BIOLOGY - GENERAL (BIOB)

BIOB 101N - Discover Biology. 3 Credits.
Offered every term. Offered on Mountain Campus and at Missoula College. Contemporary exploration of the organization and complexity of living organisms and the systems in which they live. The central questions of biology -- the relationship between form and function, acquisition and use of energy, and continuity between generations will be addressed through lectures and laboratory investigations.
Gen Ed Attributes: Natural Science Lab Course, Natural Science

BIOB 109N - Montana Ecosystems. 3 Credits.
Offered autumn and spring. Offered at Missoula College. An introduction to the landscapes and ecosystem diversity of Montana, with an emphasis on exploring the dominant habitats of western Montana. Required, integrated laboratory includes field trip investigations, classroom lab exercises, and presentations.
Gen Ed Attributes: Natural Science Lab Course, Natural Science

BIOB 125 - Apprentice-Level Beekeeping. 2 Credits.
This course aims to teach the basic beekeeping of honey bees. Participants will gain a general knowledge of honey bee biology and how to care for honey bees throughout the year. Students will be taught how to recognize common honey bee ailments and pests and the methods for treating them. After completion, students will know how to manage honey bee colonies for maximum bee health and honey production as well as a general understanding of basic insect biology.

BIOB 160 - Principles of Living Systems. 3 Credits.
Offered every term. Non-science majors are encouraged to take either BIOB 101N (Discover Biology) or BIOB 170N (Principles of Biological Diversity) instead of BIOB 160. Unifying principles of biological structure-function relationships at different levels of organization and complexity. Consideration of reproduction, genetics, development, evolution, ecosystems, as well as the inter-relationships of the human species to the rest of life. Students requiring a laboratory should also register for BIOB 161N.

BIOB 161N - Principles of Living Systems Lab. 1 Credit.
Offered autumn and summer. Coreq. or prereq., BIOB 160. Lab experiences illustrate biological principles underlying growth, reproduction, development, genetics and physiology, and are designed to give students practice in scientific methods of description, development of hypotheses, and testing.
Gen Ed Attributes: Natural Science Lab Course, Natural Science

BIOB 170N - Principles of Biological Diversity. 3 Credits.
Offered spring. Survey of the diversity, evolution and ecology of life including prokaryotes, viruses, protista, fungi, plants and animals.
Gen Ed Attributes: Natural Science

BIOB 171N - Principles of Biological Diversity Lab. 2 Credits.
Offered spring. Prereq. or Coreq., BIOB 170N. The diversity of life including prokaryotes, viruses, protista, fungi, plants and animals including structure and evolutionary relationships. Gen Ed Attributes: Natural Science Lab Course (N)
Gen Ed Attributes: Natural Science Lab Course, Natural Science

BIOB 191 - Special Topics. 1-6 Credits.
Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

BIOB 198 - Internship. 1-6 Credits.
Prereq., consent of Division. Extended classroom experience that provides practical application of learning during placement off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

BIOB 210N - Communicating Biology. 3 Credits.
Offered autumn and spring. Offered at Missoula College. Prereq., WRIT 101 or equivalent. An examination of modern methods for sharing scientific discovery with an emphasis on biological issues related to the human experience.
Gen Ed Attributes: Natural Science, Writing Across the Curriculum

BIOB 225 - Journeyman-Level Beekeeping. 3 Credits.
Prereq., BIOB 125 or consent of instructor. This course will cover topics such as the honeybees' interaction and relation to native pollinators and the plants they work with as well as a look into pesticide uses and truths. The student will be given detailed instruction on the honeybees' internal anatomy and structures and the uses of their unique external anatomy. Students will learn to use the microscope and understand how it is used in diagnosing insect diseases and pests. By the end of the course, students will understand the honeybees' place in the ecosystem and how their unique anatomy contributes to their interactions with the world both inside and outside the hive.

BIOB 226N - General Science: Chemical & Life Sciences. 5 Credits.
Offered spring. Prereq., or coreq., M 132. Integrated lectures, laboratory exercises, and field trips on topics in chemical and biological science for prospective elementary school teachers and the non-scientist. 2, two-hour laboratory sessions are required each week.
Gen Ed Attributes: Natural Science Lab Course, Natural Science

BIOB 260 - Cellular and Molecular Biology. 4 Credits.
Offered autumn and summer. Prereq., BIOB 160 (preferred) or BCH 110/111 (preferred) or B- or higher in BIOH 112; and either CHMY 123 or CHMY 143N. Analytical exploration of the structure and function of the cell, the fundamental unit of life, with an emphasis on energy transformations and information flow. Topics include molecular building blocks, membranes, organelles, and mechanisms of replication, gene expression, metabolism, signal transduction, cell birth, cell death, and cell differentiation.

BIOB 272 - Genetics and Evolution. 4 Credits.
Offered spring. Prereq., either BIOB 260; OR both BIOB 160 and BIOB 170N; OR just BIOB 160 with a B- or better; AND one of M 121, 122, 151, 162, or 171; OR Maplesoft Pre-Calculus>=10; OR Maplesoft Algebra>=17; OR EdReady Math placement level 4. Principles and mechanisms of inheritance and evolution. Population genetics, fossil record, macroevolution, speciation, extinction, systematics, molecular evolution.

BIOB 277 - Natural Beekeeping: Integrating Honey Bee Ecology into Modern Beekeeping. 2 Credits.
Prereq., BIOB 125 or consent of instructor. This course introduces a method of beekeeping that, as best we can, emulates how bees naturally occur in nature while promoting the practices that qualify us as beekeepers, not just people with a hive in the backyard. This course is designed to introduce the beekeeper to a method of beekeeping that incorporates the behaviors and preferences of naturally nesting colonies into managed beekeeping practices.

BIOB 291 - Special Topics. 1-6 Credits.
(R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

BIOB 295 - Student Teaching. 1-6 Credits.
(R-6) Offered intermittently. Offered at Missoula College. Organized student teaching.

BIOB 298 - Internship. 1-6 Credits.
Offered intermittently. Prereq., consent of Division. Extended classroom experience that provides practical application of learning during placement off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

BIOB 301 - Developmental Biology. 3 Credits.
Offered autumn. Prereq., BIOB 260; BIOB 272 recommended. An analysis of the origin and development of form and patterns in organisms, stressing the processes of growth and differentiation in plants and animals. Graded traditional letter grade only.

BIOB 325 - Master-Level Beekeeping. 3 Credits.
Prereq., BIOB 225 or consent of instructor. The Master course is the third and final level in the Master Beekeeping curriculum. It offers a more detailed look into bee flight, anatomy, and reproduction, discusses bee pheromones and genetics, and provides templates for record-keeping for improved bee management. The course also covers hive products, bee nutrition, selection of apiary locations, and basic principles for conducting your own experiments. By the end of the course, students will have a better understanding of advanced bee management and an introduction to the beekeeping business. They should be ready to develop and maintain healthy hives for hobbyists and larger-scale endeavors.

BIOB 375 - General Genetics. 3 Credits.
Offered spring. Prereq., BIOB 260 and 272. This course will focus on the molecular genetics of eukaryotes, with special emphasis on transmission genetics and gene structure and regulation.

BIOB 390 - Undergraduate Research. 1-10 Credits.
(R-10) Offered every term. Prereq., consent of instr. Independent research under the direction of a faculty member. Graded credit/no credit.

BIOB 391 - Special Topics. 1-10 Credits.
(R-10) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

BIOB 392 - Independent Study. 1-10 Credits.
(R-10) Offered every term. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

BIOB 395 - Practicum. 1-12 Credits.

BIOB 398 - Internship. 1-6 Credits.
Offered every term. Prereq., consent of the Division. Extended classroom experience that provides practical application of learning during placement off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

BIOB 410 - Immunology. 3 Credits.
Offered autumn. Prereq., BIOB 260. Current concepts and methods in Immunology. Level: Undergraduate-Graduate

BIOB 411 - Immunology Laboratory. 2 Credits.
Offered autumn. Prereq., or Coreq., BIOB 410. Modern techniques for analysis of immune responses. Level: Undergraduate-Graduate

BIOB 425 - Advanced Cellular & Molecular Biology. 3 Credits.
Offered spring. Prereq., BIOB 260 and 272; BCH 380 or BCH 480 strongly recommended. Cell structure and function, cell cycle, cellular signaling, molecular basis of cancer, regulated cell death, membrane transport, organelle dynamics, cytoskeleton, cell adhesion, and the molecular basis of learning and memory. Level: Undergraduate-Graduate

BIOB 435 - Comparative Animal Physiology. 3 Credits.
Offered Spring. Prereq., BIOB 260 or equivalent. Animal physiology with emphasis on diversity of functional processes, with strong links to broader ecological and evolutionary contexts. Level: Undergraduate-Graduate

BIOB 467 - Molecular Analysis of Development. 2 Credits.
(R-12) Offered alternate spring (UM campus, face-to-face). Prereq. Consent of Instructor. This course covers key topics in developmental biology through the detailed study of the primary literature. Seminar topics are updated for each year the course is offered and listed in syllabus. With help of the instructor, the students present each topic and lead a discussion each class period based on the assigned research paper and one or two review articles to provide background on the topic. CR/NCR only (no letter grade). Level: Undergraduate

BIOB 468 - Endocrinology. 3 Credits.
Offered intermittently. Prereq., BIOB 260 and 272. Integration of fundamental concepts of endocrinology (such as hormone release, hormone transport and receptor activation) into complex systems (such as reproduction). Level: Undergraduate-Graduate

BIOB 480 - Conservation Genetics. 3 Credits.
Offered spring. Prereq., BIOB 272. Genetic basis for solving biological problems in conservation including the genetics of small populations, the application of molecular genetic techniques to conservation biology and case studies of the application of genetics to conservation problems. Level: Undergraduate-Graduate

BIOB 483 - Phylogenics and Evolution. 3 Credits.
Offered autumn semester, odd-numbered years. Prereq., BIOB 260 and BIOB 272. Phylogenies, or evolutionary trees, provide insights into the history of life on Earth, including our own origins. This course focuses on the theoretical foundations of popular methods of reconstructing phylogenies from molecular sequence data and how to implement these methods with computational software for real data sets. Other current methods for testing evolutionary hypotheses with sequence data will also be introduced. Level: Undergraduate-Graduate

BIOB 486 - Genomics. 3 Credits.
Offered spring. Prereq., BIOB 272. Principles and mechanisms of genome biology of animals and microbes, including genome function, evolution, and basic molecular and computational methodology used in genome biology. Level: Undergraduate-Graduate

BIOB 490 - Advanced Undergraduate Research. 1-10 Credits.
(R-10) Offered every term. Prereq., junior or senior standing and consent of instr. Independent research under the direction of a faculty member. Graded credit/no credit. Level: Undergraduate

BIOB 491 - Special Topics. 1-10 Credits.
(R-10) Offered intermittently. Prereq., consent of instr. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics. Level: Undergraduate-Graduate

BIOB 492 - Independent Study. 1-10 Credits.
Offered every term. Prereq., consent of instr. Independent work under the University omnibus option. See index. Level: Undergraduate-Graduate

BIOB 494 - Seminar in Biology. 1 Credit.
(R-3) Offered intermittently. Prereq., consent of instr. A review and discussion of current research. Topics vary. Level: Undergraduate-Graduate

BIOB 495 - Practicum. 1-12 Credits.
(R-12) Level: Undergraduate-Graduate

BIOB 498 - Internship. 1-6 Credits.
Offered every term. Prereq., consent of the Division. Extended classroom experience that provides practical application of learning during placement off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation. Level: Undergraduate

BIOB 499 - Undergraduate Thesis. 3-6 Credits.
(R-6) Offered every term. Prereq., senior standing and consent of instr. Preparation of a thesis or manuscript based on undergraduate research for presentation and/or publication. Student must give oral or poster presentation at the Biological Sciences Undergraduate Research Symposium or a scientific meeting. Level: Undergraduate

BIOB 505 - OBE Core Course - Genetics and Evolution. 4 Credits.
Offered every other autumn. Prereq., graduate standing. Exploration of the fundamental concepts and approaches in evolutionary biology, functional biology and evolutionary genetics with evolutionary ecology woven throughout. Lectures and discussions, with an emphasis on primary literature, classic and contemporary. Level: Graduate

BIOB 506 - OBE Core Course - Ecology. 4 Credits.
Offered alternate years. Prereq., graduate standing. Broad overview of population and community ecology. Lectures and discussions, introducing theoretic foundations and exploring classic and more recent empirical tests of ecological theory with relevant topics in evolutionary ecology and functional biology woven throughout. Level: Graduate

BIOB 518 - Plant-Consumer Interactions. 3 Credits.
Offered alternate years. Prereq. BIOE 370 or equiv. Ecology and evolution of plant-consumer interactions. Review of classic and contemporary literature on plant-consumer interactions. Level: Graduate

BIOB 522 - Readings in Morphology, Physiology, and Zoology. 1 Credit.
(R-8) Prereq., graduate standing and consent of instr. Review and discussion of current literature in the fields of morphology, physiology, and ecology. Level: Graduate

BIOB 524 - Physiological Plant Ecology. 3 Credits.
Offered alternate years. Prereq., BIOE 370 and BIOO 433. The physiological basis of plant adaptation and response to the environment. Level: Graduate

BIOB 541 - Electron Microscopy Lab. 1-6 Credits.
(R-6) Prereq. or coreq., BIOB 440 or equiv. Practical laboratory experience in the preparation of various samples and hands-on operation of the transmission and/or scanning electron microscopes. Level: Graduate

BIOB 547 - Experimental Molecular, Cellular, and Chemical Biology. 1 Credit.
(R-14) Prereq., graduate standing or consent of instr. Focus on experimental design, methods, and presentation of experimental results for graduate students in laboratories with a molecular, cellular or chemical biological focus. Level: Graduate

BIOB 551 - Environmental Field Study. 1-3 Credits.
(R-3) Prereq. or coreq.,ENSC 540 or ENST 560. Same as ENSC 551. Designing, executing, and interpreting environmental studies. Project oriented. Level: Graduate

BIOB 561 - Population Genetics Seminar. 1-2 Credits.
(R-12) Prereq., consent of instr. or graduate standing. Current topics in population genetics, evolutionary biology, molecular evolution and related topics. Level: Graduate

BIOB 567 - Molecular Analysis of Development. 2 Credits.
(R-12) Offered alternate spring (UM campus, face-to-face). Prereq. Consent of Instructor. This course covers key topics in developmental biology through the detailed study of the primary literature. Seminar topics are updated for each year the course is offered and listed in syllabus. With help of the instructor, the students present each topic and lead a discussion each class period based on the assigned research paper and one or two review articles to provide background on the topic. CR/NCR only (no letter grade). Level: Graduate

BIOB 590 - Research. 1-8 Credits.
(R-12) Requires consent of instructor. Directed individual research and study appropriate to the background and objectives of the student. Level: Graduate

BIOB 591 - Special Topics. 1-4 Credits.
(R-22) Experimental offering of new courses by resident or visiting faculty. Level: Graduate

BIOB 592 - Independent Study. 1-8 Credits.
(R-8) Requires consent of instructor. Course material appropriate to the needs and objectives of the individual student. Level: Graduate

BIOB 594 - Seminar in Biology. 1 Credit.
(R-6) Prereq., graduate standing or consent of instr. A review and discussion of current research in biology. Topics vary. Level: Graduate

BIOB 598 - Internship. 1-8 Credits.
(R-8) Prereq., consent of the Division, graduate standing. Extended classroom experience that provides practical application of learning during placement off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. Level: Graduate

BIOB 599 - Thesis. 1-10 Credits.
(R-10) Prereq., masters student in biology. Field and laboratory research on, and writing of, a student's master's thesis. Level: Graduate

BIOB 691 - Special Topics. 1-6 Credits.
(R-24) Experimental offering of new courses by resident or visiting faculty. Level: Graduate

BIOB 699 - Dissertation. 1-10 Credits.
(R-20) Prereq., doctoral student in biology. Credit for field and laboratory research on, and writing of, a student's doctoral dissertation. Level: Graduate