

Biology (AS-T)

CAREER PATHS:

Biological Technician
Biologist
Molecular and Cellular Biologist
Geneticists
Life Scientist

Natural Science Manager
Environmental Restoration
Secondary Education
Post-Secondary Education

Additional Career Paths and related data, including state-by-state wage info and growth in the field, can be found at www.onetonline.org.

This program map represents one possible pathway. See a counselor to create a customized education plan. Map is for the 2019-2020 catalog year.

1 FIRST SEMESTER

Total Recommended Units: 15

CHEM 001 5 units
General Chemistry I (IGETC 5A/5C)

MATH 020 5 units
Analytic Geometry & Calculus I (IGETC 2)

ENGL 001 4 units
College Composition (IGETC 1A)

LR 010 1 unit
Introduction to Library Research and Information Competency

2 SECOND SEMESTER

Total Recommended Units: 17

CHEM 002 5 units
General Chemistry II (IGETC 5B)

BIO 002 5 units
Cell & Molecular Biology

IGETC 1B 4 units
Suggested: ENGL 002 or 004

IGETC 3A 3 units
Suggested: ART 001 or 002 or MUSC 005 or 008

2020-2021 catalog year Pathways coming soon.

PHYS 002 or 006* 5 units
General Physics I OR Physics for Science & Engineering

BIO 003 5 units
Evolution, Ecology and Biodiversity

IGETC 3B/Am Inst Grp 2 3 units
Suggested: HIST 017 or 018

IGETC 1C 3 units
Suggested: COMM 001 or 002 or 006

PHYS 004 or 007* 5 units
General Physics II OR Physics for Science & Engineering

IGETC 4 3 units
Suggested: PSYC 001

IGETC 3A or 3B 3 units

IGETC 4/Am Inst Grp 1 3 units
Suggested: PLSC 001 for Am Inst requirement

IGETC 4 3 units
Suggested: SOC 001 or ANTH 002 or ECON 001

*The University of California transfer pathway for Biology also requires MATH 021, CHEM 003, and CHEM 004, but does NOT require courses in Physics. See a counselor for a personalized education plan.

Required Courses/Courses in Discipline GE Courses/Categories



SOLANO
COMMUNITY COLLEGE

BIOLOGY

Associate in Sciences for Transfer
GE Pattern: IGETC
Program Total Units: 65

For more information
please contact:
(707) 864-7211

GET STARTED NOW!

▶ **Get started on your Pathway now with these recommended courses!**
Then – See a counselor to create a **CUSTOMIZED** education plan personalized to your career and transfer goals!

▶ Required courses may change depending on a student's career and transfer goals, including requirements for cross-cultural and foreign language courses, and/or specific requirements for an individual CSU or UC.

▶ Unique transfer requirements for a specific institution can be found at www.assist.org.

LET US HELP YOU!

How to Apply: solano.edu/ar/apply.php

■ **Questions? Talk to a Counselor Now!**
Main Campus, Fairfield: (707) 864-7101
Vacaville Center: (707) 863-7836
Vallejo Center: (707) 642-8188
Travis AFB: (707) 863-7878
Visit online at solano.edu/counseling

■ **Contact Our Career Center to Learn Your Career Options!**
Call 707-864-7124, or email at CareerCenter@solano.edu
Visit online at solano.edu/career

■ **You Can Afford College! Learn more about Financial Aid!**
Call 707-864-7103, or email at FinancialAid@solano.edu
Visit online at solano.edu/financial_aid

■ **College is Accessible!** Contact our Disability Services Program (DSP) at 707-864-7136.

Biology

Associate in Science in Biology for Transfer (ADT: A.S.-T.)

Program Description

The Associate in Science in Biology for Transfer Degree program prepares students to transfer to the California State University system as a biology major.

Associate in Science Degree

The Associate in Science in Biology for Transfer degree prepares students to seamlessly transfer to the California State University system as a Biology major. This degree gives Biology majors the Biology, Mathematics, Chemistry, and Physics knowledge that allows them to succeed in upper division courses after transfer. In the major, students gain knowledge of biological molecules, cell structure and function, bioenergetics, Mendelian and molecular genetics, microbiology, plant biology, evolution, ecology, biodiversity, and biotechnology. In the laboratory students learn experimental design including data collection and analysis, keeping a legal laboratory notebook, and reporting the results in a standard scientific journal format. The Biology courses give students an extensive laboratory experience where they gain essential skills required to study and manipulate macromolecules, aseptically transfer cells, work with the common model organisms used in Biology research, and carry out a field study.

Associate in Science in Biology for Transfer

Students who complete this 35 unit major will be guaranteed admission with junior status to the California State University system, though not to a particular campus.

The Associate in Science in Biology for Transfer degree requires:

1. Completion of 60 semester units that are eligible for transfer to the California State University, including both of the following:
 - a. The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education – Breadth Requirements.
 - b. Completion of the 35 units of courses in the major.
2. Obtainment of a minimum grade point average of 2.0. Students must earn a C or better in all courses required for the major. A “P” (Pass) grade is not an acceptable grade for courses in the major.

Program Outcomes

Students who complete the Biology Associate Degree will be able to:

1. Design and/or interpret an investigation, including data collection and/or analysis.
2. Describe the molecular basis of genetics and energetics.
3. Explain the principles and mechanisms of microevolution and macroevolution.

REQUIRED COURSES.....	Units
BIO 002 Cell and Molecular Biology	5
BIO 003 Evolution, Ecology & Biodiversity	5
CHEM 001 General Chemistry I	5
CHEM 002 General Chemistry II.....	5
MATH 020 Analytic Geometry and Calculus I.....	5
Select List A or List B	10
Required Major Total Units	35

List A.....	Units
PHYS 002 General Physics (Non-Calculus)	5
PHYS 004 General Physics (Non-Calculus)	5

List B.....	Units
PHYS 006 Physics for Science and Engineering	5
PHYS 007 Physics for Science and Engineering	5

CSU General Education or IGETC for Stem Units.31-33	
CSU Transferable Electives (as needed to reach 60	
Transferable units)*	1-4
Total Degree Units	60

**9-10 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.*

Biology

Biology

Program Description

This degree has been designed for students planning on transferring to a campus of the University of California as a Biology, Cell Biology, Molecular Biology, or Biochemistry major. The program incorporates a study of the mathematics, chemistry, and biology required to understand and research biological processes including cell biology, molecular biology, bioenergetics, genetics, population genetics, microbiology, evolution, developmental biology, ecology, biodiversity, and biotechnology.

Associate in Science Degree

The Associate in Science Degree can be obtained by completing the 40-unit major, and general education requirements. All courses in the major must be completed with a minimum grade of C or a P if the course is taken on a Pass/No Pass basis.

Program Outcomes

Students who complete the Biology Associate Degree will be able to:

1. Design and/or interpret an investigation, including data collection and/or analysis.
2. Describe the molecular basis of genetics and energetics.
3. Explain the principles and mechanisms of microevolution and macroevolution.

REQUIRED COURSES.....	Units
BIO 002 Cell and Molecular Biology	5
BIO 003 Evolution, Ecology & Biodiversity	5
CHEM 001 General Chemistry I	5
CHEM 002 General Chemistry II.....	5
CHEM 003 Organic Chemistry I.....	5
CHEM 004 Organic Chemistry II.....	5
MATH 020 Analytic Geometry and Calculus I.....	5
MATH 021 Analytic Geometry and Calculus II.....	5
Required Major Total Units	40

CSU General Education or IGETC for	
STEM units.....	31-33
Total Degree Units CSU GE or IGETC	62-64

Solano General Education.....	21
Electives (as needed to reach 60 units)	0
Total Degree Units Solano GE.....	61

** 9 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.*

Biology

Biomedical Sciences

Program Description

The Biomedical Sciences Associate in Science Degree prepares students to transfer into a health care profession program offered at a community college or a four year institution. These fields include nursing, respiratory therapy, radiological science, physical therapy, occupational health, dental assistant, and dental hygiene. The degree provides basic knowledge in chemistry, microbiology, human anatomy, and human physiology. These are the common prerequisites for community college and university allied health majors.

Certificate of Achievement and Associate in Science Degree

A Certificate of Achievement can be obtained upon completion of the 18-19-unit major. The Associate in Science Degree can be obtained by completing the 18-19-unit major, general education requirements and electives. All courses for the major must be completed with a minimum grade of C or a grade of P if the course is taken on a Pass/No Pass basis.

Program Outcomes

1. Demonstrate knowledge of the structure and function of the major organ systems of the human body.
2. Demonstrate knowledge of the normal physiological functions of the organ systems and explain how disturbances of normal physiological functions lead to metabolic and physiological disorders (clinical applications).
3. Demonstrate knowledge of how microorganisms interact with the human body and describe how these interactions lead to health or human disease

REQUIRED COURSES.....Units

BIO 004 Human Anatomy 5

BIO 005 Human Physiology 5

BIO 014 Principles of Microbiology..... 4

One course from Chemistry List..... 4-5

Required Major Total Units 18-19

Chemistry List: (select one course)Units

CHEM 001 General Chemistry I 5

CHEM 010 Intermediate Chemistry 4

CHEM 012 Chemistry for the Health Sciences 5

CSU General Education or IGETC Pattern units.... 37-39

Electives (as needed to reach 60 units)..... 9-12

Total Degree Units CSU GE or IGETC 60

Solano General Education 21

Electives (as needed to reach 60 units)..... 20-21

Total Degree Units Solano GE..... 60

** 7 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.*

BIO 002 Cell and Molecular Biology 5.0 Units

Prerequisite: CHEM 001

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 96-108 lab

This course, intended for biology majors, covers the structure and function of prokaryotic and eukaryotic cells, biological molecules, cell reproduction and its controls. Mendelian and molecular genetics, cell physiology and the metabolism including cellular respiration and photosynthesis, cellular communication, and homeostasis. An extensive laboratory component teaches the techniques used in biotechnology to manipulate DNA and to study proteins. (C-ID BIOL 190)

BIO 003 Evolution, Ecology & Biodiversity 5.0 Units

Prerequisite: BIO 002 with a minimum grade of C

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 96-108 lab

This course, intended for biology majors, covers evolution, ecology, and the diversity of life. Laboratory includes invertebrate and vertebrate dissection and several weekend and all day field trips. Students must successfully complete both the lecture and the laboratory portions of the course. Field trips may be required with some involving a fee. (C-ID BIOL 140)

Biology

BIO 004 Human Anatomy

5.0 Units

Course Advisory: BIO 016 and BIO 016L strongly recommended

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 96-108 lab

A study of the structural organization of the human body, from cellular to organismal level. Throughout the course, various types of instruction are used, including microscopic investigation of prepared slides of tissues and organs, gross (macroscopic) anatomical dissection, and examination of prosected human material. (C-ID BIOL 110B)

BIO 005 Human Physiology

5.0 Units

Prerequisite: A minimum grade of C in BIO 004 and CHEM 001, CHEM

010 or CHEM 012 (formerly CHEM 051)

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 96-108 lab

A description of physiological and homeostatic mechanisms of the body systems in health and disease. The laboratory relates structure to function, uses instrumentation to measure physiological variables, and enables students to critically evaluate functional status. (C-ID BIOL 120B)

BIO 012 Environmental Science

3.0 Units

General Education: Opt. A: Area A; Opt. B: Area 5B; Opt. C: Area B2

Transferable to UC/CSU

Hours: 48-54 lecture

Examines environmental issues from a scientific perspective by using an understanding of the physical, chemical, and biological processes of the Earth system to examine the interaction between humans and these processes. Topics include ecological principles, biodiversity, human population growth, climate change, air and water pollution, solid waste management, and the management of renewable and non-renewable energy, water, land, soil, and mineral resources. The course utilizes knowledge of these subject to find solutions to environmental challenges. Field trips may be required.

BIO 012L Environmental Science Laboratory

1.5 Units

Prerequisite: BIO 012 (may enroll concurrently)

General Education: Opt. B: Area 5C; Opt. C: Area B3

Transferable to UC/CSU

Hours: 8-9 lecture, 48-54 lab

Examine the ecological roles of organisms, resource use, and pollution/waste by using laboratory and mandatory field trip techniques. Field trips may be required.

BIO 014 Principles of Microbiology

4.0 Units

Prerequisite: A minimum grade of C in CHEM 001, CHEM 010, or CHEM 012

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 48-54 lab

The study of the morphology, physiology, genetics, taxonomy, and ecology of microorganisms. The course also includes principles of immunology, the control of microbes, and their relationship to disease. Laboratory exercises cover microscopy, staining, aseptic techniques, identification, and microbial growth among others.

BIO 015 Introduction to Biology

4.0 Units

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3

Transferable to UC/CSU

Hours: 48-54 lecture, 48-54 lab

Intended for non-science majors, a survey of biology including biological chemistry, cell structure and function, genetics, evolution, and ecology. The laboratory component emphasizes the scientific method to reinforce lecture concepts. Off-campus field trips may be scheduled. NOTE: Not open for credit to students who have completed BIO 003.

BIO 016 Introduction to Human Biology

3.0 Units

General Education: Opt. A: Area A; Opt. B: Area 5B; Opt. C: Area B2

Transferable to UC/CSU

Hours: 48-54 lecture

An introduction to general biology with emphasis on the human model. Topics include cell structure and function, human evolution, anatomy and physiology, genetics, and the human impact on the environment. This is a course for non-majors. NOTE: Not open for credit to students who have completed BIO 001, 002, 004, 005, 010 or 015.

BIO 016L Human Biology Laboratory

1.5 Units

Prerequisite: BIO 016 with a minimum grade of C (may enroll concurrently)

General Education: Opt. B: Area 5C; Opt. C: Area B3

Transferable to UC/CSU

Hours: 8-9 lecture, 48-54 lab

An introduction to general biology with an emphasis on the human model. Topics include microscopy, cell structure and function, human anatomy and physiology, genetics and the human impact on the environment. Off-campus field trips may be required and may involve a fee. This course is for non-majors. Note: Not open for credit to students who have completed BIO 002, 003, 004, 005 or 015.

Biology

BIO 018 Biology Of Sex

3.0 Units

General Education: Opt. A: Area A; Opt. B: Area 5B; Opt. C: Area B2, E
Transferable to UC/CSU
Hours: 48-54 lecture

The biological bases of human sex and sexuality will be discussed. Emphasis will be placed on the normal and diseased state of the male and female reproductive system. Essay and objective exams as well as written assignments will be used for student evaluations; the final exam will be comprehensive.

BIO 019 Marine Biology

4.0 Units

General Education: Opt. A: Area A; Opt. B: Area 5B, 5C; Opt. C: Area B2, B3
Transferable to UC/CSU
Hours: 48-54 lecture, 48-54 lab

The study of the diversity and natural history of life in the marine environment with an emphasis on the adaptations of organisms to their environment. Students must successfully complete both the lecture and laboratory portions of the course. Field trips may be required. Some field trips may involve a fee. This course is for non-majors. NOTE: This course is not open for credit to students who have completed BIO 001 or 002.

BIO 020

3.0 Units

Infectious Disease, Plagues, and Public Health

General Education: Option A: Area A; Option B: Area 5B; Option C: Area B2
Transferable to UC/CSU
Hours: 48-54 lecture

Examine infectious disease and the changing disease landscape from the molecular to the ecological level. Topics include cell structure and function, microorganisms, immunity, epidemiology, historical plagues, emerging diseases, prevention and treatment, and conditions that promote novel disease emergence. This is a course designed for non-science majors.

BIO 025 Human Genetics

3.0 Units

General Education: Option A: Area A; Option B: Area 5B; Option C: Area B2
Transferable to UC/CSU
Hours: 48-54 lecture

Provides an understanding of basic principles of genetics, current developments in genetics, and the influence of genes and the environment in determining human characteristics. This course is for non-science majors.

BIO 047 Independent Study

0.5 to 3.0 Units

Prerequisite: A minimum grade of C in 12.0 Units of credit, including 4.0 Units from within the discipline

Course Advisory: MATH 011 may be useful for data analysis
Transferable to CSU

Hours: 48-162 lab by arrangement

Designed for students who intend to major in biological sciences or pre-professional programs. Students may take this course up to the maximum number of units over multiple semesters.

BIO 049 Biology Honors

1.0 to 3.0 Units

Prerequisite: Eligibility for Honors Program; BIO 001, BIO 002, BIO 005, BIO 014, or BIO 015 (any of these courses may be taken concurrently).
Transferable to CSU

Hours: 24-162 lab by arrangement

Requires approval of a faculty member sponsor and the Dean of the School of Science and Mathematics. Requires students to complete an independent student project under the supervision of a member of the faculty. The project may be a laboratory or field study or a library study that leads to a thesis. In all cases, the final written product should show integration and synthesis of ideas. Students may take this course up to the maximum number of units over multiple semesters.

BIO 099

0.5 to 2.0 Units

Biology Honors: Special Dissection

Prerequisite: Completion of 24.0 units of college credit with a minimum GPA of 3.3; BIO 004 with a minimum grade of B; an ability to work independently; permission of the School Dean based on instructor availability.

Transferable to CSU

Hours: 24-108 lab by arrangement

An independent study project designed to increase understanding of human anatomy through detailed dissection and other projects assigned by the supervising instructor. The student will be evaluated through oral examination and evaluation of dissections. This course is an Open Entry/Open Exit course. Students may continue BIO 099 over multiple semesters not to exceed 2.0 units.

BIO 101 How to Study Science

0.5 Units

Hours: 8-9 lab

A step-by-step approach for success in transferable science courses. Topics include: overcoming science anxiety; learning how science courses are organized; how best to learn and retain scientific information; how to use science textbooks, common scientific terms, and symbols; how to analyze figures; how to develop test-taking skills to prepare for lecture and laboratory tests; and more.

BIO 160

2.5 Units

Review of Scientific Principles of Pre-Nursing

Prerequisite: Current acceptance or on the waiting list of an RN Program.
Hours: 40-45 lecture.

A focus on science and mathematics topics that are critical to success for students entering an RN program. Providing a clinically pertinent review of select anatomy, physiology, nutrition, and microbiology topics for students entering nursing school. Especially designed for students that have had an extended time period between finishing their pre-nursing requirements and entering nursing school. This course is taught by a panel of experts in the field. Case studies are extensively used in order to contextualize the material. This is a Pass/No Pass only course.