AVIA 105 Basic Pilot Ground School (3)
3 hours lecture
Transfer acceptability: *CSU*
A study of Federal Aviation Regulations, flight data, aerodynamics, weather and navigation, radio communications, aircraft and engine operation, flight instruments, and aircraft performance. Prepares the student for the Federal Aviation Administration's Private Pilot written examination.

AVIA 106 Commercial Pilot Ground School (3)
3 hours lecture
Prerequisite: *Private Pilot Certificate or AVIA 105 with concurrent or prior flight training*
Transfer acceptability: *CSU*
A comprehensive study of aircraft performance, Federal Aviation Regulations, navigation, flight charts and graphs, radio navigation and communications, meteorology, emergency procedures, aerodynamics, flight instruments, and multi engine procedure. Prepares the student for the Federal Aviation Administration's Commercial Pilot written examination.

AVIA 107 Instrument Pilot Ground School (3)
3 hours lecture
Prerequisite: *Private Pilot Certificate or AVIA 105 with concurrent or prior flight training*
Transfer acceptability: *CSU*
The rules and regulations for instrument flight, interpretation of flight instruments, air navigation, meteorology, instrument flight techniques, air traffic control, and flight planning. Prepares the student for the Federal Aviation Administration's Instrument written examination.

AVIA 120 Aviation Weather (3)
3 hours lecture
Transfer acceptability: *CSU*
Basic principles relating to weather with particular emphasis placed upon the relationship of weather to aviation. Practical instruction is given in the use and interpretation of weather reports, forecasts, and charts.

AVIA 145 Glass Cockpits and GPS Navigation (1)
1 hour lecture
Transfer acceptability: *CSU*
Prerequisite: *A minimum grade of 'C' in AVIA 105 or Private Pilot Certificate*
A practical examination of glass cockpit technology and global positioning system navigation in aviation.

Biology (BIOL)

Contact the Life Sciences Department for further information.
(760) 744-1150, ext. 2275
Office: NS-207A

Associate in Science Degrees -

AS 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

Provides intensive lower division preparation for pursuing advanced studies in the Biological Sciences leading towards a Bachelor's Degree and beyond.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		
BIOL 200	Foundations of Biology I	5
BIOL 201	Foundations of Biology II	5
CHEM 110	General Chemistry	3
CHEM 110L	General Chemistry Laboratory	2
Group One (Select a minimum of 1 unit)		
BIOL 114L	Ecosystem Biology (Laboratory)	1 - 2
BIOL 195A	Field Studies in Natural History	1 - 3
BIOL 195B	Field Studies in Ecology	1 - 3
BOT 195	Field Study of Native Plants	1 - 3
ZOO 195D	Field Study of Birds	1 - 3
Group Two (Select a minimum of 16 units)		
BOT 100	General Botany	4
	or	
BOT 101	General Botany Lecture	3
	and	
BOT 101L	General Botany Laboratory	1
BIOL 110	Human Genetics	3
BIOL 114	Ecosystem Biology (Lecture)	3
BIOL 118	General Ecology (Lecture)	3
BIOL 118L	General Ecology (Laboratory)	1
BIOL 130	Marine Biology	4
	or	
BIOL 131	Marine Biology (Lecture)	3
	and	
BIOL 131L	Marine Biology (Laboratory)	1
BIOL/ ZOO 135	Biology of Marine Mammals	3
BIOL/ NUTR 185	Science of Human Nutrition	3
BIOL 295	Directed Study in Life Science	1 - 3
MICR 200	Fundamentals of Microbiology	4
ZOO 100	General Zoology	4
	or	
ZOO 101	General Zoology (Lecture)	3
	and	
ZOO 101L	General Zoology (Laboratory)	1
ZOO 120	Animal Behavior	3
ZOO 145	Introduction to Anatomy and Physiology	3
ZOO 145L	Introduction to Anatomy and Physiology Laboratory	1
ZOO 200	Anatomy	4
ZOO 203	Physiology	4
ZOO 295	Directed Study in Zoology	1 - 3
MINIMUM TOTAL UNITS		**32**

Recommended Electives: CHEM 100, 115, 115L; MATH 110, 115, 135, 140, 141; CSIT 105

See Catalog addendum at http://www.palomar.edu/catalog

Biology-Preprofessional

Provides intensive lower-division preparation for pursuing advanced studies in biological science, pre-medical, pre-dental, or pre-veterinarian 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.S. 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
TOTAL UNITS		**39**

Courses in the program are based upon recommendations given to pre-med students at UC Berkeley. Actual requirements will vary from school to school and will depend on specific student goals. Students must check with the professional schools (not transfer schools) to which they plan to apply for their specific requirements. Choice of courses will also depend upon the student's major. Humanities majors, for example, can spread out pre-med coursework into their junior and senior years.

Recommended Electives: 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, 5 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 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, NUTR 165, NUTR 185, and HE 165 combined: maximum credit, one course

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 and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Non-degree Applicable
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**
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**
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: *A minimum grade of 'C' in BIOL 101 or 114, or concurrent enrollment in BIOL 101 or 114*
Note: *Not open to students with prior credit in BIOL 100, BIOL 102, BIOL 105, BIOL 106.*
Transfer acceptability: *CSU; UC**
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, cell division, classical and molecular 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, 110/110L, 102, 105*
Transfer acceptability: *CSU; UC*
Principles of cellular, organismal and population biology as exemplified by, and relating to, the human organism.

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, 1.5, 2)
3, 4½, or 6 hours laboratory
Prerequisite: *A minimum grade of 'C' in BIOL 101 or 114, 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: *A minimum grade of 'C' in BIOL 118, 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: *A minimum grade of 'C' in BIOL 131, 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 Biology of Marine Mammals (3)
3 hours lecture
Note: *Cross listed as ZOO 135*
Transfer acceptability: *CSU; UC*
The fundamentals of marine mammal biology are explored. Topics include comparative anatomy, evolution, cladistics, mammalian physiology, ecology and zoogeography, behavior and conservation as they apply to the study of marine mammals.

BIOL 185 Science of Human Nutrition (3)
3 hours lecture
Note: *Cross listed as NUTR 185*
Transfer acceptability: *CSU; UC*
Science of food, nutrients, and other substances. Processes by which humans ingest, digest, absorb, transport, utilize, and excrete foods and nutrients are explored. Emphasis on biological, chemical, and physiological implications to human nutrition and overall health. Current nutrition recommendations and controversies are analyzed from a scientific perspective.

BIOL 195A Field Studies in Natural History (1, 1.5, 2, 2.5, 3)
½-1 hours lecture - 1½-7½ hours laboratory
Prerequisite: *A minimum grade of 'C' in BIOL 100 ; or BIOL 101 ; or BIOL 130 ; or BIOL 131 ; or ZOO 100 ; or ZOO 101 ; or BIOL 114 ; or BOT 100 ; or BOT 101*
Note: *Fee charged*
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, 1.5, 2, 2.5, 3)
½-1 hours lecture - 1½-7½ hours laboratory
Prerequisite: *A minimum grade of 'C' in BIOL 100 ; or BIOL 101 ; or BIOL 130 ; or BIOL 131 ; or ZOO 100 ; or ZOO 101 ; or BIOL 114 ; or BOT 100 ; or BOT 101*
Note: *Fee charged*
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 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 and/or laboratory may be scheduled by the department. Refer to Class Schedule.
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: *A minimum grade of 'C' in CHEM 110, 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: *A minimum grade of 'C' in BIOL 200, 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 295 Directed Study in Life Science (1, 2, 3)
3, 6, or 9 hours laboratory
Prerequisite: *Approval of project or research by department chairperson*
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*
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.