

# POPULATION BIOLOGY (PBG)

## Graduate Studies

### PBG 200A – Principles of Population Biology (5 units)

Starting Winter Quarter 2026, this course is no longer offered.

*Course Description:* Principles of single-species ecology and evolution.

Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics.

*Prerequisite(s):* PBG 231 required concurrently; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

### PBG 200B – Principles of Population Biology (6 units)

Starting Summer Session 1 2025, this course is no longer offered.

*Course Description:* Principles of multi-species communities. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns.

*Prerequisite(s):* PBG 200A; PBG 231.

*Learning Activities:* Lecture 5 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

### PBG 200C – Principles of Population Biology (6 units)

Starting Summer Session 1 2025, this course is no longer offered.

*Course Description:* Principles of microevolution and macroevolution.

Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogeny reconstruction.

*Prerequisite(s):* PBG 200B.

*Learning Activities:* Lecture 5 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

### PBG 201 – Principles of Population Biology (6 units)

*Course Description:* Principles of single-species ecology and evolution.

Ecological and evolutionary processes shaping population dynamics and genetic and phenotypic variation within species. Modeling, experimental, and molecular approaches to population biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 6 hours(s).

*Enrollment Restriction(s):* Open to Population Biology graduate students only, or consent of the instructor.

*Credit Limitation(s):* No credit to students who have taken PBG 200A.

*Grade Mode:* Letter.

### PBG 202 – Principles of Population Biology (6 units)

*Course Description:* Principles of multi-species ecology and evolution.

Ecological and evolutionary processes underlying the formation and maintenance of biodiversity. Natural history, modeling, experimental, and molecular approaches to community ecology and evolutionary biology.

*Prerequisite(s):* PBG 201; consent of instructor.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Open to Population Biology graduate students only or consent of instructor.

*Credit Limitation(s):* No credit to students who have taken PBG 200B or PBG 200C.

*Grade Mode:* Letter.

### PBG 203 – Advanced Evolution (3 units)

*Course Description:* Adaptation and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

### PBG 206 – Ecology of Insect Parasitoids (4 units)

*Course Description:* Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized.

*Prerequisite(s):* Introductory animal ecology or behavior.

*Learning Activities:* Lecture 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

### PBG 207 – Plant Population Biology (3 units)

*Course Description:* Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology.

*Prerequisite(s):* Advanced undergraduate ecology course (e.g., ESP 100, EVE 101, ENT 104, PLB 117), and advanced undergraduate course in genetics and/or evolution (e.g., BIS 101 or EVE 100).

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* ECL 207.

*Grade Mode:* Letter.

### PBG 212 – Topics in Invertebrate Evolution (2 units)

*Course Description:* Advanced seminar that critically examines problems relevant to evolutionary patterns among the invertebrates.

*Prerequisite(s):* Graduate standing or consent of instructor; courses in evolutionary biology, systematics, and ecology highly recommended.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### PBG 221 – Animal Behavior, Ecology & Evolution (3 units)

*Course Description:* Interface between animal behavior, ecology and evolution. New developments in behavioral ecology development and testing of hypotheses in this discipline.

*Prerequisite(s):* NPB 102; EVE 100; EVE 101; or the equivalent, and consent of instructor, graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ANB 221.

*Grade Mode:* Letter.

### PBG 224 – Field Reconnaissance for Population Biologists (2 units)

*Course Description:* Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary research opportunities in northern and central California.

*Prerequisite(s):* Graduate student in Population Biology, or consent of instructor.

*Learning Activities:* Fieldwork 6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 225 – Terrestrial Field Ecology (4 units)**

*Course Description:* Field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results are stressed.

*Prerequisite(s):* Introductory ecology and introductory statistics, or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Fieldwork 12 hour(s).

*Cross Listing:* ECL 225, ENT 225.

*Grade Mode:* Letter.

**PBG 231 – Mathematical Methods in Population Biology (3 units)**

*Course Description:* Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed.

*Prerequisite(s):* MAT 016C or MAT 021C; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ECL 231.

*Grade Mode:* Letter.

**PBG 233 – Computational Methods in Population Biology (3 units)**

*Course Description:* Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementing simulations with R.

*Prerequisite(s):* A course in theoretical ecology (e.g., ECL 231 or an equivalent to ESP 121 from your undergraduate institution) or consent of instructor; no programming experience required.

*Learning Activities:* Lecture/Lab 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* ECL 233.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 250A – Interdisciplinary Approaches to Biological Invasions (4 units)**

*Course Description:* An integrative consideration of biological invasions, including an overview of concepts from ecology, ecological theory, evolution, genetics, philosophy, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem-solving.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**PBG 250B – Interdisciplinary Approaches to Biological Invasions (4 units)**

*Course Description:* An integrative consideration of biological invasions, including an overview of concepts from history, sociology, communications, law, policy, management, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem-solving.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**PBG 251 – Collaborative Project in Biological Invasions (3 units)**

*Course Description:* A year-long interdisciplinary collaborative project focusing on biological invasions, resulting in a paper or other suitable product presented at a symposium at the conclusion of the project.

*Prerequisite(s):* PBG 250A; PBG 250B; or equivalent courses, and consent of instructor.

*Learning Activities:* Project, Discussion 1 hour(s).

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 270 – Research Conference in Evolutionary Biology (1 unit)**

*Course Description:* Critical presentation and evaluation of current literature and ongoing research in evolutionary biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 271 – Research Conference in Ecology (1 unit)**

*Course Description:* Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* ECL 271.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 287 – Advanced Animal Behavior (2 units)**

*Course Description:* Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution.

*Prerequisite(s):* NPB 102; EVE 100; or the equivalents; graduate standing; consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* ANB 287.

*Grade Mode:* Letter.

**PBG 290 – Seminar (1 unit)**

*Course Description:* Seminars presented by visiting lecturers, UC Davis graduate students and faculty.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 290C – Research Conference in Population Biology (1 unit)**

*Course Description:* Presentation and discussion of faculty and graduate student research in population biology.

*Prerequisite(s):* PBG 299 (can be concurrent); and consent of instructor.

Graduate standing; PBG 299 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 292 – Topics in Ecology & Evolution (1 unit)**

*Course Description:* Seminar presented by visiting lecturers, UC Davis faculty and graduate students.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* ECL 296.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 296 – Seminar in Geographical Ecology (2 units)**

*Course Description:* Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics.

*Prerequisite(s):* EVE 100 or EVE 101; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* GEO 214.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.