

**Note:** May be taken 3 times for increased proficiency by utilizing more advanced lesson plans and taped lesson plans in the lab.

**Transfer acceptability:** CSU

Instrument flight including VOR navigation, holding patterns, and ILS, LOC, NDB, and VOR approaches through use of a ground trainer.

**AVIA 140 Aviation Mathematics and Modern Navigation Systems (3)**

(Formerly AERO 140)

3 hours lecture

**Transfer acceptability:** CSU

The nature and properties of numbers and arithmetic operations utilizing the flight computer for improvement in operational efficiency and applications involving all forms of air navigation. Basic principles of modern navigation systems such as Loran, INS/IRS, R NAV, TCAS, GPWS, Flight Directors, and GPS will be examined.

**AVIA 145 Glass Cockpits and GPS Navigation (1)**

1 hour lecture

**Transfer acceptability:** CSU

**Prerequisite:** AVIA 105 or Private Pilot Certificate

A practical examination of glass cockpit technology and global positioning system navigation in aviation.

**AVIA 197 Aviation Sciences Topics (5-4)**

(Formerly AERO 197)

**Transfer acceptability:** CSU

Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.

**Note:** May be taken 4 times.

Topics in Aviation Sciences. See class schedule for specific topic covered. Course title will designate subject covered.

**AVIA 205 Principles of Aerodynamics (3)**

(Formerly AERO 205)

3 hours lecture

**Transfer acceptability:** CSU

Introduction to the theory of flight; applications of the basic laws of physics to the principles of flight. Aircraft design is considered with respect to airfoils, wings, viscous effects, propellers, and aircraft performance.

**AVIA 210 Aviation Safety and Accident Investigation (3)**

(Formerly AERO 210)

3 hours lecture

**Prerequisite:** AVIA 105 or Private Pilot Certificate

**Transfer acceptability:** CSU

Accident prevention principles through a study of recent mishaps. Pilot physical and psychological factors and their role in mishaps. A study of crash survival and post crash survival techniques. Fundamentals of mishap investigation and reporting.

**AVIA 215 Complex Aircraft Systems and Propulsion (3)**

(Formerly AERO 215)

3 hours lecture

**Prerequisite:** AVIA 105 or Private Pilot Certificate

**Transfer acceptability:** CSU

Turboprop and turbojet engines and their operation. Electrical, pressurization, hydraulic, and fuel systems will be examined.

**AVIA 220 Regional Airline Aircraft Systems (3)**

(Formerly AERO 220)

3 hours lecture

**Prerequisite:** AVIA 105

**Transfer acceptability:** CSU

Engine, fuel, hydraulic, electrical, flight control, pressurization, ice protection, pneumatic, warning, and navigation systems of a typical regional airline jet will be examined. Aircraft performance will be calculated.

**AVIA 295 Directed Study in Aviation Sciences (1,2,3)**

(Formerly AERO 295)

3, 6, or 9 hours field work

**Prerequisite:** AVIA 100 and approval of project proposal

**Note:** May be taken 4 times

**Transfer acceptability:** CSU

Individual study in field or library within the field of air transportation.

## Biology (BIOL)

Contact the Life Sciences Department for further information.

(760) 744-1150, ext. 2275

Office: NS-207A

### Associate in Arts Degrees -

AA Degree requirements are listed in Section 6 (green pages).

- Biology - General
- Biology - Preprofessional

### Certificates of Achievement -

Certificate of Achievement requirements are listed in Section 6 (green pages).

- Biology - General
- Biology - Preprofessional

## PROGRAMS OF STUDY

### Biology – General

#### A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements	Units
BIOL 200 Foundations of Biology I	5
BIOL 201 Foundations of Biology II	5
ZOO 100 or ZOO 101/101L General Zoology Animal Kingdom	4
<b>Group One (Select 3-4 units)</b>	
BOT 101/101L General Botany	4
BOT 110 Botany of Spring Wildflowers	4
BOT 115 Plants and People	3
<b>Group Two (Select 4-5 units)</b>	
BIOL 114/114L Ecosystem Biology	4.5-5
BIOL 118/118L General Ecology	4
BIOL 130 or BIOL 131/131L Marine Biology Marine Biology	4
ZOO 115 or ZOO 116/116L Natural History of Animal Life Natural History of Animal Life	4
<b>Group Three (Select 9-11 units)</b>	
Biology Any course not used above (100 and up)	
Botany Any course not used above	
Microbiology Any course	
Zoology Any course not used above	

**MINIMUM TOTAL UNITS 32**

Recommended Electives: BIOL 215; CHEM 100, 110, 110L, 115, 115L; MATH 110, 115, 135; CSIT 105

### Biology-Preprofessional

Provides intensive lower division preparation for pursuing advanced studies in biological science, premedical, pre dental, or preveterinarian programs leading towards a Bachelor's degree and beyond.

Students are advised to consult catalogs of the institution to which they plan to apply to determine special or additional requirements, or see a Palomar College Counselor.

### A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
BIOL 200	Foundations of Biology I	5
BIOL 201	Foundations of Biology II	5
CHEM 110/110L	General Chemistry and Laboratory	5
CHEM 115/115L	General Chemistry and Laboratory	5
CHEM 220	Organic Chemistry	5
CHEM 221	Organic Chemistry	5
MATH 140	Calculus/Analytic Geometry, First Course	5
MATH 141	Calculus/Analytic Geometry, Second Course	4
<b>TOTAL UNITS</b>		<b>39</b>

Recommended Electives: BIOL 215; MATH 205; PHYS 230, 231, 232; ZOO 203

### COURSE OFFERINGS

Courses numbered under 50 are non-degree courses.

Courses numbered under 100 are not intended for transfer credit.

\*UC credit limitations –

- BIOL 100, 101/101L, 102 and 200 combined: maximum credit, 4 units
- No credit for BIOL 100 and 101/101L if taken after 200 or 201
- No credit for BIOL 102 if taken after 100, 101/101L or 200 or 201
- BIOL 105, 106/106L and ZOO 145/145L combined: maximum credit, 4 units
- BIOL 114/114L, 118/118L combined: maximum credit, 4 units
- BIOL 130 and 131/131L combined: maximum credit 4 units
- BIOL 185, FCS 165, FCS 185, and HE 165 combined: maximum credit, one course
- BIOL 215, MATH 120, SOC 205, and PSYC 205 combined: maximum credit, one course

#### BIOL 45A Field Studies in Natural History (.5,1,2,3)

1, 2, 4, or 6 hours lecture/laboratory

**Note:** May be taken 4 times; designed for families. Recommended for children between the ages of 8-14. Parent or guardian must accompany children. See class schedule or contact the Life Sciences Department for locality to be visited, and more information. Fee charged.

Field studies of plant and animal species encountered in various habitats, including systematics and major structural and functional characteristics of the taxonomic groups to which these species belong, and emphasizing each species particular adaptations that favor its survival in its natural habitat.

#### BIOL 47 Biology Topics (.5-4)

Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.

**Note:** May be taken 4 times

Topics in Biology. See class schedule for specific topic covered. Course title will designate subject covered.

#### BIOL 100 General Biology (4)

3 hours lecture-3 hours laboratory

**Note:** Not open to students with prior credit in BIOL 101 or 101L, BIOL 102, BIOL 105, BIOL 106/106L.

**Transfer acceptability:** CSU; UC\*; CAN BIOL 2

Basic principles of general biology as they relate to the cellular, organismic, and population levels of organization. Includes cell ultrastructure and function, energy transfer, reproduction, genetics, evolution, diversity of organisms, and ecology. Not recommended for students interested in Biology, Zoology, Botany, Premed, or related majors (see Biology 200 and Biology 201).

#### BIOL 101 General Biology (Lecture) (3)

3 hours lecture

**Note:** Not open to students with prior credit in BIOL 100

**Transfer acceptability:** CSU; UC\*; BIOL 101+101L= CAN BIOL 2

Basic principles of general biology as they relate to the cellular, organismic, and population levels of organization. Includes cell ultrastructure and function, energy transfer, reproduction, genetics, evolution, diversity of organisms, and ecology.

#### BIOL 101L General Biology (Laboratory) (1)

3 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 101 or BIOL 114

**Note:** Not open to students with prior credit in BIOL 100, BIOL 102, BIOL 105, BIOL 106/106L.

**Transfer acceptability:** CSU; UC\*; BIOL 101+101L= CAN BIOL 2

Laboratory exercises in cell structure and function, energy transfer, reproduction, genetics, and ecology. This is a general education course intended for non-science majors.

#### BIOL 102 Molecules and Cells (4)

3 hours lecture-3 hours laboratory

**Recommended preparation:** MATH 50

**Transfer acceptability:** CSU; UC\*

The basic principles of biological systems including the chemistry of life, cell structure and function, energy transfer, reproduction, and genetics.

#### BIOL 105 Biology with a Human Emphasis (4)

3 hours lecture-3 hours laboratory

**Note:** Not open to students with prior credit in BIOL 100, BIOL 101/101L, BIOL 102, BIOL 106/106L.

**Transfer acceptability:** CSU; UC\*

Principles of cellular, organismal and population biology as exemplified by, and relating to, the human organism. Laboratory includes study of cells, tissues, and mammalian organ systems.

#### BIOL 106 Biology with a Human Emphasis (Lecture) (3)

3 hours lecture

**Note:** Not open to students with prior credit in BIOL 100, BIOL 101/101L, BIOL 102, BIOL 105

**Transfer acceptability:** CSU; UC

Principles of cellular, organismal and population biology as exemplified by, and relating to, the human organism.

#### BIOL 106L Biology with a Human Emphasis (Laboratory) (1)

3 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 106

**Note:** Not open to students with prior credit in BIOL 100, BIOL 101/101L, BIOL 102, BIOL 105

**Transfer acceptability:** CSU; UC

Laboratory experiences designed to demonstrate cellular structure and function as they relate to the human organism. An examination of major body systems is included.

#### BIOL 110 Human Genetics (3)

3 hours lecture

**Transfer acceptability:** CSU; UC

Principles of human inheritance including gene transmission, genetic diseases, pedigree analysis, molecular genetics, immunogenetics, and population genetics; relationships to other fields of study will be emphasized.

#### BIOL 114 Ecosystem Biology (Lecture) (3)

3 hours lecture

**Note:** See also BIOL 114L

**Transfer acceptability:** CSU; UC\*

Basic principles of general biology as they relate to exemplary ecosystems.

#### BIOL 114L Ecosystem Biology (Laboratory) (1.5,2)

4½, or 6 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 101 or 114

**Note:** A fee is required, and additional costs may be incurred. Contact the Life Sciences Department or see the schedule of classes for specific information about the laboratory field sites, dates and fees.

**Transfer acceptability:** CSU; UC\*

Laboratory and field experiences to illustrate and observe biology as it relates to exemplary ecosystems. Typical field sites include the Greater Yellowstone ecosystem, Central America, or the Sea of Cortez.

- BIOL 118 General Ecology (Lecture)** (3)  
3 hours lecture  
**Transfer acceptability:** CSU; UC\*  
Basic concepts of evolution, population ecology, community ecology, and ecosystem ecology.
- BIOL 118L General Ecology (Laboratory)** (1)  
3 hours laboratory  
**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 118  
**Transfer acceptability:** CSU; UC\*  
Provides hands-on experiences with ecological concepts, methods, and problem-solving techniques by using the plants and animals of local communities in their natural settings. The majority of laboratory sessions will be devoted to off-campus field studies.
- BIOL 130 Marine Biology** (4)  
3 hours lecture-3 hours laboratory  
**Note:** Not open to students with prior credit in BIOL 131 or 131L  
**Transfer acceptability:** CSU; UC\*  
An introduction to marine biology with an emphasis on the adaptations, classification, and ecology of marine organisms as well as current issues in marine biology. A survey of local marine organisms and habitats. Participation on field trips as scheduled is required.
- BIOL 131 Marine Biology (Lecture)** (3)  
3 hours lecture  
**Note:** Not open to students with prior credit in BIOL 130  
**Transfer acceptability:** CSU; UC\*  
An introduction to marine biology with an emphasis on the adaptations, classification, and ecology of marine organisms as well as current issues in marine biology.
- BIOL 131L Marine Biology (Laboratory)** (1)  
3 hours laboratory  
**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 131  
**Note:** Not open to students with prior credit in BIOL 130  
**Transfer acceptability:** CSU; UC\*  
A survey of local marine organisms and local marine habitats. A field trip oriented course; participation on field trips as scheduled is required.
- BIOL 135 Marine Mammals: Biology and Ecology** (3)  
3 hours lecture  
**Note:** Cross listed as ZOO 135  
**Transfer acceptability:** CSU; UC  
Basic biology and ecology of marine mammals. Special emphasis on behavior, adaptations, and conservation.
- BIOL 160 Biotechnology Preparatory Course** (5)  
3 hours lecture-6 hours laboratory  
**Recommended preparation:** MATH 50  
**Transfer acceptability:** CSU  
This course is intended as a preparation course for students interested in further studies in biotechnology. The course provides the basic knowledge in math, chemistry, biology, and microbiology for additional biotechnology coursework. Topics include the fundamental chemical processes common in prokaryotic and eukaryotic biology, chemistry of biomolecules, cellular and molecular biology, gene expression and genetic engineering. The laboratory experience provides basic skills and techniques essential to advanced biotechnology courses.
- BIOL 161 Biotechnology Methods** (4)  
2 hours lecture-6 hours laboratory  
**Prerequisite:** MATH 50, BIOL 100 and CHEM 100, or MATH 50 and BIOL 102, or MATH 50 and BIOL 160, or MATH 50 and BIOL 200  
**Transfer acceptability:** CSU  
Biotechnology Methods includes current basic theory and laboratory skills used in biotechnology industry. Lectures cover concepts such as recombinant DNA technology and basic protein biochemistry. The laboratory illustrates lecture topics through preparing a recombinant plasmid, transformation of the recombinant plasmid into a suitable bacterial host, verification of the process by identification and analysis of the recombinant bacteria, growth of the recombinant bacteria, expression of the protein encoded by the recombinant plasmid and purification and analysis of the expressed protein.
- BIOL 185 Science of Human Nutrition** (3)  
3 hours lecture  
**Note:** Cross listed as FCS 185  
**Transfer acceptability:** CSU; UC  
Science of food, nutrients, and other substances therein; processes by which the organism ingests, digests, absorbs, transports, utilizes, and excretes food substances. Emphasis on biological, chemical, and physiological implications to human nutrition.
- BIOL 195A Field Studies in Natural History** (1,2,3)  
2, 4, or 6 hours lecture/laboratory  
**Note:** Fee charged; may be taken 4 times  
**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.  
Field studies of plant and animal species encountered in various habitats, including systematics and major structural and functional characteristics of the taxonomic groups to which these species belong, and emphasizing each species' particular adaptations that favor its survival in its natural habitat. See Class Schedule for locality to be visited.
- BIOL 195B Field Studies in Ecology** (1,2,3)  
2, 4, or 6 hours lecture/laboratory  
**Note:** Fee charged; may be taken 4 times  
**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.  
Field study of the fauna and biota of selected geographic regions, with emphasis placed upon field identification, observation and interpretation of behavioral and ecological interrelationships of living things to their environment and to one another. See Class Schedule for locality to be visited.
- BIOL 195C Field Studies in Marine Biology** (1,2,3)  
2, 4, or 6 hours lecture/laboratory  
**Note:** Fee charged; may be taken 4 times  
**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.  
Field study of the fauna and biota of marine intertidal and subtidal habitats of selected geographic regions, with emphasis placed upon field identification, observation and interpretation of behavioral and ecological interrelationships of living things to their environment and to one another. See Class Schedule for locality to be visited.
- BIOL 195D Field Studies in Island Ecology** (1,2,3)  
2, 4, or 6 hours lecture/laboratory  
**Note:** Fee charged; may be taken 4 times  
**Transfer acceptability:** CSU  
Field study of the unique ecology of islands, emphasizing systematics, speciation, observation and interpretation of the interactions of indigenous and exotic biota, and how the biotic communities of the study island(s) have adapted to the special limitations of their confined environments. See Class Schedule for locality to be visited.
- BIOL 195E Field Studies in Tropical Biology** (1,2,3)  
2, 4, or 6 hours lecture/laboratory  
**Note:** Fee charged; may be taken 4 times  
**Transfer acceptability:** CSU  
Field study in the fauna and flora of selected tropical regions, with emphasis placed upon field identification, observation and interpretation of behavioral and ecological interrelationships of living things to their environment and to one another. See Class Schedule for locality to be visited.
- BIOL 197 Biology Topics** (5-4)  
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.  
**Note:** May be taken 4 times

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.  
Topics in Biology. See Class Schedule for specific topic offered. Course title will designate subject covered.

**BIOL 200 Foundations of Biology I (5)**

3 hours lecture-6 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, CHEM 110

**Transfer acceptability:** CSU; UC\*

Molecular and cellular biology. Transmission, molecular, and population genetics. Aspects of reproduction of prokaryotes and eukaryotes. Principles of evolution and systematics. Recommended for biology majors.

**BIOL 201 Foundations of Biology II (5)**

3 hours lecture-6 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, BIOL 200

**Transfer acceptability:** CSU; UC\*

An examination of the diversity of life, as seen in the Eubacteria, Archaea, and Eukarya, emphasizing the integration of structure and function, development, life histories, phylogenetics, animal behavior, and ecology. Recommended for biology majors.

**BIOL 215 Introduction to Biostatistics (4)**

3 hours lecture-3 hours laboratory

**Prerequisite:** A minimum grade of 'C' in MATH 110, and a minimum grade of 'C' in BIOL 201

**Note:** This course does not qualify for mathematics credit

**Transfer acceptability:** CSU; UC\*; max credit for one course: BIOL 215, PSYC 205, or SOC 205 and MATH 120, one course

An introduction to the quantitative analysis of biological data. Founded on the principles of the scientific process, this course provides experience in the design of biological experiments and the appropriate analysis and interpretation of biological data.

**BIOL 295 Directed Study in Life Science (1,2,3)**

3, 6, or 9 hours laboratory

**Prerequisite:** Approval of project or research by department chairperson

**Note:** May be taken 4 times

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.

Independent study for students who have demonstrated skills and/or proficiencies in biology subjects and have the initiative to work independently on projects or research outside the context of regularly scheduled classes. Students will work under the personal supervision of an instructor.

## Botany (BOT)

Contact the Life Sciences Department for further information.

(760) 744-1150, ext. 2275

Office: NS-207A

### COURSE OFFERINGS

**BOT 100 General Botany (4)**

3 hours lecture 3 hours laboratory

**Note:** Not open to students with prior credit in BOT 101 or 101L.

**Transfer acceptability:** CSU; UC – BOT 100 and 101/101L combined: maximum credit, 4 units; CAN BIOL 6

The diversity, structure, and function of major plant groups including cellular metabolism, soil water relationships, classification, genetics, life cycle patterns, growth, and the basic ecological and evolutionary concepts of botany. This is a general education course intended for non-science majors.

**BOT 101 General Botany Lecture (3)**

3 hours lecture

**Note:** Not open to students with prior credit in BOT 100

**Transfer acceptability:** CSU; UC – BOT 100 and 101/101L combined: maximum credit, 4 units

The diversity, structure, and function of major plant groups including cellular metabolism, soil water relationships, classification, genetics, life cycle patterns, growth, and the basic ecological and evolutionary concepts of botany.

**BOT 101L General Botany Laboratory (1)**

3 hours laboratory

**Prerequisite:** Completion of, or concurrent enrollment in, BOT 101

**Note:** Not open to students with prior credit in BOT 100

**Transfer acceptability:** CSU; UC – BOT 100 and 101/101L combined: maximum credit, 4 units

A laboratory course in plant biology. Special emphasis on the structure, growth, function, genetics, and life cycles of major plant groups. This is a general education course intended for non-science majors.

**BOT 110 Botany of Spring Wildflowers (4)**

3 hours lecture-3 hours laboratory

**Transfer acceptability:** CSU; UC

The identification, distribution, and interrelationships of plants in their natural environment; ecological principles; and representative plant communities. Special emphasis will be given to the study of plant families and the use of taxonomic keys.

**BOT 115 Plants and People (3)**

3 hours lecture

**Transfer acceptability:** CSU; UC – No credit if taken after 100 or 101/101L

The role of plants in the world ecosystem, including past and present cultural and economic uses for food, medicine, and industrial products. Principles of plant structure and function, with selected topics on plant diversity, plant adaptations, and the interrelationships between plants and people will also be discussed.

**BOT 195 Field Study of Native Plants (1,2,3)**

2, 4, or 6 hours lecture/laboratory

**Note:** May be taken 4 times

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.

Extended field study of the flora of selected geographical areas including habitats, adaptations, and identification of native and naturalized species. See Class Schedule for locality to be visited. Fee charged.

**BOT 197 Botany Topics (.5-4)**

Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.

**Note:** May be taken 4 times

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus. Topics in Botany. See Class Schedule for specific topic offered. Course title will designate subject covered.

## Business (BUS)

See also Accounting, Business Management, Insurance, International Business, Legal Studies, Office Information Systems, Paralegal Studies, Real Estate

Contact the Business Administration Department for further information.

(760) 744-1150, ext. 2488

Office: B-18

### Associate in Arts Degrees -

AA Degree requirements are listed in Section 6 (green pages).

- Advertising, Marketing, and Merchandising
- Business Administration
- Business - General
- Internet - Emphasis in Business Education

### Certificates of Achievement -

Certificate of Achievement requirements are listed in Section 6 (green pages).

- Advertising, Marketing, and Merchandising
- Internet - Emphasis in Business Education
- Retail Management

### Certificates of Proficiency -

Certificate of Proficiency requirements are listed in Section 6 (green pages).

- E-Business
- Entrepreneurship
- Salesperson - Retail

