Committee on Evolutionary Biology

Department Website: http://evbio.uchicago.edu

Chair
• Michael Coates

Associate Chair
• Shannon Hackett

Faculty
• Kenneth Angielczyk, Field Museum
• John Bates, Field Museum
• Joy Bergelson, Ecology and Evolution
• Rüdiger Bieler, Field Museum
• Michael Coates, Organismal Biology and Anatomy
• Maureen Coleman, Geophysical Sciences
• Martin Feder, Organismal Biology and Anatomy
• Michael J. Foote, Geophysical Sciences
• Jack A. Gilbert, Ecology and Evolution
• Lance Grande, Field Museum
• Shannon Hackett, Field Museum
• Lawrence Heaney, Field Museum
• Patrick Herendeen, Chicago Botanic Garden
• Andrew Hipp, Morton Arboretum/Herbarium
• Robert Ho, Organismal Biology and Anatomy
• David Jablonski, Geophysical Sciences
• Susan M. Kidwell, Geophysical Sciences
• Marcus Kronforst, Ecology and Evolution
• Robert Lacy, Brookfield Zoo
• Scott Lidgard, Field Museum
• Sarah London, Psychology
• Manyuan Long, Ecology and Evolution
• Thorston Lumbsch, Field Museum
• Zhe-Xi Luo, Organismal Biology and Anatomy
• Vincent J. Lynch, Human Genetics
• Dario Maestripieri, Comparative Human Development
• Peter Makovicky, Field Museum
• Robert D. Martin, Field Museum
• Jill Mateo, Comparative Human Development
• Lance Miller, Chicago Zoological Society (Brookfield Zoo)
• R. Michael Miller, Argonne National Laboratory
• Corrie Moreau, Field Museum
• Gregory M. Mueller, Chicago Botanic Garden
• Salikoko Mufwene, Linguistics
• John Novembre, Human Genetics
• Bruce Patterson, Field Museum
• Catherine Pfister, Ecology and Evolution
• Trevor Price, Ecology and Evolution
• Victoria Prince, Organismal Biology and Anatomy
• Stephen Pruett-Jones, Ecology and Evolution
• Clifton Ragsdale, Neurobiology
• Richard Ree, Field Museum
• Olivier Rieppel, Field Museum
Committee on Evolutionary Biology

- Callum Ross, Organismal Biology and Anatomy
- Rachel Santymire, Lincoln Park Zoo
- Urs Schmidt-Ott, Organismal Biology and Anatomy
- Paul Sereno, Organismal Biology and Anatomy
- Neil Shubin, Organismal Biology and Anatomy
- Petra Sierwald, Field Museum
- Graham Slater, Geophysical Sciences
- Douglas Stotz, Field Museum
- Russell Tuttle, Anthropology
- Janet Voight, Field Museum
- Mark Webster, Geophysical Sciences
- Mark Westneat, Organismal Biology and Anatomy
- Huntington Willard, President and Director, Marine Biological Laboratory
- John Timothy Wootton, Ecology and Evolution
- Chung I Wu, Ecology and Evolution

Emeritus
- John Bolt, Field Museum
- Jerry Coyne, Ecology and Evolution
- James Hopson, Organismal Biology and Anatomy
- Michael LaBarbera, Organismal Biology and Anatomy
- Wen-Hsiung Li, Ecology and Evolution
- R. Eric Lombard, Organismal Biology and Anatomy
- Thomas Nagylaki, Ecology and Evolution
- Janice B. Spofford, Ecology and Evolution
- Margaret Thayer, Field Museum
- Harold Voris, Field Museum
- William Wimsatt, Philosophy

The Committee on Evolutionary Biology (CEB) provides students with the opportunity for interdisciplinary study of all aspects of evolutionary biology. The committee consists of faculty members with primary appointments in departments in all four graduate divisions within the university and of associated faculty from institutions in the Chicago area, such as Argonne National Laboratory, Lincoln Park Zoo, Chicago Botanic Garden, the Marine Biological Laboratory, Morton Arboretum, and the Field Museum. The diversity of research interests represented by the collective expertise of the committee faculty contributes to its strong national and international reputation as a graduate training program.

Students in the committee have ready access to facilities at the associated institutions, including the more than 1,100 animals representing over 200 species at Lincoln Park Zoo, more than 17 million specimens in the Field Museum collections in botany, zoology, and paleontology, and libraries at the Field Museum. Various facilities for the study of molecular evolution and phylogenetic analysis are available to committee students, as are several student computer centers, an on-campus greenhouse, and digital equipment for off-site research.

In the Chicago area, committee students have access to the rich and diverse resources available at the Chicago Botanic Garden, Argonne National Laboratory, the Shedd Aquarium, the Morton Arboretum, and the many parks and lands managed by the local forest preserve and park districts.

The University of Chicago is a member of the Organization for Tropical Studies. Doctoral students in the committee have taken courses in tropical ecology and conducted research in Costa Rica through this affiliation. Recent evolutionary biology students have also conducted domestic research at a variety of field sites, including the Southwest Research Station of the American Museum of Natural History, Sierra Nevada Aquatic Research Laboratory, Kellogg Biological Station, the Marine Biological Laboratory at Woods Hole, and Friday Harbor Marine Laboratory. International research is conducted on every continent.

Program of Study

Most students in the Committee on Evolutionary Biology complete their Ph.D. program in about five and a half years.

The first and second years consist largely of course work and individual reading and research courses, aiming toward successful defense of a dissertation research proposal by the end of the second year of study.

First year

Entering students are expected to have received a broad undergraduate training in biology and a good background in related quantitative subjects, such as chemistry, statistics and calculus. Students who are admitted with gaps in these areas may be required to remedy their deficiencies by taking appropriate courses during their first two years in the graduate
program. The committee maintains a student advisory committee, which meets three times a year with each of the first and second year students to advise them on courses available, arbitrate on which courses meet the committee’s course distribution requirements, and otherwise help students keep on track towards Ph.D. candidacy.

Second year

Second year students continue to meet with the student advisory committee until they pass their preliminary examination/dissertation proposal hearing. The first part of the second year may be taken up mostly with course work, supplemented more heavily by reading and research courses.

Reading and research requirements

CEB courses have been divided into six broad areas. Students must successfully complete a course in five of the six areas to be recommended for Ph.D. candidacy. The primary aim is that the student acquires considerable breadth in evolutionary biology; this breadth and the interdisciplinary research it permits should be the distinguishing feature of students working in the committee. In the first two years of study students generally enroll in three courses per quarter. This can be a combination of lecture, seminar, research, and reading formats.

Division of the Biological Sciences teaching assistant requirement program

During their tenure in the doctoral program, students are required to register for two evaluated teaching assistants in two approved courses.

Dissertation proposal hearing and admission to Ph.D. candidacy

Students should select an advisor no later than Autumn Quarter of their second year. This advisor normally will become the chair of the student’s dissertation proposal committee. The committee for the dissertation proposal hearing will be formed by the student and her/his advisor, subject to approval by the CEB Chair, when the student asks the CEB Chair in writing to approve her/his request to appoint the exam committee and hold the proposal hearing.

CEB students must present and defend their dissertation proposal, followed by an oral examination by a faculty committee on general issues in evolutionary biology. Students are expected to successfully defend their dissertation proposal by the end of the Spring Quarter of their second year in the Ph.D. program. After successfully defending their dissertation proposal, students may be recommended for candidacy for the Ph.D. by the CEB Chair.

Ph.D. dissertation

Upon successful completion of the dissertation proposal hearing and admission into candidacy for the Ph.D., students work on their dissertation projects in close consultation with their faculty advisor and dissertation committee. During a period of two to three years the student does primary original research, participates in seminars, discussion groups, and professional meetings and conferences, and completes the written Ph.D. dissertation. Students are expected to publish dissertation related research, and encouraged to submit a substantial part of their research for publication before Ph.D. completion. A student is expected to submit a dissertation outline and proposed timetable for dissertation completion six months before the estimated date of final defense. These plans must be approved by the advisory committee, and a copy submitted as part of the meeting report to the CEB Chair.

The Ph.D. in evolutionary biology is awarded based upon the candidate’s having:

• Submitted a written dissertation reporting results of the student’s original research in a form suitable for publication, which must be approved by the faculty advisor and dissertation committee.
• Successfully completed a final oral examination covering the student’s field of specialization.
• Final approval of the dissertation by the CEB Chair and the University Dissertation Office.

Admission

We strongly advise students considering application to CEB to begin preparation of their application early in the autumn quarter, so that all materials will arrive by the December 1st deadline. The committee requires GRE General Test scores from all applicants. Foreign applicants whose first language is not English also must submit TOEFL or IELTS test scores with their application materials (http://gradadmissions.uchicago.edu/admissions/international/).

Students have the opportunity to apply for the M.S. degree while completing their work for the Ph.D. The M.S. degree is also awarded in special cases, usually in association with Ph.D. requirements for graduate students in the Committee on the Conceptual and Historical Studies of Science.

Further information also may be obtained from the program’s home at http://evbio.uchicago.edu, or by sending an email to darwin@uchicago.edu.
Evolutionary Biology Courses

**EVOL 30250. Chordates: Evolution and Comparative Anatomy. 100 Units.**
Chordate biology emphasizes the diversity and evolution of modern vertebrate life, drawing on a range of sources (from comparative anatomy and embryology to paleontology, biomechanics, and developmental genetics). Much of the work is lab-based, with ample opportunity to gain firsthand experience of the repeated themes of vertebrate body plans, as well as some of the extraordinary specializations manifest in living forms. The instructors, who are both actively engaged in vertebrate-centered research, take this course beyond the boundaries of standard textbook content.
Instructor(s): M. Coates Terms Offered: Winter. L.
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence. Recommended for Advanced Biology students.
Equivalent Course(s): ORGB 30250, BIOS 22250

**EVOL 30300. Key Issues in Early Vertebrate Evolution. 100 Units.**
The course addresses questions about the origin of vertebrates, the interrelationships of major gnathostome clades, and the fish-tetrapod transition.
Instructor(s): M. I. Coates Terms Offered: Winter
Prerequisite(s): Undergraduate level chordate biology required; familiarity with methods in systematic biology advantageous.
Equivalent Course(s): ORGB 31300

**EVOL 31700. Macroevolution. 100 Units.**
Patterns and processes of evolution above the species level, in both recent and fossil organism. A survey of the current literature, along with case studies.
Instructor(s): D. Jablonski Terms Offered: Spring
Equivalent Course(s): GEOS 36800

**EVOL 31800. Taphonomy. 100 Units.**
Lecture and research course on patterns and processes of fossilization, including rates and controls of soft tissue decomposition, post mortem behavior of skeletal hard parts, concentration and burial of remains, scales of time averaging, and the net spatial and compositional fidelity of (paleo)biologic information, including trends across environments and evolutionary time. Offered alternate years.
Instructor(s): S. Kidwell
Equivalent Course(s): GEOS 36700

**EVOL 31900. Topics in Paleobiology. 100 Units.**
In this seminar we investigate paleobiological or multidisciplinary topics of current interest to students and faculty. Previous subjects include the origin of phyla, historical and macro-ecology, the stratigraphic record and evolutionary patterns, and climate and evolution.
Instructor(s): D. Jablonski, S. Kidwell, T. Price Terms Offered: Autumn
Equivalent Course(s): ECEV 36900, GEOS 36900

**EVOL 32400. Invertebrate Paleobiology and Evolution. 100 Units.**
This course provides a detailed overview of the morphology, paleobiology, evolutionary history, and practical uses of the invertebrate and microfossil groups commonly found in the fossil record. Emphasis is placed on understanding key anatomical and ecological innovations within each group and interactions among groups responsible for producing the observed changes in diversity, dominance, and ecological community structure through evolutionary time. Labs supplement lecture material with specimen-based and practical application sections. An optional field trip offers experience in the collection of specimens and raw paleontological data. Several “Hot Topics” lectures introduce important, exciting, and often controversial aspects of current paleontological research linked to particular invertebrate groups. (L)
Instructor(s): M. Webster Terms Offered: Autumn
Prerequisite(s): GEOS 13100 and 13200, or equivalent. For BIOS students: Three quarters of a Biological Sciences Fundamentals sequence.
Equivalent Course(s): BIOS 23261, GEOS 36300, GEOS 26300

**EVOL 33700. Evolutionary Developmental Biology. 100 Units.**
The purpose of this course is to provide a developmental genetic perspective on evolutionary questions that have emerged in various disciplines (e.g., developmental biology, paleontology, phylogenetic systematics). Topics range from the evolution of gene regulation to the origin of novelties (e.g., eyes, wings). Although these subjects are introduced in lectures, the focus of this course is on reading, presenting, and discussing original research papers.
Instructor(s): U. Schmidt-Ott Terms Offered: Spring
Prerequisite(s): Biological Sciences Fundamentals sequence. Recommended for AP5 students.
Equivalent Course(s): BIOS 22256
EVOL 33850. Evolution and Development. 100 Units.
The course examines the evolution of animal development. Special attention is given to the development of invertebrate phyla from sponges to lower chordates. References to vertebrate body plans are included. Original research papers will be assigned to introduce current debates. Students will be asked to contribute an oral presentation on a selected research topic that fits the broader goal of the course.
Instructor(s): U. Schmidt-Ott Terms Offered: Autumn
Prerequisite(s): Advanced undergraduates may enroll with the consent of the instructor.
Equivalent Course(s): BIOS 22306,DVBI 33850,ORGB 33850

EVOL 34500. Advanced Topics in Evolution. 100 Units.
While evolution by natural selection is an elegantly simple phenomenon, modern research in evolutionary biology contains a variety of controversial, and sometimes confusing, topics. In this course, we will explore, as a group, a select list of controversial or confusing topics in evolutionary biology through a mix of student-led presentations and discussion of the primary literature. Each student will also write a review paper about his or her selected topic.
Instructor(s): M. Kronforst Terms Offered: Spring
Equivalent Course(s): ECEV 34500

EVOL 35300. Phylogenetic Comparative Methods. 100 Units.
This is a graduate seminar course about the uses of phylogenetic trees in evolution and ecology, emphasizing historical inference of phenotypic traits, geographic ranges, and community ecology. (This is not a course on how to infer phylogenies, or their uses in studies of molecular evolution and population genetics.) Within this scope we will focus on topics of popular interest and relevance to student research. The format of the 2-hour weekly meeting will be somewhat fluid, but I anticipate giving introductory remarks or a lecture on main topics, followed by discussion of primary literature, and opportunities to work hands-on with software (bring your own laptop). Small-group assignments will be given to develop and present short tutorials on conducting analyses of real data.
Instructor(s): R. Ree, A. Hipp

EVOL 35401. Reconstructing the Tree of Life: An Introduction to Phylogenetics. 100 Units.
This course is an introduction to the tree of life (phylogeny): its conceptual origins, methods for discovering its structure, and its importance in evolutionary biology and other areas of science. Topics include history and concepts, sources of data, methods of phylogenetic analysis, and the use of phylogenies to study the tempo and mode of lineage diversification, coevolution, biogeography, conservation, molecular biology, development, and epidemiology. One Saturday field trip and weekly computer labs required in addition to scheduled class time. This course is offered in alternate (odd) years.
Instructor(s): C. Moreau, R. Ree. Terms Offered: Autumn. L.
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence or consent of instructor
Note(s): This course is offered in alternate (odd) years.
Equivalent Course(s): BIOS 23404

EVOL 35600. Principles of Population Genetics-1. 100 Units.
Examines the basic theoretical principles of population genetics, and their application to the study of variation and evolution in natural populations. Topics include selection, mutation, random genetic drift, quantitative genetics, molecular evolution and variation, the evolution of selfish genetic systems, and human evolution.
Instructor(s): C.-I. Wu and M. Kreitman Terms Offered: Winter
Equivalent Course(s): ECEV 35600

EVOL 35800. Classics in Evolutionary Genetics. 100 Units.
Major classic papers in evolutionary genetics that had great impact on the development of the field are reviewed.
Instructor(s): M. Long, J. Reinitz, C-I Wu Terms Offered: Winter
Equivalent Course(s): ECEV 35800

EVOL 35901. Genomic Evolution. 100 Units.
Canalization, a unifying biological principle first enunciated by Conrad Waddington in 1942, is an idea that has had tremendous intellectual influence on developmental biology, evolutionary biology, and mathematics. In this course we will explore canalization in all three contexts through extensive reading and discussion of both the classic and modern primary literature. We intend this exploration to raise new research problems which can be evaluated for further understanding. We encourage participants to present new ideas in this area for comment and discussion.
Instructor(s): M. Long and J. Reinitz Terms Offered: Autumn
Equivalent Course(s): STAT 35410,ECEV 35901

EVOL 36300. Speciation. 100 Units.
A review of the literature on the origin of species beginning with Darwin and continuing through contemporary work. Both theoretical and empirical studies will be covered, with special emphasis on the genetics of speciation.
Instructor(s): C-I Wu, S. Pruett-Jones Terms Offered: Winter. in alternate (odd) years
Note(s): not offered in 2016-17
Equivalent Course(s): ECEV 36300
EVOL 36700. Morphometrics. 100 Units.
This graduate-level course serves as an introduction to the field of morphometrics (the analysis of organismal shape). Quantitative exploratory and confirmatory techniques involving both traditional (length-based) and geometric (landmark-based) summaries of organismal shape are introduced in a series of lectures and practical exercises. Emphasis is placed on the application of morphometric methods to issues such as (but not restricted to) quantification of intraspecific variability, interspecific differences, disparity, ontogenetic growth patterns (allometry), and phylogenetic changes in morphology. Relevant statistical and algebraic operations are explained assuming no prior background. Students are required to bring personal laptop computers, and are expected to acquire and analyze their own data sets during the course.
Instructor(s): M. Webster
Equivalent Course(s): GEOS 36000

EVOL 36900. Biopsychology of Sex Differences. 100 Units.
This course will explore the biological basis of mammalian sex differences and reproductive behaviors. We will consider a variety of species, including humans. We will address the physiological, hormonal, ecological and social basis of sex differences. To get the most from this course, students should have some background in biology, preferably from taking an introductory course in biology or biological psychology.
Instructor(s): J. Mateo Terms Offered: Autumn
Notes: CHDV Distributions: A; 1*
Equivalent Course(s): GNSE 30901,PSYC 31600,CHDV 30901

EVOL 36905. Topics in Conservation Paleobiology. 100 Units.
Paleobiological data from very young sedimentary records, including 'death assemblages' of shells and bones that are accumulating on modern-day seabeds and land surfaces, provide unique information on the status of present-day populations, communities, and ecosystems and their responses to natural and anthropogenic stress. This course on the emerging discipline of 'conservation paleobiology' uses a mix of lectures, seminars, and individual research projects to introduce how basic geologic methods, applied to modern samples, can address critical issues in the conservation and restoration of biodiversity and natural environments, including the identification of shifted baselines and disentangling human and natural drivers of ecological change. The course is designed to accommodate biologists with little background in paleontology and geology, focusing on methods of age-dating, paleo-environmental reconstruction, and geohistorical inference relevant to analysis of the last few thousands of years of human expansion and cultural/industrial development. The 2017 version will include hands-on experience with already-collected marine benthic samples. Enrollment limited.
Instructor(s): S. Kidwell Terms Offered: Winter
Prerequisites: Prerequisites for undergraduates: completion of GEOS 13100-13200-13300 or equivalent or completion of a 20000-level course in paleontology.
Equivalent Course(s): GEOS 26905,GEOS 36905

EVOL 38100. Evolution of the Hominoida. 200 Units.
This course is a detailed consideration of the fossil record and the phylogeny of Hominidae and collateral taxa of the Hominidea that is based upon studies of casts and comparative primate osteology.
Instructor(s): R. Tuttle Terms Offered: TBD
Prerequisites: Third- or fourth-year standing and consent of instructor
Equivalent Course(s): ANTH 38100,HIPS 24000,ANTH 28100

EVOL 38400. History and Theory of Human Evolution. 100 Units.
This course is a seminar on racial, sexual, and class bias in the classic theoretic writings, autobiographies, and biographies of Darwin, Huxley, Haeckel, Keith, Osborn, Jones, Gregory, Morton, Broom, Black, Dart, Weidenreich, Robinson, Leakey, LeGros-Clark, Schultz, Straus, Hooton, Washburn, Coon, Dobzhansky, Simpson, and Gould.
Instructor(s): R. Tuttle Terms Offered: TBD
Equivalent Course(s): ANTH 38400,HIPS 23600,ANTH 21102

EVOL 38800. Introduction to Research at the Field Museum. 100 Units.
Introduction to Research at the Field Museum and the University of Chicago. This course meets once every two weeks for a lecture by a curator at the Field Museum. A different curator lectures each week, presenting results of her/his current research on a range of topics in evolutionary biology, including phylogenetic systematics, molecular biology, paleontology, development, conservation biology and biodiversity, population biology, or biomechanics. Lectures often are followed by a tour of one of the major natural history collections in the world of living or fossil birds, mammals, plants, insects, fishes, invertebrates, or amphibians and reptiles.
Instructor(s): S. Hackett Terms Offered: Autumn

EVOL 40100. Grants, Publications and Professional Issues. 100 Units.
Covers professional topics in evolutionary biology, primarily strategies in grant writing and review. Each student will work towards the submission of an application of their choice. The course meets weekly and involves extensive writing and discussion.
Instructor(s): J. Bergelson, R. Ho, M. Coates Terms Offered: Autumn
Note(s): Open to first and second year graduate students in the Darwinian Sciences Cluster
Equivalent Course(s): ORGB 40100,ECEV 40100
EVOL 40200. Advanced Topics in Ethics for the Darwinian Sciences. 100 Units.
This course covers advanced topics in ethics relevant to senior Ph.D. students in the Darwinian Sciences. CEB students are required to successfully complete this course before being awarded the Ph.D.
Instructor(s): M. Coates, P. Herendeen, S. Hackett Terms Offered: Winter. offered in alternate (even) years
Prerequisite(s): Open to Ph.D. students in the Darwinian Sciences
Note(s): not offered in 2016-17
Equivalent Course(s): ECEV 40200, ORGB 40200

EVOL 41500. Topics in Stratigraphy and Biosedimentology. 100 Units.
Seminar course using the primary literature and/or a field problem. Topic selected from the rapidly evolving fields of sequence stratigraphy, basin analysis, and animal sediment relationships.
Instructor(s): S. Kidwell
Prerequisite(s): GEOS 26400 and GEOS 28300 or equivalent
Equivalent Course(s): GEOS 38400

EVOL 41920. The Evolution of Language. 100 Units.
How did language emerge in the phylogeny of mankind? Was its evolution saltatory or gradual? Did it start late or early and then proceed in a protracted way? Was the emergence monogenetic or polygenetic? What were the ecological prerequisites for the evolution, with the direct ecology situated in the hominine species itself, and when did the prerequisites obtain? Did there ever emerge a language organ or is this a post-facto construct that can be interpreted as a consequence of the emergence of language itself? What function did language evolve to serve, to enhance thought processes or to facilitate rich communication? Are there modern “fossils” in the animal kingdom that can inform scholarship on the subject matter? What does paleontology suggest? We will review some of the recent and older literature on these questions and more.
Instructor(s): S. Mufwene Terms Offered: Winter
Equivalent Course(s): CHSS 41920, ANTH 47305, CHDV 41920, PSYC 41920, LING 21920, CHDV 21920, LING 41920

EVOL 42600. Community Ecology. 100 Units.
Lectures and readings cover advanced topics in multi-species systems, and include an introduction to basic theoretical approaches.
Instructor(s): J.T. Wootton Terms Offered: Autumn
Equivalent Course(s): ECEV 42600

EVOL 42800. Population Ecology. 100 Units.
A lecture course on the empirical and theoretical approaches to the study of natural populations, including field methodologies and quantitative approaches. Includes computer assignments.
Instructor(s): C. Pfister Terms Offered: Winter
Equivalent Course(s): ECEV 42800

EVOL 42900. Theoretical Ecology. 100 Units.
An introduction to mathematical modeling in ecology. The course will begin with linear growth and Lotka-Volterra models, and proceed to partial differential equations. The course's perspective will emphasize numerical computations and fitting models to data.
Instructor(s): G. Dwyer, S. Cobey Terms Offered: Winter
Equivalent Course(s): ECEV 42900

EVOL 44001. Molecular Evolution I: Fundamentals and Principles. 100 Units.
The comparative analysis of DNA sequence variation has become an important tool in molecular biology, genetics, and evolutionary biology. This course covers major theories that form the foundation for understanding evolutionary forces that govern molecular variation, divergence, and genome organization. Particular attention is given to selectively neutral models of variation and evolution, and to alternative models of natural selection. The course provides practical information on accessing genome databases, searching for homologous sequences, aligning DNA and protein sequences, calculating sequence divergence, producing sequence phylogenies, and estimating evolutionary parameters.
Instructor(s): M. Kreitman Terms Offered: Winter
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence and two quarters of calculus, or consent of instructor.
Equivalent Course(s): ECEV 44001, BIOS 23258

EVOL 45500. Biogeography. 100 Units.
This course examines factors governing the distribution and abundance of animals and plants. Topics include patterns and processes in historical biogeography, island biogeography, geographical ecology, areography, and conservation biology (e.g., design and effectiveness of nature reserves).
Instructor(s): B. Patterson (odd years, lab), L. Heaney (even years, discussion) Terms Offered: Winter
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence and a course in either ecology, evolution, or earth history; or consent of instructor.
Equivalent Course(s): ENST 25500, GEOG 25500, GEOG 35500, BIOS 23406
EVOL 46200. Evolution and the Fossil Record. 100 Units.
This course serves as an introduction to the practical and theoretical issues involved in obtaining primary systematic data from the fossil record, and demonstrates the criticality of such data to the rigorous documentation and interpretation of evolutionary patterns. Precise topics of the seminar discussions will vary from year to year depending on relevance to student research projects and interest, but are likely to focus on issues such as (but not restricted to) practical techniques in specimen-based paleontology (including fossil preparation and photography), species delimitation (including species concepts, variability, and ecophenotypy), stratigraphic/geographic range determination (including biostratigraphic correlation), phylogeny reconstruction (including the relevance of stratigraphic data), and the importance of these topics to broader macroevolutionary issues such as diversity/disparity dynamics and the determination of evolutionary trends, rates and processes.
Instructor(s): M. Webster
Equivalent Course(s): GEOS 36200

EVOL 46700. Advanced Topics in Behavioral Ecology. 100 Units.
This is a reading course covering advanced topics in behavioral ecology. The list of topics to be covered will be based in part on student interests, but may include: behavior and conservation, communication, mating systems, sexual conflict, and sperm competition. This course is designed as a graduate course, but advanced undergraduates may enroll with the permission of the instructor.
Instructor(s): S. Pruett-Jones, T. Price Terms Offered: Winter
Equivalent Course(s): ECEV 36700

EVOL 48412. Publications, Grants, and the Academic Job Market. 100 Units.
In this graduate seminar we will discuss how to write and publish scientific articles, write CVs and job applications, and give job talks and interviews. In other words, everything students always wanted to know about being successful in academia but were afraid to ask.
Instructor(s): D. Maestripieri Terms Offered: Autumn
Equivalent Course(s): PSYC 48412, CHDV 48412

EVOL 49401. Approaches to Teaching in the Darwinian Sciences. 100 Units.
This course will introduce different teaching philosophies and methods that address how to be an effective teacher in the Darwinian Sciences. Specifically, the course will address what skills and knowledge undergraduates need to acquire and which assignments best teach these skills. Students will prepare course syllabi, discuss different approaches to teaching, and draft a philosophy of teaching statement. The overall goal for the course is that the students think critically about the art of teaching and formulate their own thoughts on the matter to better prepare them for their own careers in teaching.
Instructor(s): Staff
Prerequisite(s): Open to Ph.D. students in the Darwinian Sciences

EVOL 49500. Teaching in Evolutionary Biology. 100 Units.
Under the supervision of University faculty, graduate students in the Evolutionary Biology may serve as teaching assistants for courses in the College and relevant Graduate Divisions. Students will be evaluated and mentored throughout the quarter by their faculty supervisor, and at the end of the quarter by enrolled students. Prerequisite: successful fulfillment of the BSD teaching requirement and consent of instructor. Students must choose the instructor name from the faculty listing in the Time Schedules and register using that instructor’s assigned section number.
Instructor(s): Staff

EVOL 49600. Graduate Readings in Evolutionary Biology at the Field Museum. VAR Units.
Directed individual reading courses supervised by CEB faculty members who are curators at the Field Museum. Students must choose the instructor name from the faculty listing in the Time Schedules and register using that instructor’s assigned section number.
Instructor(s): Staff
Prerequisite(s): Consent of instructor.

EVOL 49700. Graduate Readings in Evolutionary Biology. VAR Units.
Directed individual reading courses in evolutionary biology supervised by CEB faculty members. Prerequisite: consent of instructor. Students must choose the instructor name from the faculty listing in the Time Schedules and register using that instructor’s assigned section number.
Instructor(s): Staff
Prerequisite(s): Consent of Instructor

EVOL 49800. Graduate Research - Off Campus. VAR Units.
Advanced research under the direction of the faculty of the Committee on Evolutionary Biology, undertaken away from the University of Chicago campus at the Field Museum, the Chicago Zoological Park, Lincoln Park Zoo, established biological field stations under the direction of their staffs, or other locations approved by the Chair and the student's advisory committee. Students must choose the instructor name from the faculty listing in the Time Schedules and register using that instructor’s assigned section number.
Instructor(s): Staff
Prerequisite(s): Consent of Instructor
EVOL 49900. Graduate Research - On Campus. VAR Units.
Advanced research under the direction of the faculty of the Committee on Evolutionary Biology. While any approved research problem may be pursued under this course number, special attention is called to the following research fields available in the Committee: population ecology and genetics, entomology, applied ecology, plant biology, systematics of fossil invertebrates, molluscs, problems in the systematics of arthropods, herpetology, mammalogy, ornithology, and ichthyology, theoretical biology, animal behavior, paleoecology, molecular evolution, functional morphology, evolution of development, community ecology and evolution, evolutionary paleobiology and macroevolution, and physiological ecology. Students must choose the instructor name from the faculty listing in the *Time Schedules* and register using that instructor’s assigned section number.

Instructor(s): Staff
Prerequisite(s): Consent of Instructor
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

- Times was used instead of Trajan.
- Times was used instead of Palatino.

The editor may contact Leepfrog for a draft with the correct fonts in place.