Integrative Biology

Biological phenomena occur at various levels of structural organization, ranging from molecules to organisms, and from populations to the global ecosystem. Integrative Biology takes a whole-organism approach, extending from the genome and proteome through organismal traits (phenotypes), to communities and ecosystems. Through the coordinated study of multiple levels of biological organization over a broad range of spatial and temporal scales, Integrative Biology offers a unique approach to understanding fundamental questions concerning the evolution and maintenance of biological diversity, including organismal form and function, and ecological and ecosystem processes. This multidimensional approach underpins our graduate program, where students combine observational, experimental, and comparative approaches with the development of theory; and apply concepts and techniques from the biological sciences and other disciplines.

Integrative Biology admits students to the PhD program only.

Admission to the University

Minimum Requirements for Admission

The following minimum requirements apply to all graduate programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A grade point average of B or better (3.0);
3. If the applicant comes from a country or political entity (e.g., Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 90 on the iBT test, 570 on the paper-and-pencil test, or an IELTS Band score of at least 7 on a 9-point scale (note that individual programs may set higher levels for any of these); and
4. Sufficient undergraduate training to do graduate work in the given field.

Applicants Who Already Hold a Graduate Degree

The Graduate Council views academic degrees not as vocational training certificates, but as evidence of broad training in research methods, independent study, and articulation of learning. Therefore, applicants who already have academic graduate degrees should be able to pursue new subject matter at an advanced level without need to enroll in a related or similar graduate program.

Programs may consider students for an additional academic master's or professional master's degree only if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.
2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may apply only to one single degree program or one concurrent degree program per admission cycle.

Required Documents for Applications

1. **Transcripts:** Applicants may upload *unofficial* transcripts with your application for the departmental initial review. *If the applicant is admitted,* then *official* transcripts of all college-level work will be required. Official transcripts must be in sealed envelopes as issued by the school(s) attended. If you have attended Berkeley, upload your unofficial transcript with your application for the departmental initial review. *If you are admitted,* an official transcript with evidence of degree conferral *will not* be required.
2. **Letters of recommendation:** Applicants may request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, not the Graduate Division.
3. **Evidence of English language proficiency:** All applicants from countries or political entities in which the official language is not English are required to submit official evidence of English language proficiency. This applies to applicants from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, most European countries, and Quebec (Canada). However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a US university may submit an official transcript from the US university to fulfill this requirement. The following courses will not fulfill this requirement:
   - courses in English as a Second Language,
   - courses conducted in a language other than English,
   - courses that will be completed after the application is submitted, and
   - courses of a non-academic nature.

   If applicants have previously been denied admission to Berkeley on the basis of their English language proficiency, they must submit new test scores that meet the current minimum from one of the standardized tests. Official TOEFL score reports must be sent directly from Educational Test Services (ETS). The institution code for Berkeley is 4833. Official IELTS score reports must be mailed directly to our office from British Council. TOEFL and IELTS score reports are only valid for two years.

Where to Apply

Visit the Berkeley Graduate Division application page (http://grad.berkeley.edu/admissions/apply).

Admission to the Program

The online Graduate Application for Admission, Fellowship and Financial Aid will be available in early September on the Graduate Division's website (http://www.grad.berkeley.edu/admissions/grad_app.shtml) and will include the current deadline to apply to the program. The completed

application must be submitted online (http://grad.berkeley.edu/admissions/grad_app.shtml) and fee paid by the deadline. Be sure to allow sufficient time for your letters of recommendation and test scores to arrive by the deadline. The department reviews application for admission to our graduate program once a year. We accept applications for fall only.

Admissions Criteria

Initiating contact with faculty members; coursework; GRE general scores; letters of recommendation; degree of preparedness for graduate school; and your statement of purpose are all important factors in our review of your application.

Contact IB Faculty

It is required that you list on your application at least one faculty member in our department whose research is of interest to you. It is highly recommended that you contact them to discuss your interest in working with them. This contact is the first step in broadly defining areas of potential research focus and should be elaborated on in your statement of purpose.

Bachelor's Degree

Students admitted to the program typically have a bachelor's degree in one of the life sciences or physical sciences**.** However, promising students with other academic backgrounds are encouraged to apply if they have a undergraduate grounding in biology.

Grade Point Average (GPA)

Upper division or graduate GPA of 3.4 or higher is preferred. A minimum GPA of 3.0 (courses taken after the first two years) is required by the Graduate Division.

Graduate Record Examination (GRE) and TOEFL

All applicants must take the GRE general test; GRE subject test in biology or subject tests in other relevant disciplines highly recommended, but not required. No minimum GRE scores required for consideration. We will accept GRE scores taken within the last ten years. Older scores will be considered on a case by case basis. GRE Institution Code: 4833; Department Code: 0203.

For international students from countries in which the official language is not English, results of the TOEFL (Test of English as Foreign Language) are required. TOEFL exams taken before June 1, 2011 will not be accepted even if your score was reported to Berkeley.

Letters of Recommendation

Three letters of recommendation from faculty or other persons who have known you in an academic or research capacity.

Statement of Purpose

Describe your aptitude and motivation for graduate study in your area of specialization, including your preparation for this field of study, your academic plans or research interests in your chosen area of study, and your future career goals. Please be specific about why UC Berkeley would be a good intellectual fit for you.

The statement should reflect serious intent, focus, maturity, motivation, and the ability to organize and articulate your thoughts on complex subjects.

There is no page limit restrictions although statements are typically one to two pages in length.

Personal History Statement

Please note that the personal history statement should not duplicate the statement of purpose.

Describe how your personal background informs your decision to pursue a graduate degree. Please include information on how you have overcome barriers to access opportunities in higher education, evidence of how you have come to understand the barriers faced by others, evidence of your academic service to advance equitable access to higher education for women, racial minorities, and individuals from other groups that have been historically underrepresented in higher education, evidence of your research focusing on underserved populations or related issues of inequality, or evidence of your leadership among such groups.

Research Experience

Research experience is preferred. It helps to define interest and focus, and proven success with research is a positive indicator for success in the program.

Normative Time Requirements

- **An advanced course in evolutionary biology is the only specific course required of all graduate students.** It must be taken for a letter grade during the graduate program if it was not completed during the student's undergraduate education. A student's supervisory committee may suggest courses as well.
- **Four semesters of residency** as required by the Graduate Division. This means you must be registered for a minimum of four semesters. There are no departmental unit requirements for the PhD program.
- Students are required to be a graduate student instructor (GSI) (http://ib.berkeley.edu/grad/teaching.php) **for at least two semesters** and must complete INTEGBI 375.
- A student in the PhD program must take a **three hour oral** qualifying examination (QE) (http://ib.berkeley.edu/grad/curriculum/addinfo.php) on fields specified by their QE committee.
- PhD candidates are **required to write a** dissertation (http://ib.berkeley.edu/grad/dissertation.php) **based on original and independent research** carried out by the student.
- You are encouraged (but not required) to enroll in seminars in your field of specialization and present topics. Effective participation in seminars is a useful introduction to your field of specialization and may give you valuable direction for advanced study, particularly if you have not begun research activities.

Curriculum

Courses Required		
One advanced course in evolutionary biology (INTEGBI 160 or committee-approved alternative)		
INTEGBI 375	Teaching Colloquium: Graduate Student Instructor Training	2
INTEGBI Electives in specialized study list - seminars and student presentations strongly advised		

Integrative Biology

Expand all course descriptions [+]Collapse all course descriptions [-]

INTEGBI C200 Principles of Phylogenetics 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018, Spring 2016
The core theory and methodology for comparative biology, beginning with issues in building phylogenetic trees, with emphases on both morphology and molecules, and both living and fossil organisms. Also covers the many applications of phylogenetic trees to systematics, biogeography, speciation, conservation, population genetics, ecology, behavior, development, functional morphology, and macroevolution that have revolutionized those fields. Labs are closely integrated with lectures and cover the major algorithms and computer software used to implement these approaches. Requirements include participation in discussions, two exams, and a term project.
Principles of Phylogenetics: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructors: Ackerly, Mishler, Will

Also listed as: ESPM C200

Principles of Phylogenetics: Read Less [-]

INTEGBI 201 Introduction to Quantitative Methods In Biology 4 Units

Terms offered: Spring 2020
This course provides a fast-paced introduction to a variety of quantitative methods used in biology and their mathematical underpinnings. While no topic will be covered in depth, the course will provide an overview of several different topics commonly encountered in modern biological research including differential equations and systems of differential equations, a review of basic concepts in linear algebra, an introduction to probability theory, Markov chains, maximum likelihood and Bayesian estimation, measures of statistical confidence, hypothesis testing and model choice, permutation and simulation, and several topics in statistics and machine learning including regression analyses, clustering, and principal component analyses.
Introduction to Quantitative Methods In Biology: Read More [+]
Objectives Outcomes

Student Learning Outcomes: Ability to calculate means and variances for a sample and relate it to expectations and variances of a random variable.
Ability to calculate probabilities of discrete events using simple counting techniques, addition of probabilities of mutually exclusive events, multiplication of probabilities of independent events, the definition of conditional probability, the law of total probability, and Bayes' formula, and familiarity with the use of such calculations to understand biological relationships.
Ability to carry out various procedures for data visualization in R.
Ability to classify states in discrete time Markov chains, and to calculate transition probabilities and stationary distributions for simple discrete time, finite state-space Markov chains, and an understanding of the modeling of evolutionary processes as Markov chains.
Ability to define likelihood functions for simple examples based on standard random variables.
Ability to implement simple statistical models in R and to use simple permutation procedures to quantify uncertainty.
Ability to implement standard and logistic regression models with multiple covariates in R.
Ability to manipulate matrices using multiplication and addition.
Ability to model simple relationships between biological variables using differential equations.
Ability to work in a Unix environment and manipulating files in Unix.
An understanding of basic probability theory including some of the standard univariate random variables, such as the binomial, geometric, exponential, and normal distribution, and how these variables can be used to model biological systems.
An understanding of powers of matrices and the inverse of a matrix.
An understanding of sampling and sampling variance.
An understanding of the principles used for point estimation, hypothesis testing, and the formation of confidence intervals and credible intervals.
Familiarity with ANOVA and ability to implementation it in R.
Familiarity with PCA, other methods of clustering, and their implementation in R.
Familiarity with basic differential equations and their solutions.
Familiarity with covariance, correlation, ordinary least squares, and interpretations of slopes and intercepts of a regression line.
Familiarity with functional programming in R and/or Python and ability to define new functions.
Familiarity with one or more methods used in machine learning/statistics such as hidden Markov models, CART, neural networks, and/or graphical models.
Familiarity with python allowing students to understand simple python scripts.
Familiarity with random effects models and ability to implement them in R.
Familiarity with the assumptions of regression and methods for investigating the assumptions using R.

INTEGBI C204 Research Reviews in Animal Behavior: Behavior Review 1 Unit

Terms offered: Spring 2020, Fall 2019, Spring 2019
This course will provide a rigorous, critical review of current research in animal behavior. Emphases will include hypothesis testing and experimental design, as well as methods of data collection and analysis. Each week, a student in the course will present original research in the form of a seminar presentation, grant proposal, or manuscript. Through discussion with seminar participants, presenters will gain critical feedback regarding their research.
Research Reviews in Animal Behavior: Behavior Review: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing, basic course in animal behavior. Instructor approval required

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructors: Lacey, Caldwell, Bentley, Elias

Formerly known as: Psychology C204, Integrative Biology C204

Also listed as: ESPM C204

Research Reviews in Animal Behavior: Behavior Review: Read Less [-]

INTEGBI C205 Quantitative Methods for Ecological and Environmental Modeling 3 Units

Terms offered: Fall 2015, Fall 2013, Fall 2012, Fall 2011, Fall 2009
This course will review the background mathematical and statistical tools necessary for students interested in pursuing ecological and environmental modeling. Topics include linear algebra; difference equation, ordinary differential equation, and partial differential equation models; stochastic processes; parameter estimation; and a number of statistical techniques. This course will be recommended as a prerequisite for advanced modeling courses in Integrative Biology, Energy and Resources Group, and Environmental Science, Policy, and Management.
Quantitative Methods for Ecological and Environmental Modeling: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Also listed as: ENE,RES C205/ESPM C205

Quantitative Methods for Ecological and Environmental Modeling: Read Less [-]

INTEGBI 206 Statistical Phylogenetics 3 Units

Terms offered: Fall 2018, Fall 2012, Fall 2011
This course is aimed at students who wish to understand the evolutionary models and methods for estimating phylogenies (which are trees representing how organisms are related to one another). Topics include continuous-time Markov chains as applied in phylogenetics; maximum likelihood estimation; Bayesian estimation; the combinatorics of evolutionary trees; Markov chain Monte Carlo; distance and parsimony methods for estimating trees; optimization strategies for finding best trees. Students will learn to write computer programs that implement many of the methods discussed in class, and apply their knowledge in a research project.
Statistical Phylogenetics: Read More [+]
Rules & Requirements

Prerequisites: College level course in calculus

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Huelsenbeck

Statistical Phylogenetics: Read Less [-]

INTEGBI C215 Communicating Ocean Science 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018, Spring 2015, Fall 2014, Spring 2014, Spring 2013
For graduate students interested in improving their ability to communicate their scientific knowledge by teaching ocean science in elementary schools or science centers/aquariums. The course will combine instruction in inquiry-based teaching methods and learning pedagogy with six weeks of supervised teaching experience in a local school classroom or the Lawrence Hall of Science with a partner. Thus, students will practice communicating scientific knowledge and receive mentoring on how to improve their presentations.
Communicating Ocean Science: Read More [+]
Rules & Requirements

Prerequisites: One course in introductory biology, geology, chemistry, physics, or marine science required and interest in ocean science,junior, senior, or graduate standing; consent of instructor required for sophomores

Hours & Format

Fall and/or spring: 15 weeks - 2.5 hours of lecture, 1 hour of discussion, and 2 hours of fieldwork per week

Additional Details

Subject/Course Level: Integrative Biology/Professional course for teachers or prospective teachers

Grading: Letter grade.

Instructor: Ingram

Also listed as: EPS C301/GEOG C301

Communicating Ocean Science: Read Less [-]

INTEGBI C216 Freshwater Ecology 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2015, Spring 2014, Spring 2013
This graduate course will combine formal lectures and discussion, with the overall goal of exposing students to general concepts in freshwater ecology. We will discuss a broad range of topics including freshwater environments and biota, natural selection and adaptive evolution, food webs and trophic cascades, cross-ecosystem linkages, and social-ecological resilience of freshwater ecosystems under global change. Upper division undergraduates are welcome, with permission of the instructors.
Freshwater Ecology: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructors: Carlson, Power

Also listed as: ESPM C216

Freshwater Ecology: Read Less [-]

INTEGBI C217 Biomimetic Engineering -- Engineering from Biology 3 Units

Terms offered: Fall 2017, Spring 2014, Fall 2010
Study of nature's solutions to specific problems with the aim of determining appropriate engineering analogs. Morphology, scaling, and design in organisms applied to engineering structures. Mechanical principles in nature and their application to engineering devices. Mechanical behavior of biological materials as governed by underlying microstructure, with the potential for synthesis into engineered materials. Trade-offs between redundancy and efficiency. Students will work in teams on projects where they will take examples of designs, concepts, and models from biology and determine their potential in specific engineering applications.
Biomimetic Engineering -- Engineering from Biology: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing in engineering or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Dharan

Also listed as: BIO ENG C217/MEC ENG C217

Biomimetic Engineering -- Engineering from Biology: Read Less [-]

INTEGBI 222 Seminar in Physiological Energetics and Biomechanics 2 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
Discussion and critique of scientific literature and current topics in physiological energetics and biomechanics. Emphasis is on metabolic energetics. Topics include efficiency, energy-saving mechanisms, muscle function, oxidative stress, development in metabolic physiology and biochemistry and comparative aspects.
Seminar in Physiological Energetics and Biomechanics: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminar in Physiological Energetics and Biomechanics: Read Less [-]

INTEGBI 223 Seminar on Bioenergetics and Metabolism 2 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
Immediate and long-range adaptations of the body to exercise. Physiological limits and work capacities in relation to age, sex, diet, environmental factors, and nature of activity.
Seminar on Bioenergetics and Metabolism: Read More [+]
Rules & Requirements

Prerequisites: 123A, 123AL

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Brooks

Seminar on Bioenergetics and Metabolism: Read Less [-]

INTEGBI C226 Isotopics 2 Units

Terms offered: Fall 2019, Fall 2018, Fall 2016
This seminar will explore current topics that employ the use of stable isotopes. Discussion topics include the areas of biology, paleontology, biogeochemistry, soil science, and atmospheric science. Students will be required to lead at least one discussion of relevant literature in the topic area.
Isotopics: Read More [+]
Hours & Format

Fall and/or spring: 10 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Amundson, Dawson, Mambelli

Also listed as: ESPM C225

Isotopics: Read Less [-]

INTEGBI C227 Stable Isotope Ecology 5 Units

Terms offered: Spring 2020, Spring 2019, Spring 2016
Course focuses on principles and applications of stable isotope chemistry as applied to the broad science of ecology. Lecture topics include principles of isotope behavior and chemistry, and isotope measurements in the context of terrestrial, aquatic, and marine ecological processes and problems. Students participate in a set of laboratory exercises involving preparation of samples of choice for isotopic analyses, the use of the mass spectrometer and optical analysis systems, and the anlaysis of data.
Stable Isotope Ecology: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructors: Amundson, Dawson, Mambelli

Also listed as: EPS C241/ESPM C220

Stable Isotope Ecology: Read Less [-]

INTEGBI 230 Marine Science Review 1 Unit

Terms offered: Fall 2018, Spring 2018, Spring 2017
Reports and discussion of original research in marine science.
Marine Science Review: Read More [+]
Rules & Requirements

Prerequisites: Senior or graduate standing; consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Herrlinger, Stillman

Marine Science Review: Read Less [-]

INTEGBI 232 Seminar in Biomechanics 2 Units

Terms offered: Fall 2019, Fall 2017, Spring 2017
Presentation, discussion, and critique of current literature in scientific research and current topics in comparative biomechanics which include solid and fluid mechanics, locomotion, and energetics.
Seminar in Biomechanics: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminar in Biomechanics: Read Less [-]

INTEGBI 234 Seminar on Biology of Amphibians and Reptiles 1 Unit

Terms offered: Spring 2020, Fall 2019, Spring 2019
Review of current research activity and literature concerning the biology of amphibians and reptiles.
Seminar on Biology of Amphibians and Reptiles: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 8 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminar on Biology of Amphibians and Reptiles: Read Less [-]

INTEGBI 241 Advanced Topics in Endocrine-Regulated Development 3 Units

Terms offered: Spring 2019, Spring 2018, Spring 2015
This course will examine intentional endocrine disruption, such as the use of pharmaceuticals to regulate hormones in humans, livestock, and wildlife. We will also evaluate endocrine disrupting pollutants and their impacts on wildlife and humans, including their potential role in cancer.
Advanced Topics in Endocrine-Regulated Development: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Hayes

Advanced Topics in Endocrine-Regulated Development: Read Less [-]

INTEGBI 246 Seminars in Systems Biology 2 Units

Terms offered: Spring 2015, Spring 2014, Spring 2013
This course discusses seminal papers in the field of systems biology with particular emphasis on gene regulation and cell biology. The course covers the critical analysis of primary research data, computational modeling, and important theoretical concepts in systems biology. Topics vary from year to year.
Seminars in Systems Biology: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Lim

Seminars in Systems Biology: Read Less [-]

INTEGBI 248 Comparative Physiology and Endocrinology Seminar 1 Unit

Terms offered: Spring 2020, Spring 2019, Spring 2018
Reviews and reports of current research in vertebrate endocrinology and physiology.
Comparative Physiology and Endocrinology Seminar: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Firestone

Comparative Physiology and Endocrinology Seminar: Read Less [-]

INTEGBI 249 Seminar on Evolutionary Genetics 1 Unit

Terms offered: Spring 2009, Spring 2008, Fall 2002
Recent developments in evolutionary genetics will be discussed in a seminar format.
Seminar on Evolutionary Genetics: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of discussion per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminar on Evolutionary Genetics: Read Less [-]

INTEGBI 250 Seminar in Ecology 2 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Readings and discussion of current topics.
Seminar in Ecology: Read More [+]
Rules & Requirements

Prerequisites: 153

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Seminar in Ecology: Read Less [-]

INTEGBI 251 Ecological Research Reviews 1 Unit

Terms offered: Fall 2019, Fall 2018, Spring 2018
Reports and discussions of original research.
Ecological Research Reviews: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Formerly known as: 254

Ecological Research Reviews: Read Less [-]

INTEGBI 257 Current Topics in Behavioral Physiology 2 Units

Terms offered: Spring 2010, Spring 2009, Fall 1999
Topics to vary. Report and discussion of current literature.
Current Topics in Behavioral Physiology: Read More [+]
Rules & Requirements

Prerequisites: C144 or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Current Topics in Behavioral Physiology: Read Less [-]

INTEGBI 259 Advanced Paleoecology 2 Units

Terms offered: Fall 2013, Spring 2011, Spring 2009
Topics vary from year to year but will include paleoecology of major groups of organisms or major environments from population, community evolutionary, or taxonomic persepectives.
Advanced Paleoecology: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Advanced Paleoecology: Read Less [-]

INTEGBI 262 Seminar in Computational Biology 1 Unit

Terms offered: Spring 2009, Fall 2008
Students will discuss original papers in the general area of computational biology and will discuss new research presented by instructors in the course and by invited speakers from other departments at UC Berkeley and from other universities and research groups.
Seminar in Computational Biology: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Huelsenbeck, Nielsen, Slatkin

Seminar in Computational Biology: Read Less [-]

INTEGBI 263 Genetics and the Evolution of the Skeleton 2 Units

Terms offered: Spring 2016, Spring 2015, Spring 2012
In this seminar, we will explore the genetic underpinnings of vertebrate skeletal variation and review how such information is being incorporated into evolutionary and paleontological studies. Topics include quantitative genetic analyses of cranial variation and developmental genetics of the limb and dentition. This course will be tailored each semester to cover new research; therefore, students may enroll in this course multiple semesters.
Genetics and the Evolution of the Skeleton: Read More [+]
Rules & Requirements

Prerequisites: A graduate-level course in biology or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Hlusko

Genetics and the Evolution of the Skeleton: Read Less [-]

INTEGBI 264 Seminar in Evolutionary Biology of the Vertebrates 1 Unit

Terms offered: Spring 2020, Fall 2019, Spring 2019
Presentation of results of original research by students, faculty, and visitors.
Seminar in Evolutionary Biology of the Vertebrates: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing; consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminar in Evolutionary Biology of the Vertebrates: Read Less [-]

INTEGBI 265 Advanced Studies in Hominid Paleobiology 2 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
This is a graduate level course that focuses on special topics within hominid evolutionary studies. The topic for each semester will be decided upon during the first class meeting. Previous advanced training in biology, human evolutionary studies, and evolutionary theory is required.
Advanced Studies in Hominid Paleobiology: Read More [+]
Rules & Requirements

Prerequisites: Students need to have advanced undergraduate/graduate courses in biology, primate evolution, evolutionary theory, and/or geology. Enrollment is by consent of instructor only

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructors: Hlusko, White

Advanced Studies in Hominid Paleobiology: Read Less [-]

INTEGBI 268 Seminar in Evolution above the Species Level 2 Units

Terms offered: Fall 2009, Fall 2006, Fall 2004
Current issues in macroevolution and paleobiology, using both neontological and paleontological data.
Seminar in Evolution above the Species Level: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Seminar in Evolution above the Species Level: Read Less [-]

INTEGBI 281 Seminar in Evolution 2 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Advanced study and current literature in various fields of evolution. Topics vary from year to year.
Seminar in Evolution: Read More [+]

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Padian

Seminar in Evolution: Read Less [-]

INTEGBI 283 Seminar in Vertebrate Evolution and Paleontology 1 Unit

Terms offered: Fall 2017, Fall 2016, Spring 2016
Presentations and discussions of original research and new literature in vertebrate evolution and paleontology. Syllabus and reading list will vary as topics change from semester to semester. Open to Undergraduate students with permission. Enrollment limit: 20.
Seminar in Vertebrate Evolution and Paleontology: Read More [+]

Rules & Requirements

Prerequisites: 183, 183L or consent of instructor

Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Instructor: Padian

Seminar in Vertebrate Evolution and Paleontology: Read Less [-]

INTEGBI 286 Seminars in Paleontology 2 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
Advanced study and current literature in various fields of paleontology. Topics vary from year to year.
Seminars in Paleontology: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Seminars in Paleontology: Read Less [-]

INTEGBI 290 Research Seminar 1 - 2 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
Advanced study in various fields of Integrative Biology. Topics will be announced in advance of each semester. Enrollment in more than one section permitted.
Research Seminar: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Research Seminar: Read Less [-]

INTEGBI 291 Research Seminar 1 Unit

Terms offered: Fall 2018, Fall 2017, Fall 2016
Review and discussion of topics of current interest. Topics to vary.
Research Seminar: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 7.5 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Research Seminar: Read Less [-]

INTEGBI 292 Integrative Biology Colloquium 0.0 Units

Terms offered: Spring 2017, Spring 2014, Fall 2013
Meetings for the presentation of original work by faculty, visiting lecturers, and graduate students.
Integrative Biology Colloquium: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of colloquium per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Integrative Biology Colloquium: Read Less [-]

INTEGBI 296 Special Study for Graduate Students 1 - 4 Units

Terms offered: Spring 2016, Fall 2015, Spring 2015
Reading or other advanced study by arrangement with a staff member.
Special Study for Graduate Students: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Summer:
6 weeks - 1-4 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Formerly known as: Zoology 296

Special Study for Graduate Students: Read Less [-]

INTEGBI 297 Directed Field Studies 1 - 8 Units

Terms offered: Spring 2017, Fall 2016, Spring 2016
Open to qualified students directly engaged in field studies.
Directed Field Studies: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of fieldwork per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Directed Field Studies: Read Less [-]

INTEGBI 298 Special Study in Integrative Biology 1 - 12 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
Graduate research by small groups.
Special Study in Integrative Biology: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Letter grade.

Special Study in Integrative Biology: Read Less [-]

INTEGBI 299 Graduate Research 1 - 12 Units

Terms offered: Spring 2020, Fall 2019, Spring 2019
Credit awarded according to work planned and accomplished.
Graduate Research: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Graduate Research: Read Less [-]

INTEGBI N299 Graduate Research 1 - 6 Units

Terms offered: Summer 2015 Second 6 Week Session, Summer 2010 10 Week Session, Summer 2007 10 Week Session
Graduate student research.
Graduate Research: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Summer:
6 weeks - 2.5-15 hours of independent study per week
8 weeks - 1-6 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Graduate Research: Read Less [-]

INTEGBI 304 Dissemination of Research: Your Interface with the Public 2 Units

Terms offered: Spring 2018, Spring 2017, Fall 2012
This course will consist of lectures and class discussions about mechanisms of communicating about science to the public. We will consider how to convey the issues, process, and findings of scientific research to a variety of audiences using different media (e.g., posters, web pages, newsletters, newspaper and magazine articles, books, television). Projects conducted by teams of students under the direct supervision of the instructors will include preparation of outreach materials (e.g., posters, newsletters, web pages).
Dissemination of Research: Your Interface with the Public: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Integrative Biology/Professional course for teachers or prospective teachers

Grading: Letter grade.

Dissemination of Research: Your Interface with the Public: Read Less [-]

INTEGBI 305 Academic Survivorship 2 Units

Terms offered: Fall 2019, Fall 2018, Spring 2015
Series of lectures and workshops to prepare graduate students for many aspects of academic careers, including grant proposal writing, giving talks at meetings or to academic departments, preparing job applications and having job interviews, advising graduate students and postdocs, reviewing manuscripts and grant proposals, service activities and time management, working at teaching college vs. research universities, alternative careers, etc.
Academic Survivorship: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Academic Survivorship: Read Less [-]

INTEGBI 375 Teaching Colloquium: Graduate Student Instructor Training 2 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017
Series of workshops and seminars involving graduate students and faculty participation. The main objectives of this course are to train graduate students to become effective instructors and to discuss important issues that graduate students face when teaching undergraduate classes.
Teaching Colloquium: Graduate Student Instructor Training: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Integrative Biology/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Formerly known as: Integrative Biology 303

Teaching Colloquium: Graduate Student Instructor Training: Read Less [-]

INTEGBI 400 Training in Stable Isotope Methods and Mass Spectrometry 1 Unit

Terms offered: Fall 2019, Fall 2018, Fall 2017
An intensive lecture and laboratory training course on the fundamental principles and practical applications of stable isotope methods in biogeochemistry, ecology, physiology, and environmental science. Topics covered are sample preparation, operating of an isotope ratio mass spectrometer, and analysis of stable isotope data. This course is required for all students interested in using the facilities housed in the Center for Stable Isotope Biogeochemistry for their research.
Training in Stable Isotope Methods and Mass Spectrometry: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Integrative Biology/Other professional

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Dawson

Training in Stable Isotope Methods and Mass Spectrometry: Read Less [-]

INTEGBI C407 Introduction to Scientific Diving 3 Units

Terms offered: Spring 2017, Spring 2016, Spring 2015
Diving physics, physiology, medicine, rescue, decompression, theory, navigation, environment, marine life, research methods, equipment, and University regulations. Course leads to University certification to use underwater life support apparatus for study or research under University auspices.
Introduction to Scientific Diving: Read More [+]
Rules & Requirements

Prerequisites: Advanced scuba certification, swim test, medical exam, and consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Integrative Biology/Other professional

Grading: Letter grade.

Instructors: Hayward, Scott

Formerly known as: Integrative Biology C407/Physical Education C407

Also listed as: PHYS ED C407

Introduction to Scientific Diving: Read Less [-]

INTEGBI 601 Individual Study for Master's Students 1 - 8 Units

Terms offered: Spring 2016, Fall 2015, Spring 2015
Individual study for the comprehensive requirements in consultation with the major adviser. Units may not be used to meet either unit or residence requirements for a master's degree.
Individual Study for Master's Students: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Master's Students: Read Less [-]

INTEGBI 602 Individual Study for Doctoral Students 1 - 8 Units

Terms offered: Spring 2016, Fall 2015, Spring 2015
Individual study in consultation with the major adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for candidates for the Ph.D.
Individual Study for Doctoral Students: Read More [+]
Rules & Requirements

Credit Restrictions: Course does not satisfy unit or residence requirements for doctoral degree.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Students: Read Less [-]

INTEGBI N602 Individual Study for Doctoral Students 1 - 6 Units

Terms offered: Prior to 2007
Formerly < Paleon 602, Zoology 602, Botany 602, Physiol 602, Anatomy 602> Individual study in consultation with the major field adadviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for candidates for the Ph.D.
Individual Study for Doctoral Students: Read More [+]
Rules & Requirements

Credit Restrictions: Course does not satisfy unit or residence requirements for doctoral degree.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Summer: 8 weeks - 1-6 hours of independent study per week

Additional Details

Subject/Course Level: Integrative Biology/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Students: Read Less [-]