

AT R033—Automotive Emission and Fuel Control Systems **4 units**

*Advisory: AT R010.
3 hours lecture, 3 hours lab weekly*

This course covers a brief history of air pollution, automotive emissions control laws, and control systems. The basic emission controls such as positive crankcase ventilation, air injection, evaporative controls, catalytic converters, and computer control systems will be covered in depth. Emission testing equipment approved by the State of California will be used on vehicles. Students will study emission failing vehicles and principles of diagnosis to correct excessively polluting vehicles. Fuel injection systems will be studied and tested. Preparation for the ASE (Automotive Service Excellence) certification test is included. Field trips may be required.

AT R045—Enhanced Clean Air Car Course, State of California **5 units**

*Advisory: AT R013 and AT R015 or student must be an automotive major or have at least two years of automotive experience.
4 hours lecture, 3 hours lab weekly*

This course is for automotive technology majors or employed auto technicians who are preparing to take the Bureau of Automotive Repair, State of California (BAR) Enhanced Clean Air Car Course Exam. This course covers automotive fuel systems, electrical systems, computer control systems, emission controls, and inspection procedures. This course will follow the state mandated lesson outline. The laws and regulations related to automotive repair in California will be covered in this course. Official vehicle inspection procedures will be taught in this course. Field trips may be required. Formerly AT R021.

AT R050—Automotive Steering and Suspension **6 units**

*Advisory: AT R010.
5 hours lecture, 3 hours lab weekly*

This course is for the automotive student, who wants to understand automotive steering and suspension systems. This course provides the technical skills and preparation required in diagnosis, adjustment, replacement and repair of all types of suspension systems commonly used in the automotive industry. Factory type scan tools will be used for interaction with the vehicle steering and suspension control systems. Skills used for diagnosing body computer systems will be taught as part of the course. Preparation for the ASE certification exam is included. Field trips may be required.

AT R088—California Bureau of Automotive Repair Smog License Update Class **1 units**

Advisory: This course is for persons holding a current State of California Smog Inspection License and candidates for the Smog Inspection License.

¾ hour lecture, ¾ hour lab weekly

This short course will cover selected areas of automotive technology. This course will meet the smog license update training requirements of the State of California, Bureau of Automotive Repair. Field trips may be required. (1)

AT R098—Short Courses in Automotive Mechanics **½-10 units**

Lecture and/or lab hours as required by unit formula

Specialized topics designed to inform or update interested persons in various disciplines within the auto repair industry. Length of course determines unit credit.

BIOLOGICAL SCIENCES

Biology courses at Oxnard College introduce the student to gross anatomy, histology of human organ systems, the basic principles of molecular and cellular biology, lower division biochemistry which offers the study of biochemical and cellular design and the regulation of that metabolism. Basic laboratory techniques are employed for plant and animal tissue, organ culture preparation and virus cultivation. Directed Studies furthers the knowledge of Biology on an independent study basis.

An Associate in Arts Degree in Biology is offered.

*For more information, contact:
Christiane Mainzer, cmainzer@vcccd.edu
(805) 986-5800, ext. 1930*

Career Opportunities

(Most careers require a bachelor's and advanced degree)

Biological Technician	Public Health Biologist
Health Technician	Laboratory Technician
Clinical Lab Technologist	Research Technician
Marine Biology	Forestry & Wildlife Biology
Environmental Policy	Ecology
Biotechnology	Fisheries
Zoology	

Faculty

Full-Time	Part-Time	Part-Time
Michael Abram	Kevin Flint	Michael Nicholson
Lorraine Buckley	Joe Frantz	Jan Schienle
James Harber	Gabriel Garcia	Bryan Swig
Shannon Newby	Melissa Graham	Rachel Ulrich
	Stephanie Mutz	Neil Ziegler

◆ Biology

Associate in Arts Degree

Program under revision. See General Studies Degree - Patterns II & III with Natural Sciences or Mathematics emphasis.

Core Courses:	Units
BIOL R120 Principles of Biology I	4
BIOL R120L Principles of Biology I Lab	1
BIOL R122 Principles of Biology II	4
BIOL R122L Principles of Biology II Lab	1
BIOL R199 Directed Studies in Biology	2

Required Units from Core Courses **12**

Elective Courses: Units

Students must select at least 15 units from Group A and at least 13 units from Group B.

Group A:	Units
CHEM R120 General Chemistry I	5
CHEM R122 General Chemistry II	5
CHEM R130 Organic Chemistry I	5
MATH R105 Introductory Statistics	5
MATH R120 Calculus with Analytic Geometry I	5
MATH R121 Calculus with Analytic Geometry II	5
PHYS R131 Physics for Scientists & Engineers 1	5
PHYS R132 Physics for Scientists & Engineers 2	5

Group B:		Units
BIOL R130	Biochemistry	3
BIOL R135	Molecular Biology	3
BIOL R135L	Molecular Biology Laboratory	2
BIOL R140L	Tissue Culture Laboratory	3
BIOL R145L	Applied Microbiology Laboratory	3
BIOL R150L	Biotechnology Laboratory	3
BIOL R170	Biological Marine Resource Management	1
MICR R100	Principles of Microbiology	3
MICR R100L	Principles of Microbiology Lab	2
PHSO R101	Human Physiology	5
Required Units from Elective Groups A & B		28
Total Required Units		40

Program Student Learning Outcomes

Upon successful completion of the Biology program students will be able to:

- Students will use logic and the scientific method to draw well supported conclusions from information provided.
- Students will display written and verbal competency in the description and analysis of biological subject matter and data.
- Students will integrate ideas and values from different disciplines (i.e. mathematics, chemistry) to explain biological concepts or ideas.
- Students will conduct research and information gathering using a variety of sources such as texts, tables, graphs, maps, media, personal communication, observation, and electronic databases.
- Students will understand and communicate complex relationships between natural and human systems.
- Students will be able to recognize applications of biology in everyday life.
- Students will be able to acquire knowledge and skills sufficient to allow one to pursue more advanced study in biological sciences or find employment in biology-related fields.



Anatomy Courses

ANAT R101—General Human Anatomy **4 units**

Prerequisites: BIOL R101 or BIOL R120.

2 hours lecture, 6 hours lab weekly

This course is organized into two parts: lecture and laboratory. The lecture portion is an introduction to gross anatomy as well as organization and histology of human organ systems. The laboratory portion reinforces the lecture material and consists of hands-on experiments and demonstrations used to illustrate the principles and concepts of anatomy. These include but are not limited to microscope use, model and specimen examination, dissection of the cat as well as other livestock organs and demonstration of the dissected human cadaver. This course is appropriate and meets the requirements of students anticipating transfer to university, medical school, dental school, holistic medicine, kinesiology programs and other health care certificated programs. Field trips may be required. (2)

Transfer credit: UC, CSU

Biology Courses

BIOL R100—Marine Biology **3 units**

3 hours lecture weekly

This course is a broad survey of the plants and animals found in the oceans. Topics include an overview of marine plants, invertebrates, fish, and mammals, a survey of marine habitats including coral reefs, kelp forests, and the deep sea, and an introduction to Oceanography. We will also discuss human impacts and conservation efforts as they relate to marine biology. Applications of the scientific method in marine biology are emphasized. (Same as MST R100) (2)

Transfer credit: UC, CSU

BIOL R100L—Marine Biology Laboratory **1 unit**

Prerequisites: BIOL R100 or concurrent enrollment.

3 hours lab weekly

This laboratory course includes use of the scientific method, the identification and anatomy of marine plants, invertebrates, and fish; field studies of local marine habitats; and an introduction to Oceanography. (Same as MST R100L). Field trips may be required. (2)

Transfer credit: UC, CSU

BIOL R101—General Biology **3 units**

3 hours lecture weekly

This is a survey course that presents the major principles and phenomena governing biological systems. Topics include biological chemistry, the cellular basis of life, metabolism, nutrition, reproduction, genetics, DNA modification, evolution and recombinant DNA technologies. This course is designed for non-biology majors. It will satisfy the requirements for certain dental hygiene, nursing and physical therapy programs. Field trips may be required.

Transfer credit: UC, CSU

BIOL R101L—General Biology Laboratory **1 unit**

Prerequisites: BIOL R101 or concurrent enrollment.

3 hours lab weekly

This is a laboratory course designed to be taken in conjunction with BIOL R101. The laboratory exercises deal with the scientific method, basic biochemistry, microscopy, cellular organization, cellular energy transformation, molecular genetics and evolution. Field trips may be required. (2)

Transfer credit: UC, CSU

BIOL R120—Principles of Biology I **4 units**

Prerequisites: CHEM R120.

4 hours lecture weekly

The first semester of biology for majors introduces the student to principles of cellular and molecular biology. Knowledge from a breadth of disciplines related to health, medical and research science careers is examined including: biochemistry, metabolism, molecular biology, genetics, cellular biology, recombinant DNA, developmental biology, microbiology and molecular evolution. While the diversity of life is surveyed, an emphasis is placed on the biology worldview derived from experimental data of specific model genera, animal cell culture systems and prokaryotic/eukaryotic viruses. The method of generating hypothesis based research results and the role of paradigms in advancing biological science theory are examined. This course is applied towards fulfilling University biology prerequisites and the Community College Biotechnology Certificate. Field trips may be required.

Transfer credit: UC, CSU

BIOL R120L—Principles of Biology I Lab: Intro to Cellular and Molecular Biology **1 unit**

Prerequisites: BIOL R120 or concurrent enrollment.

3 hours lab weekly

This is a laboratory course designed to complement the BIOL R120 lecture course. The current methods employed by investigators in the biological sciences are presented. These include, but are not limited to microscopy, differential centrifugation, chromatography, electrophoresis, spectrophotometry, recombinant DNA methods and PCR. This course is recommended for biological sciences majors seeking transfer to university programs as well as students anticipating careers in a broad range of health care and medical professions. Field trips may be required. (2)

Transfer credit: UC, CSU

BIOL R122—Principles of Biology II **4 units**

Prerequisites: BIOL R120 and BIOL R120L.

4 hours lecture weekly

This course is designed to complete the study of basic principles of biology for biological science majors. Topics include the diversity and evolutionary relationships of the major plant divisions and animal phyla. Emphasis is placed on evolution of as well as the development, structure and functions of vertebrate organ systems. Ecosystem structure, population ecology and evolutionary concepts are presented. Field trips may be required.

Transfer credit: UC, CSU

BIOL R122L—Principles of Biology II Lab **1 unit**

Prerequisites: BIOL R120 and BIOL R120L or equivalent; BIOL R122 or concurrent enrollment.

3 hours lab weekly

This course is designed to complete the study of basic principles of biology laboratory for biological science majors. Topics include the diversity and evolutionary relationships of the fungi, major plant divisions, and animal phyla. Dissections of representative organisms are required. Emphasis is placed on the development, structure and functions of vertebrate organ systems. Ecosystem structure, population ecology, and evolutionary concepts are presented. Field trips may be required.

Transfer credit: UC, CSU

BIOL R170—Biological Marine Resource Management **1 unit**

Corequisites: GEOL R178 or MST R178.

3 hours lab weekly

This field course is an introduction to topics in marine biology related to current resource management issues in this region. Trips to natural areas where biological, geological, and oceanographic resources can be observed will be combined with related information about resource management at the federal, state, and local levels. Field trips will be required. Course may be taken two times. (Same as MST R170) (2)

Transfer credit: CSU

BIOL R199—Directed Studies in Biology **1-3 units**

Lecture and/or lab hours as required by unit formula

Designed for students interested in furthering their knowledge of Biology on an independent study basis. All studies will require laboratory and library research, as well as written reports. Course may be taken two times.

Transfer credit: CSU

Microbiology Courses**MICR R100—Principles of Microbiology** **3 units**

Prerequisites: BIOL R120 or both ANAT R101 and PHSO R101.

3 hours lecture weekly

This course is an introduction to the structure, metabolic activities, utility and pathogenicity of bacteria, fungi, algae, protozoa and viruses. The topics will include distribution, metabolism, molecular genetics, biotechnology, immunity, cancer, probiotics and the physical/chemical methods used in control of microbes and cellular pathogens. The principles of disease transmission, prevention and immunity will also be presented. The diversity of the microbial world and its applications to improving human health and quality of life are emphasized. Field trips may be required. (2)

Transfer credit: UC, CSU

MICR R100L—Principles of Microbiology Laboratory **2 units**

Prerequisites: MICR R100 or concurrent enrollment.

6 hours lab weekly

This is a laboratory course designed for biological science majors and students interested in the health science professions. The exercises are intended to give the students experience in the manipulation of microorganisms and exposure to current microbial techniques. Topics covered will include microscopy methods, prokaryotic and eukaryotic cell structure, microbial metabolism, genetics, recombinant DNA, and biotechnology. Field trips may be required. (2)

Transfer credit: UC, CSU

Physiology Courses**PHSO R101—Human Physiology** **5 units**

Prerequisites: CHEM R110 and ANAT R101.

3 hours lecture, 6 hours lab weekly

This course emphasizes principles of cellular and systemic functions of the human body. Lecture topics include scientific method, basic inorganic and organic chemistry, solute as well as water transport and balance, homeostatic mechanisms, and functions of the major organ systems. This course emphasizes demonstrations and techniques of commonly utilized laboratory equipment. Laboratory topics will primarily consist of analysis, interpretation and evaluation of data gathered relating to homeostatic mechanisms, functions of the major organ systems and disease. Experiments reinforce material presented in lecture. This course satisfies requirements for general education as well as transfer to universities and is required for health-care and certificated programs. Field trips may be required.

Transfer credit: UC, CSU