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.

The Department of Integrative Biology at Berkeley explores life at all levels and our scientific community pursues research across three main areas:

- Tree of Life: Biodiversity and Global Change
- The Tangled Bank: Species Interactions & Biological Communities
- Human Connections: Origins, Health and Quality of Life

View a video that highlights the strengths in our department (https://youtu.be/peOUVPo4C6w/).

DIRECT ADMIT PROGRAM

IB is a **direct admit** program. There are no lab rotations, and students admitted into the program enter directly into a particular IB faculty member's lab. Students interested in applying to the IB graduate program are strongly advised to contact potential faculty mentors (https://ib.berkeley.edu/people/faculty/) before applying since not all faculty members will recruit students each year.

Admission to the University

Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (https://grad.berkeley.edu/admissions/choosing-your-program/list/) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (https://grad.berkeley.edu/admissions/steps-to-apply/).

Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (https://grad.berkeley.edu/admissions/steps-to-apply/requirements/). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (https://guide.berkeley.edu/graduate/degree-programs/).

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 the 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 applications for admission to our graduate program once a year. We accept applications for fall only.

Admissions Criteria

Initiating contact with faculty members; coursework; 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 the faculty you plan to list in your application and discuss your interest in working with them *before submitting your application*. Not all of our IB faculty recruit a graduate student each year, so when contacting faculty, please check to see if they are considering applicants for the admission cycle you plan on applying to. This faculty 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 an 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.

TOEFL AND GRADUATE RECORD EXAMINATION (GRE)

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 must be recent (see info about this on the Grad Div website (https://grad.berkeley.edu/admissions/requirements/)). Older exams will not be accepted even if your score was reported to Berkeley.

The GRE general test and the GRE subject test in biology or subject tests in other relevant disciplines are optional. No minimum GRE score is required for consideration. We will accept GRE scores taken within the last ten years. GRE Institution Code: 4833; Department Code: 0203.

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 are no page limit restrictions although statements are typically one to two pages in length. Please see the Graduate Division's website for more information (https://grad.berkeley.edu/admissions/steps-to-apply/requirements/statement-purpose/).

Personal Statement

Please note that the personal 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. Please see the Graduate Division's website for more information (https://grad.berkeley.edu/admissions/steps-to-apply/requirements/personal-statement/).

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. Publications and or national or international conference presentations are not required, but please mention experience like that if you have it.

Normative Time Requirements

Total normative time is five years.

- **A course in evolutionary biology is 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. See below for the other required courses. A student's supervisory committee may suggest courses as well.
- **Annual Reviews (https://ib.berkeley.edu/grad/annual-reviews/)** with a faculty committee for each year in the program.
- **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 Ph.D. 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 Ph.D. program must take a **two to three hour oral** qualifying examination (QE) (http://ib.berkeley.edu/grad/QE_guidelines.html) on fields specified by their QE committee (one of those fields must be evolution).
- Ph.D. 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.
- Students are encouraged (but not required) to enroll in seminars in their field of specialization and present topics and to give a finishing talk at the culmination of their PhD. Effective participation in seminars and giving presentations are important for scientific and professional development.
- It is highly recommended that students attend our weekly department seminars in each semester they are enrolled in our program.
- For more information and for program expectations of all IB Graduate Students, please see our website (https://ib.berkeley.edu/grad/curriculum/).

Required Curriculum

Courses Required

INTEGBI C160	Evolution	4
INTEGBI 375	Teaching Colloquium: Graduate Student Instructor Training	2
INTEGBI Electives in specialized study list - seminars and student presentations strongly advised		

Integrative Biology

INTEGBI C200 Principles of Phylogenetics 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022, Spring 2020, 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.

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

INTEGBI C201 Introduction to Quantitative Methods In Biology 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

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.

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: Fall 2025, Spring 2025, Fall 2024, Spring 2024
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.
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

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.
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

INTEGBI 206 Statistical Phylogenetics 3 Units

Terms offered: Fall 2024, Fall 2022, Fall 2020
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.
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

INTEGBI C215 Communicating Ocean Science 4 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019, 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.
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

INTEGBI C216 Freshwater Ecology 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020, 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.

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

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.

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

INTEGBI 222 Seminar in Physiological Energetics and Biomechanics 2 Units

Terms offered: Fall 2022, Spring 2022, Fall 2021

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.

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.

INTEGBI 223 Seminar on Bioenergetics and Metabolism 2 Units

Terms offered: Fall 2023, Fall 2021, Fall 2020

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.

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

INTEGBI C226 Isotopics 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023, Fall 2022

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.

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

INTEGBI C227 Stable Isotope Ecology 5 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022, Spring 2021, 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.
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

INTEGBI 230 Marine Ecosystems and Global Change 1 Unit

Terms offered: Spring 2022, Fall 2018, Spring 2018
The purpose of this course is to discuss recent advances in the effects of global change (inclusive of climate change, pollution, overfishing, introduced species, etc.) on any aspect of coastal marine or estuarine ecosystems. This class is aimed at graduate students or advanced undergraduate students ready to read the primary literature and engage in active discussions of the findings and implications. Students interested in learning about cutting edge research on the effects of climate change and other anthropogenic stressors on coastal marine and estuarine ecosystems will find this class to be worthwhile.
Rules & Requirements

Prerequisites: Graduate student status or permission of instructor for undergraduate students

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: Stillman

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.
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.

INTEGBI 234 Seminar on Biology of Amphibians and Reptiles 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current research activity and literature concerning the biology of amphibians and reptiles.
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.

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.
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

INTEGBI C242 CTEG Evolution, Genetics, and Genomics Seminar 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
This graduate seminar consists of weekly presentations from Berkeley graduate students as well as outside speakers on topics surrounding evolution, genetics, and genomics. Many labs spread across different departments have research programs focused on evolution, genetics, and genomics. However, it can be challenging to keep abreast of this research and to identify potential collaborations due to the dispersion of labs across different departments and specialties. The Center for Theoretical and Evolutionary Genetics (CTEG) is an informal group of labs that collectively work on genetics and genomics. The seminar seeks to provide a common space for graduate students to present their research and learn about the research of their colleagues.

Rules & Requirements

Prerequisites: Graduate standing

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.

Instructors: Sudmant, Moorjani

Also listed as: MCELLBI C242

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.

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

INTEGBI 248 Comparative Physiology and Endocrinology Seminar 1 Unit

Terms offered: Spring 2024, Spring 2023, Spring 2022
Reviews and reports of current research in vertebrate endocrinology and physiology.

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

INTEGBI 249 Seminar on Evolutionary Genetics 1 Unit

Terms offered: Fall 2020, Spring 2009, Spring 2008
Recent developments in evolutionary genetics will be discussed in a seminar format.

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.

INTEGBI 250 Seminar in Ecology 2 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019
Readings and discussion of current topics.

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.

INTEGBI 251 Ecological Research Reviews 1 Unit

Terms offered: Spring 2021, Fall 2020, Fall 2019
Reports and discussions of original research.
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

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.
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.

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.
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.

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.
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

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.
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

INTEGBI 264 Seminar in Evolutionary Biology of the Vertebrates 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
Presentation of results of original research by students, faculty, and visitors.

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.

INTEGBI 265 Advanced Studies in Hominid Paleobiology 2 Units

Terms offered: Fall 2020, Spring 2020, Fall 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.

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

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.

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.

INTEGBI 281 Seminar in Evolution 2 Units

Terms offered: Spring 2023, Spring 2022, Spring 2021
Advanced study and current literature in various fields of evolution. Topics vary from year to year.

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

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.

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

INTEGBI 286 Seminars in Paleontology 2 Units

Terms offered: Fall 2025, Fall 2024, Spring 2024
Advanced study and current literature in various fields of paleontology. Topics vary from year to year.

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.

INTEGBI 287 Paleontology Seminar Series 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
Seminar series based on recently published and in-progress research relevant to the mission of the University of California Museum of Paleontology.

Rules & Requirements

Prerequisites: Graduate standing or 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.

INTEGBI 290 Research Seminar 1 - 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Advanced study in various fields of Integrative Biology. Topics will be announced in advance of each semester. Enrollment in more than one section permitted.

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.

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.

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.

INTEGBI 292 Integrative Biology Colloquium 0.0 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Meetings for the presentation of original work by faculty, visiting lecturers, and graduate students.

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.

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.

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

INTEGBI 297 Directed Field Studies 1 - 8 Units

Terms offered: Spring 2025, Fall 2024, Spring 2017
Open to qualified students directly engaged in field studies.

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.

INTEGBI 298 Special Study in Integrative Biology 1 - 12 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Graduate research by small groups.
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.

INTEGBI 299 Graduate Research 1 - 12 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Credit awarded according to work planned and accomplished.
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.

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.
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.

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).
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.

INTEGBI 305 Thriving in Academia 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
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.
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.

INTEGBI 375 Teaching Colloquium: Graduate Student Instructor Training 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
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.
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

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

Terms offered: Fall 2025, Fall 2023, Fall 2022
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.

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

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.

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

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.

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.

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.

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.

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.

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.