BIOLOGICAL SCIENCES

The Biological Sciences curriculum provides the foundation for our majors: Biological Sciences, Bio-Medical Sciences and Natural History. Our two-year Associate in Arts Degrees are designed to provide the knowledge and skills for success before and after transfer to a four-year institution. Students who complete specialized one-year programs of study in Bio-Medical Sciences, Marine Science and Natural History can earn Biological Sciences Departmental Awards.

Our Biological Sciences Associate in Arts Degree provides preparation for transfer in such areas as Biochemistry, Molecular Biology, Pharmacology, Cell Biology, Ecology, Marine Biology, Botany, Zoology, Medical Technology and Pre-Medicine.

The Bio-Medical Sciences Emphasis: Associate in Arts Degree in Liberal Arts provides a strong foundation for students interested in pursuing a career in the health sciences.

The Natural History Associate in Arts Degree provides preparation for transfer in such areas as Natural History, Freshwater and Marine Fisheries and Wildlife Management. The Natural History A.A. can be completed fully online.

We offer specialized and general courses for all students, and support courses for medical technology and health services; recreation and nature interpretation; environmental studies; marine diving technology; and sports medicine. Many courses of a more general nature allow students to fulfill General Education and graduation requirements in Natural Sciences, while developing a biological perspective.

Our courses utilize advanced technology to deliver information to students, while retaining the tradition of personalized instruction and small class sizes. Computers at every lab bench, a 30-station computer classroom and a seamless network with wireless access facilitates student learning through the use of computer tools and information from any Biological Sciences classroom, laboratory and tutor room.

Online instruction carries this concept off campus to our students in Santa Barbara and worldwide, through more than 12 fully online classes, as well as many hybrid courses where the lecture is online and the lab is on campus. The excitement of beginning a path to a meaningful profession in biology is enhanced by a completely integrated system for acquiring information from instructors who love biology and teaching.

Advances in biological knowledge are providing solutions to the most challenging problems in medicine, environmental resources, agriculture and human ecology. Employment opportunities continue to increase as knowledge grows in genetic engineering, embryonic development, learning and memory, aging, environmental studies, natural resource management and the regulation of populations.

Honors Certificate of Achievement: Sciences

See “Honors Program (https://catalog.sbcc.edu/academic-departments/honors)” in the Catalog.

Planning a Program of Study for Transfer

Special problems confront the student planning to transfer to a four-year college or university. Both General Education and major requirements differ from one institution to another and within a single institution by major emphasis. These differences, plus personal, educational and professional goals, employment and prior preparation, will influence the courses you take. You should work closely with one of the Biological Sciences Faculty Advisers, Eric Wise (EBS-305, ext. 2517) and Blakely Barron (EBS-322, ext. 2444), to plan your program of study at SBCC.

General Education

It is very important for biology majors to complete the preparation in the major even if it means delaying some General Education/IGETC requirements. The science curriculum is sequential, controlled by prerequisites; you do not want to be in the position of taking freshman science classes as a junior.

Preparation in the Major

Since biology courses are built upon a base of mathematics and the physical sciences, it is important for biology students to begin these courses early so that they may be completed before transfer. The areas of highest concern are Mathematics, Chemistry, Physics and preparation in Biology. Students who must make up deficiencies should do so as early as possible.

Mathematics

Statistics is more widely applicable in biology than is calculus, yet most institutions require calculus because of its utility in rate-oriented biology. You should attempt to complete Elementary Statistics (MATH 117 Elementary Statistics) and a calculus sequence (MATH 130 Calculus for Biological Sciences, Social Sciences and Business I-MATH 131 Calculus For Biological Sciences, Social Sciences And Business II or MATH 150 Calculus with Analytic Geometry I-MATH 160 Calculus With Analytic Geometry II) prior to transfer. If you are not eligible for these courses based on your placement exam scores, immediately enter the mathematics sequence at the recommended course level.

Chemistry

It is difficult to understand modern biology without at least an introduction to organic chemistry. Students without prior chemistry background and/or mathematics deficiencies may need to take CHEM 101 Introductory Chemistry and appropriate mathematics courses before beginning the General and Organic Chemistry sequence (CHEM 155 General Chemistry I, CHEM 156 General Chemistry II, CHEM 211 Organic Chemistry I-CHEM 221 Organic Chemistry Laboratory I, CHEM 212 Organic Chemistry II-CHEM 222 Organic Chemistry Laboratory II). Note: however, that some universities require upper division organic chemistry. If so, complete organic chemistry after transfer.

Physics

There are three physics sequences for biology majors. General Physics (PHYS 105 General Physics-PHYS 106 General Physics) requires algebra and trigonometry. PHYS 110 Introductory Physics-PHYS 111 Introductory Physics and PHYS 121 Mechanics Of Solids And Fluids-PHYS 122 Electricity and Magnetism-PHYS 123 Heat, Light and Modern Physics require calculus. Again, colleges and universities differ as to their physics requirements. Many require calculus-based physics.

Biology

SBCC has one of the strongest programs for preparation in three biology majors: Biological Sciences, Bio-Medical Sciences and Natural History. In addition to the biology major core sequence, BIOL 101 Plant Biology, BIOL 102 Animal Biology, BIOL 103 Cell and Molecular Biology, biology students may choose from a wide range of courses to add depth and
diversity to match their goals and interests. Four-year colleges and universities have different core sequences; to assure compatibility of your course selection and transfer institutions, contact the Counseling Center (Student Services, Room 120).

Declaring a Biology Major

If you have decided to major in biology, or you are not sure but are strongly considering it, declare a biology major. Declaring your major protects you from changes of departmental requirements. You will be able to follow either the rules in effect at the time you declared your major, or the rules as later changed. Further, by declaring a biology major you meet one of the requirements for scholarships offered by the Biological Sciences Department.

You may declare a biology major at the time you register at SBCC. Any time thereafter, you may declare a biology major or change your major by filing a “Change of Major” form at the Office of Admissions & Records or online through Pipeline.

Associate in Arts Degree

In order to achieve an Associate in Arts Degree, a student must complete a minimum of sixty (60) units of work, which must fulfill General Education, SBCC and department requirements. For complete information on General Education and SBCC requirements, see “General Education” and “Graduation and Transfer Requirements” in the Catalog Index.

Departmental Awards

Students who have successfully completed a defined program of study in the areas of bio-medical sciences, marine science and natural history earn Biological Sciences Departmental Awards. Each program of study can be completed in one year. There are neither college requirements nor General Education requirements that need be taken.

Complete descriptions of Departmental Awards requirements are available from the Biological Sciences Department office.

Advising

Students pursuing Departmental Awards are encouraged to identify themselves to the appropriate adviser to formulate a program of study.

Bio-Medical Sciences: Heather J. Rose

Environmental Studies: Adam Green

Marine Science: Michelle Paddock

Natural History: Larry Jon Friesen

Honors and Awards

Outstanding Student Awards

Each year one student may be selected “Outstanding Student” in Biological Sciences, Bio-Medical Sciences, Botany, Cell, Molecular, Natural History, Marine Science, Zoology and some other courses. Selections are made by the Biological Sciences Department faculty. Selections are based solely on academic excellence and applications by students are not required.

Robert J. Profant Memorial Scholarship

Established in 1991 in honor of the late Professor Profant’s long and dedicated career, and awarded once each year, the Robert J. Profant Scholarship recognizes an outstanding student majoring in biology.

Students are recommended to the department by faculty or may apply through the Financial Aid Office.

To qualify for a scholarship award, a student must be a declared biology major (Biological Sciences or Natural History), enrolled in a course offered by the Biological Sciences Department during the academic year of application, and have a 3.5 GPA in courses from the sciences and mathematics.

William Olivarius Scholarships

In 1982, a generous endowment from the late William Olivarius enabled the Biological Sciences Department to offer scholarships to students majoring in biology. Several scholarships are awarded each year on the basis of academic excellence.

To qualify for a scholarship award, a student must be a declared biology major (Biological Sciences, Biotechnology or Natural History), be enrolled in a minimum of 12 units each semester of the award year, and have a minimum overall grade point average of 3.0. All students with exceptional overall GPAs are encouraged to apply. Applications and faculty nominations are due at the end of the first week of February.

Richard Armstrong Memorial Scholarship

Richard Armstrong is warmly remembered as a dedicated scientist and SBCC professor who taught in the Biological Sciences Department for three decades. He passed away in the Spring 2005 semester and is honored by his family, friends and colleagues with this scholarship.

Eligible students must demonstrate academic excellence and a passion for biology. They must have declared a major in one of the Biological Sciences and have completed at least 12 units of the biology majors sequence of courses, preferably (but not limited to) the following courses: BIOL 101 Plant Biology, BIOL 102 Animal Biology, BIOL 103 Cell and Molecular Biology, and CHEM 155 General Chemistry I, CHEM 156 General Chemistry II. They may be either continuing their studies at SBCC (with a clear intent of pursuing an advanced degree) or transferring to a 4-year institution as a biology major.

Microbiology Achievement Award

The Microbiology Achievement Award is an endowed gift administered jointly by the Biological Sciences Department and the Santa Barbara City College Foundation. The award is meant as a special recognition to the student who demonstrated superior academic achievement in the field of microbiology, as well as in true academic tradition, exhibited outstanding class leadership and provided strong support to classmates.

Dr. Judith Evans Meyer Memorial Scholarship for the Bio-Medical Sciences

Award is based equally on financial need and academic achievement. Applicants must have earned a passing grade in at least one (1) SBCC Bio-Medical Science course and either be currently enrolled or have successfully completed one (1) other Bio-Medical Science course within the past two (2) college terms (including summer sessions). Applicants may be entering, continuing, re-entering or transferring to a four-year institution. During the award period they must be enrolled in a minimum of six (6) units maintain a minimum 3.0 GPA.

David W. Doner, Jr., M.D. Scholarship

This award is made possible by the generous gift of David W. Doner, Jr., M.D. Dr. Doner practiced medicine for forty years and taught medical residents and students at Boston University, Tufts University and Santa Barbara Cottage Hospital as an active faculty mentor. He endowed a
Special Programs and Courses

291 — Seminars in the Biological Sciences
The 291 series in Biological Sciences is designed to provide students the opportunity to investigate areas outside the regular course offerings. The topics are selected on the basis of faculty and student interest. Students are urged to suggest topics to the department.

295/298/299 — Internship and Independent Studies
This series offers opportunities to students with particular skills or interests to receive credit for internship (295), independent reading (298) or research (299). You may enroll in Internship and Independent Studies at any time during the semester. You must secure a faculty sponsor and file an Independent Studies proposal with the Biological Sciences Office and the Office of Admissions & Records.

Student Employment Opportunities
Each semester the Biological Sciences Department hires students as laboratory and museum assistants, collectors, tutors and readers. Students may apply for one of these positions at the Biological Sciences Offices (EBS-212). The greatest number of positions is available at the beginning of the school year. Students are encouraged to file an application during the prior spring semester or during the summer to have the best chance for employment beginning in the fall.

Student laboratory and museum assistants gain experience in laboratory and museum techniques under the supervision of Biological Sciences faculty and laboratory technicians. Museum assistants and collectors collect, accession and preserve botanical and animal specimens for use in classes and work on a variety of departmental projects.

Students who have performed well in a course and who demonstrate interest and ability in teaching are selected by the faculty as readers or tutors. You may apply to tutor students currently enrolled in the course. The purpose of this program is twofold: current students in the course receive excellent peer tutoring; and tutors learn the techniques of teaching. Tutors also find that to teach is to learn.

Programs of Study

• Biological Sciences, Associate in Science for Transfer (AS-T) (https://catalog.sbcc.edu/academic-departments/biological-sciences/biological-sciences-as-t)
• Biological Sciences, Associate in Arts (AA) (https://catalog.sbcc.edu/academic-departments/biological-sciences/biological-sciences-aa)
• Liberal Arts, Associate in Arts (AA): Bio-Medical Sciences Emphasis (https://catalog.sbcc.edu/academic-departments/biological-sciences/liberal-arts-aa-bio-medical-sciences-emphasis)
• Natural History, Associate in Arts (AA) (https://catalog.sbcc.edu/academic-departments/biological-sciences/natural-history-aa)
• Bio-Medical Sciences, Departmental Award (D) (https://catalog.sbcc.edu/academic-departments/biological-sciences/bio-medical-sciences-departmental-award)
• Marine Science, Departmental Award (D) (https://catalog.sbcc.edu/academic-departments/biological-sciences/marine-science-departmental-award)

Credit Courses

Biology (BIOL)
BIOl 100 Concepts Of Biology (4 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab) Basic concepts of biology. Designed for non-biological sciences majors with no prior general biology course. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: No credit for BIOL 100 if taken after BIOL 101, 102 or 103.

BIOl 101 Plant Biology (4 Units)
Prerequisites: MATH 107 or MATH 110C or MATH 137C or SS 110C or equivalent based on SBCC’s Assessment Center placement via multiple measures.
Course Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Principles of biology, with emphasis on major plant groups. Anatomy, physiology, evolution, and diversity of the Archaea, Bacteria, Protista, Fungi and Plantae. Required for the Biological Sciences major. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
C-ID: BIOL 135S, BIOL 140, BIOL 155.

BIOl 102 Animal Biology (5 Units)
Prerequisites: MATH 107 or MATH 110C or MATH 137C or SS 110C or equivalent based on SBCC’s Assessment Center placement via multiple measures.
Course Advisories: BIOL 101, ENG 110 or ENG 110H.
Hours: 162 (54 lecture, 108 lab)
Principles of animal taxonomy, evolution, population and community ecology; protist and animal diversity and adaptations; emphasis on vertebrate anatomy and physiology. Required for the Biological Sciences major. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
C-ID: BIOL 135S, BIOL 140, BIOL 150.
BIOL 103 Cell and Molecular Biology (5 Units)
Prerequisites: CHEM 155 or CHEM 104, MATH 107 or MATH 110C or MATH 137C or SS 110C or equivalent based on SBCC's Assessment Center placement via multiple measures.
Course Advisories: ENG 110 or ENG 110H.
Hours: 162 (54 lecture, 108 lab)
Cell structure and function: molecular architecture, reproduction and growth; mechanisms of genetics; intercellular communication; cell and organ system physiology; life's origin. Study scientific literature with instruction in critical thinking, composition and logical analyses of ideas and experiments. Required for Biological Sciences majors. Satisfies SBCC General Education requirement in Communication and Analytical Thinking.
SBCC General Education: SBCCGE Area A, SBCCGE Area D2
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 103 maximum credit, 5 units.
C-ID: BIOL 135S, BIOL 190.

BIOL 110 Natural Science (3 Units)
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Physical and chemical principles underlying biological architecture and function. In combination with BIOL 141, BIOL 110 satisfies General Education requirement in Natural Sciences.
Transfer Information: CSUGE Area B1, CSUGE Area B2, IGETC Area 5B, IGETC Area 5A, IGETC Area 5B, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 110 and 110H combined: maximum credit, one course.

BIOL 110H Natural Science, Honors (4 Units)
Limitations on Enrollment: Acceptance into the Honors Program.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 72 (72 lecture)
Introduction to the physical and chemical principles important to an understanding of biological architecture and function. Laboratory and field investigations of forces, light and biomaterial; optimal form; bioenergetics; functional design. Satisfies SBCC General Education requirement in Natural Sciences.
Transfer Information: CSUGE Area B1, CSUGE Area B2, CSUGE Area B3, IGETC Area 5A, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 110 and 110H combined: maximum credit, one course.

BIOL 112 Evolution And Adaptation (3 Units)
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Principles of biological evolution, diversity of life on Earth, and a survey of living and extinct organisms. Investigates theories of life's origin, modes of speciation and adaptations of dominant life forms through the ages. In combination with BIOL 141, BIOL 112 satisfies General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

BIOL 116 Biological Illustration (4 Units)
Course Advisories: ART 120.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab)
Traditional and contemporary techniques of scientific illustration of biological subjects for technical and medical print and electronic publications.
Transfer Information: CSU Transferable

BIOL 118 Nature Photography (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Photography of biological subjects. Camera, light and the special methods of field and wildlife photography.
Transfer Information: CSU Transferable

BIOL 120 Natural History (4 Units)
Skills Advisories: Eligibility for ENG 110 or 110H Proficiency in MATH 104 or 107 or 111.
Hours: 108 (54 lecture, 54 lab)
Survey of the natural environment through studies of Earth's ecosystems: emphasis on the plant and animal inhabitants and the influences of cosmic, geological and meteorological phenomena. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable

BIOL 122 Ecology (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Organisms and populations as integrated elements of communities and ecosystems. Population structure, growth and evolution; relationships between species: competition, predation, coevolution; community structure and development; biodiversity; biogeography. Satisfies SBCC General Education Requirement in Natural Sciences when combined with Biology 123.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

BIOL 123 Ecology Laboratory (1 Unit)
Corequisites: BIOL 122.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lab)
Proficiency in MATH 104 or MATH 107 or MATH 111. Laboratory and field investigations of ecological principles. Satisfies SBCC General Education Requirement in Natural Sciences when combined with Biology 122.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable

BIOL 124 Biological Oceanography (4 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab)
Relationships between marine plants and animals and physical characteristics of Earth's oceans. Emphasis on forms of marine organisms found in the open sea, their characteristics and ecological relationships. Biological sampling techniques and physical measurements studied in laboratory and at sea.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 124 combined with EARTH 151: maximum credit, one course.
BIOL 125 Marine Biology (4 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab)
Marine plants and animals, with emphasis on local organisms and their ecological adaptations. Laboratory covers particular habitats in the littoral zone during low tides.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 125 and 126 combined: maximum credit, one course.

BIOL 126 Aquatic Ecosystems (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Proficiency in MATH 95. Diversity of life associated with marine and freshwater aquatic ecosystems; ecological relationships and adaptations to life in water.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 125 and 126 combined: maximum credit, one course.

BIOL 130 Methods In Field Biology (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 90 (36 lecture, 54 lab)
Through weekly field trips and 2-3 weekend field experiences, students will study flora and fauna of California using current biological and ecological field research methods, collect and analyze data, demonstrate leadership and group work skills, and write and present a research proposal. Students must be able to hike in rough terrain and carry bulky equipment.
Transfer Information: CSU Transferable

BIOL 133 Ecology Of Morro Bay Area (1 Unit)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 36 (9 lecture, 27 lab)
Field course of study introducing the ecology of the relatively undisturbed wetland habitats of the Morro Bay region of the central California coast (mudflats, salt marsh, rocky outer coast).
Transfer Information: CSU Transferable

BIOL 140 Principles Of Biology (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Basic principles of cells, genetics, evolution, biodiversity and ecology. Designed for Natural History majors. Satisfies Natural Science General Education requirement when combined with Bio 141.
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable
UC Transfer Limit: No credit for BIOL 140 if taken after 100, 101, 102 or 103.

BIOL 141 Biology Laboratory (2 Units)
Prerequisites: BIOL 110 or.
Corequisites: BIOL 112 or BIOL 140.
Skills Advisories: Eligibility for ENG 110 or 110H or Proficiency in MATH 104 or 107 or 111.
Hours: 72 (18 lecture, 54 lab)
Laboratory investigation of biological principles and techniques of investigation. Satisfies SBCC General Education requirement in Natural Sciences when combined with BIOL 110 or 112 or 140.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: No credit for BIOL 141 unless taken after or concurrently with BIOL 112 or 140.

BIOL 142 Marine Science (3 Units)
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Introduction to oceanography and marine biology: ocean properties, marine ecology of the tropics, poles, temperate and deep-sea regions, and marine environmental concerns.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

BIOL 144 Biogeography (3 Units)
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Survey of the history, distribution and diversity of life and the methods by which biodiversity is defined and measured.
Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

BIOL 150 Biodiversity (3 Units)
Course Advisories: High school biology.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Diversity, adaptations and evolutionary history of life on Earth; principles of ecology and evolution. Examination of theories of systematics and nomenclature.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

BIOL 161 DNA and Society (3 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Introduction to DNA structures and functions, heredity, genetics, biotechnology, cloning, genetically modified organisms, and stem cells from a biological perspective; relevant ethical issues and implications for society and the individual will be explored. Satisfies SBCC General Education requirement in Natural Sciences.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

BIOL 171 Human Evolution (3 Units)
Hours: 54 (54 lecture)
Evolution of Humans from early primate ancestors to modern humans including cultural, genetic and anatomical changes.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable
UC Transfer Limit: BIOL 171, ANTH 101 and ANTH 101H combined: maximum credit, one course.
BIOL 172 Symbiosis (3 Units)
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Origins and nature of biological partnerships. Symbiotic relations from microbial landscapes to global ecology. Emphasis on ecological, behavioral and chemical exchanges between organisms and ecosystems. Transfer Information: CSUGE Area B2, CSU Transferable, UC Transferable

BIOL 291 Seminars in Biology (2 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 36 (36 lecture)
Topic or group of interrelated topics presented in seminar format by students enrolled in the course. Course content varies. Information on course content may be obtained from the Biological Sciences Department Office or SBCC Schedule of Classes.
Transfer Information: CSU Transferable

BIOL 295 Internship in Biology (1-4 Units)
Limitations on Enrollment: Student must have completed 12 units at SBCC with a G.P.A. of 2.5 and a minimum of 6 units with a G.P.A. of 3.0 in the Biological Sciences Department.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 273 (273 lab)
Structured, on-the-job experience in a field directly related to the student's area of interest in the biological sciences.
Transfer Information: CSU Transferable

BIOL 298 Independent Reading in Biology (1-4 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 192 (192 lab)
Independent literature search and/or reading of material on a topic in biology. A final report, including an annotated bibliography, is required.
Transfer Information: CSU Transferable

BIOL 299 Independent Research in Biology (1-4 Units)
Limitations on Enrollment: Student must have completed 12 units at SBCC with a G.P.A. of 2.5 and a minimum of 6 units with a G.P.A. of 3.0 in the Biological Sciences Department.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 192 (192 lab)
Independent, systematic research investigation of a problem in biology. A final report on research conducted is required. May be taken four times for credit. Course restricted to 3 repetitions
Transfer Information: CSU Transferable

Bio-Medical Sciences (BMS)

BMS 100 The Human Body (4 Units)
Course Advisories: One semester High School Biology.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab)
Structure and function of the human body. Non-technical introduction to anatomy, physiology, exercise, fitness and nutrition. Laboratory experiments in human physiology; study of human anatomical materials. Satisfies SBCC General Education requirement in Natural Sciences, and Anatomy and Physiology requirements for SBCC LVN program. Does not satisfy requirements for ADN majors.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: No credit for BIOMD 100 if taken after BIOMD 107 or 108 or 109; BIOMD 100, 107, 108, 109, and 146 combined: maximum credit, two courses.

BMS 107 Human Anatomy (4 Units)
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 108 (54 lecture, 54 lab)
Structure of the human body. Laboratory includes study of a human anatomical specimen and comparative anatomy. Transferable to all four-year institutions, including nursing schools. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOMD 100, 107, 108, 109 and 146 combined: maximum credit, two courses.
C-ID: BIOL 110B.

BMS 107D Human Anatomy Discussion (1 Unit)
Corequisites: BMS 107.
Hours: 18 (18 lecture)
Concurrent Discussion and problem solving course designed for students currently enrolled in BMS 107.
Transfer Information: CSU Transferable, UC Transferable

BMS 108 Human Physiology (4 Units)
Course Advisories: BMS 107, CHEM 101 or CHEM 104.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Functions of the human body. Laboratory emphasizes recording physiological data from each student. Transferable to all four-year institutions, including nursing schools. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BIOMD 100, 107, 108, and 146 combined: maximum credit, two courses.
C-ID: BIOL 120B.

BMS 108D Human Physiology Discussion (1 Unit)
Corequisites: BMS 108.
Hours: 18 (18 lecture)
Concurrent Discussion and problem-solving course designed for students currently enrolled in BMS 108.
Transfer Information: CSU Transferable, UC Transferable

BMS 118 Human Microanatomy (3 Units)
Course Advisories: BMS 100 or BMS 107.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Functional histology of the human body. Cell structure and function; architecture, control and integration of cells in tissues of all major organs.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

BMS 119A Human Dissection of the Head and Neck (1 Unit)
Prerequisites: BMS 107 with a minimum grade of B.
Hours: 54 (54 lab)
Directed dissection of the head and neck of the human cadaver. May be taken for one credit. This unit of credit requires 48 hours of laboratory work per semester. Graded pass/no pass.
Transfer Information: CSU Transferable
**BMS 119B Human Dissection of the Appendages (1 Unit)**
Prerequisites: BMS 107 with a minimum grade of B.
Hours: 48 (48 lab)
Directed dissection of the appendages of the human cadaver. May be taken for one credit. This unit of credit requires 48 hours laboratory work per semester. Graded Credit/No Credit only.
Transfer Information: CSU Transferable

**BMS 119C Human Dissection of the Torso (1 Unit)**
Prerequisites: BMS 107 with a minimum grade of B.
Hours: 54 (54 lab)
Directed dissection of the external and internal structures of the torso of the human cadaver. May be taken for one credit. This unit of credit requires 48 hours of laboratory work per semester.
Transfer Information: CSU Transferable

**BMS 127 Medical Microbiology (4 Units)**
Prerequisites: CHEM 101 or one year of high school chemistry or CHEM 104 or CHEM 155.
Course Advisories: BMS 108, BIOL 100.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Surveys the microorganisms that contribute to human health and human disease. Biology of bacteria, viruses, fungi, prions, and a variety of Eukaryotic organisms will be investigated; emphases includes the structural and metabolic diversity of microorganisms, and the molecular and cellular basis of host-microbe interactions.
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable

**BMS 128 Human Nutrition (3 Units)**
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Nutritional needs of the human body. Studies individual, local, national and world nutritional efforts.
Transfer Information: CSUGE Area E, CSU Transferable, UC Transferable

**BMS 128L Human Nutrition Laboratory (1 Unit)**
Corequisites: BMS 128.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lab)
Laboratory investigations of human nutrition; nutritional analysis of food; and guidelines for prevention of chronic diseases through diet.
Transfer Information: CSU Transferable, UC Transferable

**BMS 136 Biology Of Human Sexuality (3 Units)**
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Fundamental principles and current research focused on the anatomy and physiology of reproductive systems, hormonal control of reproductive cycles, diversity of sexual responses, basic genetics and heredity, early human development, pregnancy, parturition, causes and treatments of infertility, sexually transmitted infections, contraception, age-related changes in sexual function and behavior, sexual dysfunction and comparative sexual behaviors.
Transfer Information: CSUGE Area B2, CSUGE Area E, IGETC Area 5B, CSU Transferable, UC Transferable

**BMS 146 Human Form and Function (3 Units)**
Course Advisories: Chem 101.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Descriptive introduction to the structure and function of the human body.
Transfer Information: CSUGE Area B2, CSU Transferable, UC Transferable
UC Transfer Limit: BMS 100, 107, 108, and 146 combined: maximum credit, two courses.

**BMS 157 General Microbiology (4 Units)**
Prerequisites: CHEM 101 or one year of high school chemistry and a minimum grade of C or CHEM 104 or CHEM 155.
Course Advisories: BIOL 100, BMS 108.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Surveys the biology and ecology of various microbial taxa: bacteria, archaea, viruses, fungi, protists, and microscopic animals. Emphasis placed on their symbiotic roles in nature, as well as on their evolution, taxonomy, metabolism, and genetics. Associated biotechnological techniques and industrial applications are explored.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable

**Botany (BOT)**

**BOT 100 Concepts Of Botany (4 Units)**
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Plant structure and function; the role of plants in the biosphere and society. Laboratory includes field studies. Designed for non-Biological Sciences majors with no prior general botany course. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: No credit for BOT 100 if taken after BOT 121; BOT 100, 121, and 122 combined: maximum credit, two courses.

**BOT 121 Plant Diversity (4 Units)**
Course Advisories: BIOL 100.
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 108 (54 lecture, 54 lab)
Plant diversity, adaptations and evolutionary history; principles of ecology and evolution. Satisfies SBCC General Education requirement in Natural Sciences.
SBCC General Education: SBCCGE Area A
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BOT 100, 121, and 122 combined: maximum credit, two courses.

**BOT 122 Flowering Plant Identification (3 Units)**
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 90 (36 lecture, 54 lab)
Botanical classification, methods of identification and recognition of important California plant species and families.
Transfer Information: CSUGE Area B2, CSUGE Area B3, IGETC Area 5B, IGETC Area 5C, CSU Transferable, UC Transferable
UC Transfer Limit: BOT 100, 121 and 122 combined: maximum credit, two courses.
**BOT 123 Field Botany (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 90 (36 lecture, 54 lab)
Flora, vegetation and major ecological features of natural ecosystems; field lectures, laboratories and camping. Five one-day field trips; a fee is charged.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**BOT 129 Survey Of Earth's Vegetation (3 Units)**
Skills Advisories: Eligibility for ENG 110 or 110H.
Hours: 54 (54 lecture)
Diversity and structure of Earth's vegetation types and associated environmental factors responsible for these natural associations. Consideration is given to the preservation, destruction and reconstruction of native vegetation.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**Zoology (ZOOL)**

**ZOOL 110 Animal Physiology (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H and proficiency in MATH 104 or 107 or 111.
Hours: 54 (54 lecture)
How animals work. Animal physiological systems, perception of and responses to external stimuli, integration of activities, maintenance of the internal environment, locomotion and reproduction.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**ZOOL 122 Animal Diversity (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
SBCC General Education: SBCCGE Area A Lecture
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**ZOOL 123 Animal Diversity Laboratory (1 Unit)**
Corequisites: ZOOL 122.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lab)
Laboratory and field investigations of animals. Animal diversity, anatomy and physiology, principles of ecology and evolution. Satisfies SBCC General Education requirement in Natural Sciences when combined with ZOOL 122.
SBCC General Education: SBCCGE Area A Lab
Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable

**ZOOL 124 Insect Biology (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Introduction to anatomy, physiology, ecology, behavior and diversity of insects and other terrestrial arthropods.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**ZOOL 137 Ornithology (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Systematics, distribution, physiology, behavior, and ecology of birds. Emphasis on diversity, functional morphology and evolutionary history.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable

**ZOOL 138 Biology Of Birds (1.5 Unit)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 45 (18 lecture, 27 lab)
Eight-week short course. Anatomy, physiology, evolution and behavior of birds. Field trips are timed to coincide with migratory periods and emphasize identification and classification.
Transfer Information: CSU Transferable

**ZOOL 140 Animal Behavior (3 Units)**
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (54 lecture)
Introduction to animal behavior; methods and results of studies of invertebrate and vertebrate behavior; foraging strategies, social competition, sexual selection, mating systems, cooperation and social organization.
Transfer Information: CSUGE Area B2, IGETC Area 5B, CSU Transferable, UC Transferable