural populations, stressing empirical observations and experiments. Emphasis on recent theories of genotype/environmental interactions and their relationship to evolutionary processes. Offered in alternate years. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 204; or consent of instructor.</td>
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<tr>
<td>IB 410</td>
<td>Evolution and Development</td>
<td>credit: 3 Hours.</td>
<td>Every animal is the product of two processes: development from an egg and evolution from its ancestors. The new field of evolutionary development biology, or &quot;evo-devo&quot;, examines the relationship between these two processes. This course examines the developmental mechanism underlying the evolution of animal design, particularly with regard to the patterning of animal body plans and body parts. Takes an integrative approach, synthesizing data from paleontology, embryology, and genetics. Designed for students with prior coursework in evolution who are interested in understanding the mechanisms behind evolution. No previous background in development is required. Offered in alternate years. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 204; or consent of instructor.</td>
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<tr>
<td>IB 411</td>
<td>Bioinspiration</td>
<td>credit: 3 Hours.</td>
<td>Focuses on how experts in biology and technological fields find inspiration in nature and use it as a model to make technological innovations and solve societal problems. In the future, our day-to-day living, health, and the environment will benefit from interdisciplinary teams using findings in basic biological research for technological innovation. Topics to be explored include human health, efficient architecture, cooperative control, robotics, swarm logic, and advanced biological materials. 3 undergraduate hours. 3 graduate hours.</td>
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<tr>
<td>IB 416</td>
<td>Population Genetics</td>
<td>credit: 3 or 4 Hours.</td>
<td>Same as ANSC 446. See ANSC 446.</td>
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IB 433  Comparative Vertebrate Anatomy  credit: 5 Hours.
Comparative structure, evolution, and classification of chordate animals emphasizing vertebrates. Strong attention to relationships of fossils to present animals. Function of parts, their evolution, and some developmental aspects. Lab involves dissection of vertebrates. Lecture and Laboratory. Same as ANTH 434. 5 undergraduate hours. 5 graduate hours. Prerequisite: IB 202, IB 302, or consent of instructor.

IB 437  Primate Behav Endocrinology  credit: 3 or 4 Hours.
Same as ANTH 437. See ANTH 437.

IB 439  Biogeography  credit: 3 Hours.
Spatial and temporal patterns of biological diversity and the factors that govern the distribution and abundance of taxa. This course addresses two of its subfields: historical biogeography - the origin, dispersal, and extinction of taxa and biotas; and ecological biogeography - the role physical and biotic environments have played in determining taxonomic distributions. Also explores the ecological, evolutionary, climatological, and paleontological foundations for the distribution of species and biological communities. Includes a review of many of the field’s classical papers, the current synthesis of biogeographic theory, and the relevance of biogeography to modern conservation goals. Offered in alternate years. Same as ANTH 446, ESE 439, GEOG 436, and NRES 441. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 150 or other introductory biology course, or consent of instructor.

IB 440  Plants and Global Change  credit: 3 Hours.
Same as CPSC 431 and NRES 431. See CPSC 431.

IB 442  Evolution of Infectious Disease  credit: 3 Hours.
Same as MCB 435. See MCB 435.

IB 443  Evolutionary Ecology  credit: 3 Hours.
Emphasizes the evolution of life-history strategies in plants and animals (reproductive rates, life cycles, sex ratios, breeding and mating systems) and the coevolution of animals and plants (pollination, dispersal, and herbivory). 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: IB 203 or equivalent; IB 302; or consent of instructor.

IB 444  Insect Ecology  credit: 3 or 4 Hours.
Discussion of the practical and theoretical aspects of ecology in relation to insects as individuals, populations, and communities; emphasis on the role of insects in the environment. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Offered in alternate years. Lecture only, 3 hours; with laboratory, 4 hours. Prerequisite: IB 150 and MCB 150 or consent of instructor.

IB 445  Chemical Ecology  credit: 3 Hours.
Chemical bases of ecological interactions among organisms; topics include the chemical structures and functions of messenger compounds important in inter- and intraspecific interactions among plants, insects, higher animals, fungi, microbes, and their environments. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: IB 150 and MCB 150 or CHEM 232; or consent of instructor.

IB 447  Field Ecology  credit: 1 Hour.
Study of habitats in various sections of North America during spring vacation or intersession. Outdoor cooking and camping; transportation in University cars. Additional fees may apply. See Class Schedule. 1 undergraduate hour. 1 graduate hour. May be repeated to a maximum of 3 hours. Prerequisite: IB 203; or consent of instructor.

IB 449  Limnology  credit: 3 or 4 Hours.
Fresh water biology; study of the lake, pond, and river with emphasis on the physical environment as well as on the plants and animals which live in fresh water. Lectures, discussions, laboratory, and field work. Students must complete the laboratory portion of the course to receive 4 hours of credit. Offered in alternate years. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Prerequisite: IB 203 or consent of instructor.

IB 451  Conservation Biology  credit: 4 Hours.
Synthesis of conservation biology with an emphasis on the preservation of biological diversity and its evolutionary potential. Laboratory includes an introduction to the use of modern molecular techniques in conservation biology, computer simulation modeling, and field conservation problem solving. Same as CPSC 436 and ENVS 420. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 203 or consent of instructor.

IB 452  Ecosystem Ecology  credit: 3 Hours.
Distribution and structure of ecosystems on earth; integration of multiple disciplines to gain a holistic view of ecosystem function; ecosystem concepts as they apply to understand natural and anthropogenic environmental change. Offered in alternate years. Same as ESE 452 and NRES 462. 3 undergraduate hours. 3 graduate hours. Prerequisite: CHEM 102 and CHEM 104; or consent of instructor.

IB 453  Community Ecology  credit: 3 Hours.
The direct and indirect interactions among species that determine the structure and composition of plant and animal communities. Emphasis will be on the maintenance of species diversity and its consequences at both local and regional scales. Offered in alternate years. Same as NRES 452. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 203 or consent of instructor.

IB 461  Ornithology  credit: 4 Hours.
Structure, function, ecology, behavior, and evolution of the birds of the world; laboratory devoted to anatomy and identification; and field studies devoted to identification and behavior of birds. Independent research project and two optional weekend field trips. Same as NRES 461. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 203; or consent of instructor.

IB 462  Mammalogy  credit: 4 Hours.
Classification, distribution, structure, function, life history, evolution and identification of mammals. Lecture/discussions, laboratory and field work. The laboratory includes vertebrate dissection. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 202 and IB 203; or consent of instructor.

IB 463  Ichthyology  credit: 4 Hours.
Classification, anatomy, ecology, behavior, distribution, and evolution of fishes of the world. Emphasis is on morphological, ecological, and behavioral diversification of fishes in a phylogenetic context. Laboratory devoted to anatomy and identification. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 203; or consent of instructor.

IB 464  Herpetology  credit: 4 Hours.
Classification, diversity, structure, function, ecology, behavior, and evolution of amphibians and reptiles. Laboratory devoted to anatomy and identification. Offered in alternate years. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 302; or consent of instructor.
IB 467  Principles of Systematics  credit: 4 Hours.
Comprehensive survey of the theory and methodology of systematics as they are applied today to all groups of organisms, with a practical experience in the acquisition and analysis of systematic data. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 302 and IB 335 or IB 468; or consent of instructor.

IB 468  Insect Classification and Evolution  credit: 4 Hours.
Analytical survey of the classification and evolution of the orders and principal families of insects, with practical experience in the identification of insects at these taxonomic levels; field trips required. Lecture and laboratory. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 401 or consent of instructor.

IB 471  General Mycology  credit: 4 Hours.
Structure, classification, and identification of fungi, including those of economic importance. Offered in alternate years. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 150 and MCB 150; IB 302 recommended; or consent of instructor.

IB 472  Plant Molecular Biology  credit: 1 Hour.
The basic concepts and methodologies of measuring plant gene expression and gene product activity and constructing transgenic plants are presented and discussed. Serves as a gateway to specialized methodology approaches covered in IB 473, IB 474, and IB 475. Same as CPSC 467. 1 undergraduate hour. 1 graduate hour. Prerequisite: MCB 150 and IB 204; or consent of instructor.

IB 473  Plant Genomics  credit: 1 Hour.
Provides broad overview of structural and functional genomics, including genetic and physical mapping, whole genome sequencing, comparative genomics, evolution of gene families and repetitive sequences, genome-wide expression analysis. Emphasis on structural and comparative genomics with brief introduction to functional genomics and bioinformatics. Same as CPSC 467. 1 undergraduate hour. 1 graduate hour. Prerequisite: MCB 250; IB 472; or consent of instructor.

IB 474  Plant Proteomics- Metabolomics  credit: 2 Hours.
Broad introduction to plant proteomics and metabolomics, including a survey of contemporary methods and their applications for protein and metabolite identifications. Proteomics will include the study of posttranslational modifications and protein-protein interactions. Metabolomics will introduce the complexities on pathway tracing and elucidation. The focus of the course is on the application of proteomic-metabolomic approaches to answer biological questions. Tours of proteomic and metabolomic facilities will occur. Same as CPSC 468. 2 undergraduate hours. 2 graduate hours. Prerequisite: MCB 354; IB 472; or consent of instructor.

IB 477  Genomics for Plant Improvement  credit: 2 Hours.
Same as CPSC 466. See CPSC 466.

IB 478  Advanced Plant Genetics  credit: 3 Hours.
Same as CPSC 452. See CPSC 452.

IB 481  Vector-borne Diseases  credit: 4 Hours.
Study of the major groups of arthropods and associated pathogens that affect the health and well-being of humans and other animals. Training will include ecology, evolutionary biology, and epidemiology of vector-borne diseases; taxonomy and identification of vector arthropods; practical skills in molecular and mathematical biology, spatial analysis and field research. Lecture will make use of technology-enhanced classroom for group-based active learning exercises to address critical challenges in vector-borne disease control. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 361 or IB 401 or consent of instructor.

IB 482  Insect Pest Management  credit: 3 Hours.
The principles underlying the control of important insect pests of agriculture and of human and animal health; emphasis on integrated pest management involving a systems approach which combines biological, cultural, and chemical suppressive factors into ecologically sound and socially and economically acceptable technology. Lecture and laboratory. Same as CPSC 479. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: IB 150 or equivalent; or consent of department.

IB 483  Insect Pathology  credit: 3 Hours.
The general principles of pathology as they apply to insects; includes non-infectious and infectious diseases caused by viruses, bacteria, fungi, protozoa, and nematodes. Studies the epizootiology of naturally occurring insect disease and the use of insect pathogens as microbial control agents. Same as CPSC 475. 3 undergraduate hours. 3 graduate hours. Lecture in alternate years. Prerequisite: IB 150 and MCB 150 or consent of instructor.

IB 484  Paleoclimatology  credit: 4 Hours.
Same as GEOL 484. See GEOL 484.

IB 485  Environmental Toxicology & Health  credit: 3 Hours.
Explores toxicological, environmental, public health, occupational and ecological aspects of the use and release of toxic substances in the environment; features case histories of environmental contamination that illustrate ecological, health, and social aspects of pollution; emphasizes biochemical mechanisms and ecosystem consequences. Same as CHLH 461 and ENVS 431. 3 undergraduate hours. 3 graduate hours. Prerequisite: A college chemistry course and a college biology course; or consent of instructor.

IB 486  Pesticide Toxicology  credit: 3 or 4 Hours.
Examines the biological effects of major classes of insecticides and herbicides, and of selected individual fungicides, including: toxicity to nontarget organisms, persistence and fate in the environment, biotransformation, and ecological consequences. Current regulations on pesticide testing will also be presented. The mechanism of action on target species will be discussed only in relation to effects on nontarget organisms. Same as CB 434 and ENVS 433. 3 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: One year of college chemistry and one year of college biology or consent of instructor.

IB 487  Math Modeling in Life Sciences  credit: 3 or 4 Hours.
Same as ANSC 448 and STAT 458. See ANSC 448.

IB 488  Environmental Stable Isotopes  credit: 3 Hours.
Stable isotopes are powerful tools for studying environmental processes, acting as tracers of resource origin, fate, and flux and integrators of system processes. The goal of this course is to provide a fundamental knowledge base and hands-on training for students to become practitioners of natural abundance and enriched stable isotope techniques. The course will focus on stable isotopes of biologically-relevant light elements (C, H, N, O, S). We will also review case studies demonstrating application of these techniques to disciplines including anthropology, animal, insect, and plant biology, biogeochemistry, biometeorology, ecosystem ecology, forensics, microbial ecology, paleoclimatology, and paleoecology. Offered in alternate years. Same as ATM 422, GEOL 488, and NRES 478. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: CHEM 104 or equivalent; or consent of instructor.
IB 489  Undergraduate Research Abroad  credit: 1 to 4 Hours.
Students assist in research under University of Illinois faculty supervision at a location outside of the United States. Topics and type of assistance vary. 1 to 4 undergraduate hours. No graduate credit. May be repeated in separate terms up to 6 hours. Prerequisite: Evidence of adequate preparation for such study; consent of UI faculty member supervising the work (who will have examined the proposed research plan); and approval of the school. Not available to freshman.

IB 490  Independent Study  credit: 1 to 5 Hours.
Laboratory and/or field research supervised by faculty members in the School of Integrative Biology. A written report is required. 1 to 5 undergraduate hours. No graduate credit. May be repeated. Credit is not given for more than a combined maximum of 10 hours of IB 390 or IB 490 towards graduation for IB majors. Prerequisite: Consent of instructor.

IB 491  Biological Modeling  credit: 3 or 4 Hours.
Same as ANSC 449, CPSC 448, and GEOG 468. See GEOG 468.

IB 492  Science Communication Skills  credit: 2 Hours.
A successful career in scientific research, teaching and service requires tools and skills for communicating research. Students interested in going into science careers need to know how to write a competitive graduate school or job application, a thesis proposal for graduate research, a fellowship or grant proposal, and how to give a good scientific presentation. This course is designed to teach students these skills with targeted in and out of class exercises. 2 undergraduate hours. No graduate credit. Prerequisite: IB 203 or IB 271; AND one of the following: IB 299, IB 390, IB 490, or consent of instructor. Junior IB majors only.

IB 494  Theoretical Biology + Models  credit: 4 Hours.
Biologists are increasingly using mathematical and computer-based models to complement fieldwork and experimental data. These models provide a context in which to understand and answer existing questions, and also lead us to new questions and new insights. Students will encode biological mechanisms into mathematical models, develop the skills to find solutions to these models and relate them to biological data, and analyze and discuss relevant primary literature. Examples will be drawn largely from ecology and evolutionary biology. 4 undergraduate hours. 4 graduate hours. Prerequisite: MATH 220 or MATH 221; Introductory courses in Ecology and Evolution.

IB 495  Philosophy of Biology  credit: 3 or 4 Hours.
Same as PHIL 473. See PHIL 473.

IB 496  Special Courses  credit: 1 to 5 Hours.
Experimental and temporary courses. Additional fees may apply. See Class Schedule. 1 to 5 undergraduate hours. 1 to 4 graduate hours. Approved for letter and S/U grading. May be repeated as topics vary. Prerequisite: Consent of instructor.