CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

PROGRAM MODIFICATION

PROGRAM AREA BIOLOGY

Please use the following format to modify any existing program. Any deletions from an existing program need to be underlined (left hand column), and any additions/changes to the program need to be in CAPS (right hand column).

EXISTING PROGRAM	PROPOSED PROGRAM
Name of Degree Program • Bachelor of Science in Biology • Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology • Bachelor of Science in Biology with an Emphasis in Medical Imaging • Minor in Biology • Certificate in Biotechnology	**Name of Degree Program** • Bachelor of Science in Biology • Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology • Bachelor of Science in Biology with an Emphasis in Medical Imaging • Minor in Biology • Certificate in Biotechnology
Catalog Description of the Program Biology is the study of life, its origins, diversity and intricacies. It emphasizes the relationship between structure and function in living systems and the processes by which organisms grow, reproduce and interact with each other and their environment. The discipline is dynamic and rapidly advancing particularly in the areas of biotechnology and information technology. The Biology Program provides its students with a strong theoretical foundation in biology, combined with extensive hands-on laboratory experiences using state-of-the-art technology. Students take a series of core courses augmented by upper-division electives selected from areas of special interest. CAREERS: The Bachelor of Science in Biology and the Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology are designed for students who wish to enter medical, dental or other health professional or graduate schools, the teacher credential program, or to seek careers in science education, business, industry or government.	**Catalog Description of the Program** Biology is the study of life, its origins, diversity and intricacies. It emphasizes the relationship between structure and function in living systems and the processes by which organisms grow, reproduce and interact with each other and their environment. The discipline is dynamic and rapidly advancing, particularly in the areas of biotechnology and information technology. The Biology Program provides its students with a strong theoretical foundation in biology, combined with extensive hands-on laboratory experiences using state-of-the-art technology. Students take a series of core courses augmented by upper-division electives selected from areas of special interest. CAREERS: The Bachelor of Science in Biology and the Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology are designed for students who wish to enter medical, dental or other health professional or graduate schools, or to seek careers in business, industry or government. The Bachelor of Science in Biology with an

The Bachelor of Science degree in Biology provides students with a broad background in the biological sciences. The degree program requires coursework in fundamental areas of biology and then allows students to tailor the degree through electives to suit their interests. Students interested in earning a single subject teaching credential can supplement the BS degree program with 14 additional units (see additional courses below) to satisfy the requirements for subject matter preparation in biology.

The Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology offers students an opportunity to study the exciting developments in genetics, molecular biology, cloning, biotechnology and bioinformatics. Such programs lead to careers in biotechnology, pharmaceuticals, research and development, intellectual property and patent law.

The Bachelor of Science in Biology with an Emphasis in Medical Imaging prepares students for graduate or professional study in the medical sciences (medical imaging, medical physics, health physics, dosimetry, nuclear medicine, radiotherapy, oncology, biomedical engineering), or for entry into professional positions in the clinical environment and in medical imaging research and development.

The Certificate in Biotechnology will provide students with advanced knowledge and skills in modern biotechnology that will lead to careers in biotech as well as pharmaceutical industries.

CONTACT INFORMATION
Biology@csuci.edu

FACULTY

Ching-Hua Wang, MD, PhD, Professor and Chair of Biology
Academic Advisor
Phone: (805) 437-8870
Email: ching-hua.wang@csuci.edu

Amy Denton, PhD, Assistant Professor of Biology
Phone (805) 437-8458

Emphasis in Cell and Molecular Biology offers students an opportunity to study the exciting developments in genetics, molecular biology, cloning, biotechnology and bioinformatics. Such programs lead to careers in biotechnology, pharmaceuticals, research and development, intellectual property and patent law.

The Bachelor of Science in Biology with an Emphasis in Medical Imaging prepares students for graduate or professional study in the medical sciences (medical imaging, medical physics, health physics, dosimetry, nuclear medicine, radiotherapy, oncology, biomedical engineering), or for entry into professional positions in the clinical environment and in medical imaging research and development.

The Certificate in Biotechnology will provide students with advanced knowledge and skills in modern biotechnology that will lead to careers in biotech as well as pharmaceutical industries.

CONTACT INFORMATION
Biology@csuci.edu

FACULTY

Ching-Hua Wang, MD, PhD, Professor and Chair of Biology
Academic Advisor
Phone: (805) 437-8870
Email: ching-hua.wang@csuci.edu

Amy Denton, PhD, Assistant Professor of Biology
Phone (805) 437-8458

Email: amy.denton@csuci.edu

Geoffrey Dougherty, PhD, Professor of Physics
Phone: (805) 437-8990
Email: geoffrey.dougherty@csuci.edu

Louise Lutze-Mann, PhD, Associate Professor of Biology
Phone: (805) 437-8873
Email: louise.lutze-mann@csuci.edu

Nancy Mozingo, PhD, Assistant Professor of Biology
Phone: (805) 437-8989
Email: Nancy.mozingo@csuci.edu

Requirements for the Degree Program

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY (120 units)

Lower Division Requirements (31 units)

1. Biology

BIOL 200 Principles of Organismal and Population Biology (4)
BIOL 201 Principles of Cell and Molecular Biology (4)
BIOL 202 Biostatistics (3)

2. Mathematics

MATH 105 Pre-Calculus or MATH 150 Calculus I (4)

3. Physical Sciences

CHEM 121 General chemistry I (4)
CHEM 122 General chemistry II (4)
PHYS 100 Introduction to physics I (4)
PHYS 101 Introduction to physics II (4)
Note: phys 200/201 may be substituted for the above physics sequence.
(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of the three different disciplines.)

Upper Division Requirements (21 units)

BIOL 300 Cell Biology (4)
BIOL 302 Genetics (4)
BIOL 303 Evolutionary Biology (3)
BIOL 304 Comparative Animal Physiology (3)
BIOL 433* Ecology and the Environment (4)

Email: amy.denton@csuci.edu

Geoffrey Dougherty, PhD, Professor of Physics
Phone: (805) 437-8990
Email: geoffrey.dougherty@csuci.edu

Nancy Mozingo, PhD, Assistant Professor of Biology
Phone: (805) 437-8989
Email: Nancy.mozingo@csuci.edu

Requirements for the Degree Program

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY (120 units)

COMMON LOWER DIVISION REQUIREMENTS FOR ALL EMPHASES OF THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY (8 UNITS):

BIOL 200* Principles of Organismal and Population Biology, GE-B2 (4)
BIOL 201 Principles of Cell and Molecular Biology (4)

FOR BACHELOR OF SCIENCE IN BIOLOGY:

UPPER DIVISION REQUIREMENTS IN THE MAJOR (39 units)

1. REQUIRED BIOLOGY COURSES (25 UNITS)

BIOL 300 Cell Biology (4)
BIOL 302 Genetics (4)
BIOL 303 Evolutionary Biology (3)
BIOL 304 Comparative Animal Physiology (3)
BIOL 400 MOLECULAR BIOLOGY (4)
BIOL 433* Ecology and the Environment, GE-B2, UDID (4)

AND

A MINIMUM OF 2 UNITS TAKEN FROM

AND <u>select one of</u> the following (2):
BIOL 492 Internship
BIOL 494 Independent Research
BIOL 497 Directed Study
AND
BIOL 499 Senior Capstone Colloquium (1)

Electives in Biology (<u>10-12</u>)
Select <u>at least three</u> courses from the following list, one of which must be a lab course.
BIOL 301 Microbiology (4)
BIOL 310 Animal Biology and Ecology (4)
BIOL 311 Plant Biology and Ecology (4)
BIOL 312 Marine Biology (4)
BIOL 313 Conservation Biology (4)
BIOL 316 Invertebrate Zoology (4)
BIOL 317 Parasitology (4)
<u>BIOL 400 Molecular Biology and Molecular Genetics</u> (4)
BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
BIOL 402 Toxicology (3)
BIOL 420 Cellular and Molecular Immunology (4)
BIOL 421 Virology (3)
BIOL 422 Molecular Plant Physiology (4)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 428 Biology of Cancer (3)
BIOL 431* Bioinformatics (4)
BIOL 432* Principles of Epidemiology and Environmental Health (3)
BIOL 450 Ichthyology: The Biology of Fishes (4)

Required Supporting and other GE Courses
American institutions requirement (6)
Other GE courses (39)
University electives (12-14)

<u>Additional Courses for SUBJECT MATTER PREPARATION IN BIOLOGY (14)</u>
<u>Subject matter preparation in biology can be met by fulfilling the requirements for the BS in Biology and successfully completing the following 14 units:</u>
<u>PHYS 105 Introduction to the Solar System (4)</u>
<u>GEOL 121 Physical Geology (4)</u>
<u>BIOL 335 The Biosphere (3)</u>
<u>EDUC 330 Introduction to Secondary Schooling (3)</u>

THE FOLLOWING:
BIOL 492 Internship (2-3)
BIOL 494 Independent Research (1-3)
BIOL 497 Directed Study (1-3)
AND
BIOL 499 Senior Capstone Colloquium (1)

2. Electives in Biology (14 units)
Select from the following LIST OF COURSES, one of which must be a lab course.
BIOL 301 Microbiology (4)
BIOL 310 Animal Biology and Ecology (4)
BIOL 311 Plant Biology and Ecology (4)
BIOL 312 Marine Biology (4)
BIOL 313 Conservation Biology (4)
BIOL 316 Invertebrate Zoology (4)
BIOL 317 Parasitology (4)
BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
BIOL 402 Toxicology (3)
BIOL 420 Cellular and Molecular Immunology (4)
BIOL 421 Virology (3)
BIOL 422 Molecular Plant Physiology (4)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 428 Biology of Cancer (3)
BIOL 431* Bioinformatics, GE-B2, B4, UDID (4)
BIOL 432* Principles of Epidemiology and Environmental Health, GE-B2, D, UDID (3)
BIOL 450 Ichthyology: The Biology of Fishes (4)

REQUIRED SUPPORTING AND OTHER GE COURSES (73 UNITS)
1. CHEMISTRY (16 UNITS)
CHEM 121* General Chemistry I, GE-B1 (4)
CHEM 122 General Chemistry II (4)
CHEM 311 ORGANIC CHEMISTRY I (3)
CHEM 312 ORGANIC CHEMISTRY I LABORATORY (1)
CHEM 314 ORGANIC CHEMISTRY II (3)
CHEM 315 ORGANIC CHEMISTRY II LABORATORY (1)
2. PHYSICS (8 UNITS)
select either
PHYS 100 Introduction to Physics I (4)
PHYS 101 Introduction to Physics II (4)
or

(Courses with * are double-counted toward upper-division GE credits.)

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN CELL AND MOLECULAR BIOLOGY (120 units):

LOWER DIVISION REQUIREMENTS (31 units):

1. Biology
   BIOL 200 Principles of Organismal and Population Biology (4)
   BIOL 201 Principles of Cell and Molecular Biology (4)
   BIOL 202 Biostatistics (3)

2. Mathematics
   MATH 150 Calculus I (4)

3. PHYSICAL SCIENCE
   CHEM 121 General Chemistry I (4)
   CHEM 122 General Chemistry II (4)
   AND select either
   PHYS 100 Introduction to Physics I (4)
   PHYS 101 Introduction to Physics II (4)
   or
   PHYS 200 General Physics I (4)
   PHYS 201 General Physics II (4)

(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different disciplines)

UPPER DIVISION REQUIREMENTS (44 units):

1. Biology
   BIOL 300 Cell Biology (4)
   BIOL 301 Microbiology (4)
   BIOL 302 Genetics (4)
   BIOL 303 Evolutionary Biology (3)
   BIOL 400 Molecular Biology and Molecular Genetics (4)
   BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
   BIOL 431 Bioinformatics (4)
   AND *select one of the following (2):*
   BIOL 492 Internship
   PHYS 200 GENERAL PHYSICS I (4)
   PHYS 201 GENERAL PHYSICS II (4)
3. STATISTICS AND Mathematics (7 UNITS)
   BIOL 202 Biostatistics (3)
   MATH 150* Calculus I, GE-B3 (4)
4. Other GE Courses IN CATEGORIES A-E (36 units)
   CATEGORY A (9)
   CATEGORY B- COVERED BY REQUIRED COURSES FOR THE DEGREE PROGRAM
   CATEGORY C (12)
   CATEGORY D (12)
   CATEGORY E (3)
5. American Institutions Requirement (6 units)

FOR EMPHASIS IN CELL AND MOLECULAR BIOLOGY:

UPPER DIVISION REQUIREMENTS IN THE MAJOR (40 UNITS)

1. REQUIRED Biology COURSES (31 units)
   BIOL 300 Cell Biology (4)
   BIOL 301 Microbiology (4)
   BIOL 302 Genetics (4)
   BIOL 303 Evolutionary Biology (3)
   BIOL 400 Molecular Biology (4)
   BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
   BIOL 431* Bioinformatics, GE-B2, B4, UDID (4)
   AND
   A MINIMUM OF 2 UNITS TAKEN FROM the following:
   BIOL 492 Internship (2-3)
   BIOL 494 Independent Research (1-3)
   BIOL 497 Directed Study (1-3)
   AND
   BIOL 499 Senior Capstone Colloquium (1)

2. Electives in Biology (9 units)
Select from the following list of courses:
BIOL 402 Toxicology (3)
BIOL 416 Radiobiology and Radionuclides (3)
BIOL 420 Cellular and Molecular Immunology (4)
BIOL 421 Virology (3)
BIOL 422 Molecular Plant Physiology (4)

BIOL 494 Independent Research
BIOL 497 Directed Study
AND
BIOL 499 Senior Capstone Colloquium (1)

2. Organic Chemistry and Biochemistry
Select either Group A or Group B courses:
Group A-
CHEM 311 Organic Chemistry I (3)
CHEM 312 Organic Chemistry I Laboratory (1)
AND EITHER:
CHEM 318 Biological Chemistry (3) OR
CHEM 314 Organic Chemistry II (3) AND
CHEM 315 Organic Chemistry II Laboratory (1)

Group B-
(Note: Students completing the following courses to satisfy this category will obtain a Minor in Chemistry
in addition to a Major in Biology:
CHEM 311 Organic Chemistry I (3)
CHEM 312 Organic Chemistry I Laboratory (1)
CHEM 314 Organic Chemistry II (3)
CHEM 315 Organic Chemistry II Laboratory (1)
CHEM 400 Biochemistry (4)
(A year-long organic chemistry sequence with laboratory taken at a community college may be accepted for the Biology major in lieu of CHEM 311, 312, 314, 315.)

3. Required General Education Courses
ENGL 330 Writing in the Disciplines (3)
AND Select one of the following:
BIOL 326* Scientific and Professional Ethics (3)
PHYS/ENGL 338* Science and Conscience (3)

Electives In Biology (9 units)
Select at least 9 units of courses from the following list:
BIOL 402 Toxicology (3)
BIOL 416 Radiobiology and Radionuclides (3)
BIOL 420 Cellular and Molecular Immunology (4)
BIOL 421 Virology (3)
BIOL 422 Molecular Plant Physiology (4)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 428 Biology of Cancer (3)
BIOL 432* Principles of Epidemiology and Environmental Health, GE-B2, D, UDID (3)
BIOL 433* Ecology and the Environment, GE-B2, UDID (4)

REQUIRED SUPPORTING AND OTHER GE COURSES (72 UNITS):

1. Chemistry (MINIMUM 15 UNITS)
CHEM 121* General Chemistry I, GE-B1 (4)
CHEM 122 General Chemistry II (4)
CHEM 311 Organic Chemistry I (3)
CHEM 312 Organic Chemistry I Laboratory (1)
AND select either
CHEM 318 Biological Chemistry (3)
or
CHEM 314 Organic Chemistry II (3)
CHEM 315 Organic Chemistry II Laboratory (1)
(Note: Students completing the following courses to satisfy this category will obtain a Minor in Chemistry in addition to a Major in Biology:
CHEM 121* General Chemistry I, GE-B1 (4)
CHEM 122 General Chemistry II (4)
CHEM 311 Organic Chemistry I (3)
CHEM 312 Organic Chemistry I Laboratory (1)
CHEM 314 Organic Chemistry II (3)
CHEM 315 Organic Chemistry II Laboratory (1)
CHEM 400 Biochemistry (4)
(A year-long organic chemistry sequence with laboratory taken at a community college may be accepted for the Biology major in lieu of CHEM 311, 312, 314, 315.)
2. PHYSICS (8 UNITS)
select either
PHYS 100 Introduction to Physics I (4)
PHYS 101 Introduction to Physics II (4)
or
PHYS 200 General Physics I (4)
PHYS 201 General Physics II (4)
3. STATISTICS AND Mathematics (7 UNITS)
BIOL 202 Biostatistics (3)

BIOL 428 Biology of Cancer (3)
BIOL 432* Principles of Epidemiology and Environmental Health (3)
BIOL 433* Ecology and the Environment (4)

Required Supporting and Other GE Courses (36 units):
American Institutions Requirement (6)
Other GE Courses in Categories A-E (30)

(Courses with * are double-counted toward upper-division GE credits.)

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN MEDICAL IMAGING (120 units):
Lower Division Requirements (36 units):
1. Biology
BIOL 200 Principles of Organismal and Population Biology (4)
BIOL 201 Principles of Cell and Molecular Biology (4)
BIOL 210 Human Anatomy and Physiology I (4)
BIOL 211 Human Anatomy and Physiology II (4)

2. Mathematics
MATH 150 Calculus I (4)

3. Physical Sciences
CHEM 121 General Chemistry I (4)
CHEM 122 General Chemistry II (4)
AND select either
PHYS 100 Introduction to Physics I (4)
PHYS 101 Introduction to Physics II (4)
or
PHYS 200 General Physics I (4)
PHYS 201 General Physics II (4)

(12 units of the above courses will be counted

MATH 150* Calculus I, GE-B3 (4)
4. Required General Education Courses (6 UNITS)
ENGL 330 Writing in the Disciplines, GE-A1, A2, UDID (3)
AND select one of the following:
BIOL 326* Scientific and Professional Ethics, GE-D (3)
PHYS/ENGL 338* Science and Conscience, GE-B1, C2, UDID (3)
5. Other GE Courses in Categories A-E (30 units)
CATEGORY A (6) THREE UNITS COVERED BY A REQUIRED GE COURSE FOR THE DEGREE PROGRAM
CATEGORY B- COVERED BY REQUIRED COURSES FOR THE DEGREE PROGRAM
CATEGORY C (9) THREE UNITS COVERED BY A REQUIRED GE COURSE FOR THE DEGREE PROGRAM
CATEGORY D (12)
CATEGORY E (3)
6. American Institutions Requirement (6 units)

FOR EMPHASIS IN MEDICAL IMAGING: ADDITIONAL Lower Division Requirements IN THE MAJOR (8 units):
BIOL 210 Human Anatomy and Physiology I (4)
BIOL 211 Human Anatomy and Physiology II (4)
Upper Division Requirements IN THE MAJOR (38 units):
1. REQUIRED Biology and Physics COURSES (30 units)
BIOL 300 Cell Biology (4)
BIOL 301 Microbiology (4)
BIOL 302 GENETICS (4)
BIOL 400 Molecular Biology (4)
BIOL/PHYS 416 Radiobiology and

toward lower-division GE credits, 4 units in each of three different science disciplines)

UPPER DIVISION REQUIREMENTS (39 units):

1. Biology and Physics
   BIOL 300 Cell Biology (4)
   BIOL 301 Microbiology (4)
   BIOL 400 Molecular Biology and Molecular Genetics (4)
   AND select one of the following (2):
   PHYS 492 Physics Internship
   BIOL or PHYS 494 Independent Research
   BIOL or PHYS 497 Directed Study
   AND
   BIOL or PHYS 499 Senior Capstone Colloquium (1)

2. Organic Chemistry and Biochemistry
   CHEM 311 Organic Chemistry I (3)
   CHEM 312 Organic Chemistry I Laboratory (1)
   CHEM 318 Biological Chemistry (3)
   (An organic chemistry I-equivalent course with laboratory taken at a community college may be accepted for the Biology major in lieu of CHEM 311 and 312.)

3. Required General Education Courses
   ENGL 330 Writing in the Disciplines (3)
   AND Select one of the following:
   BIOL 326* Scientific and Professional Ethics (3)
   PHYS/ENGL 338* Science and Conscience (3)

4. Medical Imaging
   BIOL/PHYS 416 Radiobiology and Radionuclides (3)
   BIOL/PHYS 434* Introduction to Biomedical Imaging (3)
   BIOL/PHYS 464 Biomedical Instrumentation (4)

Electives in Biology and Physics (9 units):
Select at least 9 units of courses from the following list:
BIOL 302 Genetics (4)
BIOL/PHYS 315 Introduction to Biophysics (4)
BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
BIOL 420 Cellular and Molecular Immunology (4)
Radionuclides (3)
BIOL/PHYS 434* Introduction to Biomedical Imaging, GE-B1, E, UDID (4)
BIOL/PHYS 464 Biomedical Instrumentation (4)
AND A MINIMUM OF 2 UNITS TAKEN FROM the following:
PHYS 492 Physics Internship (3)
BIOL ***or*** PHYS 494 Independent Research (1-3)
BIOL ***or*** PHYS 497 Directed Study (1-3)
AND
BIOL ***or*** PHYS 499 Senior Capstone Colloquium (1)

2. Electives in Biology and Physics (8 units):
Select from the following list of courses:
BIOL/PHYS 315 Introduction to Biophysics (4)
BIOL 401 Biotechnology and Recombinant DNA Techniques (5)
BIOL 420 Cellular and Molecular Immunology (4)
BIOL 421 Virology (3)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 428 Biology of Cancer (3)
BIOL 431* Bioinformatics, GE-B2, B4, UDID (4)
BIOL 432* Principles of Epidemiology and Environmental Health, GE-B2, D, UDID (3)
BIOL 433* Ecology and the Environment, GE-B2, UDID (4)
PHYS 445* Image Analysis and Pattern Recognition, GE-B1, B4, UDID (3)

REQUIRED SUPPORTING AND OTHER GE COURSES (66 units):

1. Chemistry (15 UNITS)
   CHEM 121* General Chemistry I, GE-B1 (4)
   CHEM 122 General Chemistry II (4)
   CHEM 311 Organic Chemistry I (3)
   CHEM 312 Organic Chemistry I Laboratory (1)
   CHEM 318 Biological Chemistry (3)
   (An organic chemistry I-equivalent course with laboratory taken at a community college may be accepted for the Biology major in lieu of CHEM 311 and 312.)

2. Mathematics (4 UNITS)

BIOL 421 Virology (3)
BIOL 423 Cellular And Molecular Neurobiology (3)
BIOL 424 Human Physiology (3)
BIOL 425 Human Genetics (3)
BIOL 427 Developmental Biology (4)
BIOL 428 Biology of Cancer (3)
BIOL 431* Bioinformatics (4)
BIOL 432* Principles of Epidemiology and Environmental Health (3)
BIOL 433* Ecology and the Environment (4)
PHYS 445* Image Analysis and Pattern Recognition (3)

REQUIRED SUPPORTING AND OTHER GE COURSES (36 units):

American Institutions Requirement (6)
Other GE Courses in Categories A-E (30)

(* Double-counted toward upper-division GE credits.)

MATH 150 Calculus I (4)

3. PHYSICS (8 UNITS)

select either

PHYS 100 Introduction to Physics I (4)
PHYS 101 Introduction to Physics II (4)

or

PHYS 200 General Physics I (4)
PHYS 201 General Physics II (4)

4. Required General Education Courses (6 UNITS)

ENGL 330 Writing in the Disciplines, GE-A1, A2, UDID (3)

AND select one of the following:

BIOL 326* Scientific and Professional Ethics, GE-D (3)
PHYS/ENGL 338* Science and Conscience, GE-B1, C2, UDID (3)

5. Other GE Courses in Categories A-D (27 units)

CATEGORY A (6) THREE UNITS COVERED BY A REQUIRED GE COURSE FOR THE DEGREE PROGRAM
CATEGORY B- COVERED BY REQUIRED COURSES FOR THE DEGREE PROGRAM
CATEGORY C (9) THREE UNITS COVERED BY A REQUIRED GE COURSE FOR THE DEGREE PROGRAM
CATEGORY D (12)
CATEGORY E- COVERED BY A REQUIRED GE COURSE FOR THE DEGREE PROGRAM

6. American Institutions Requirement (6 units)

(Courses with * are double-counted toward GE credits.)

1. Bachelor of Science in Biology
SUMMARY OF CHANGES

- The organic chemistry and molecular biology courses are reinstated into the BS in Biology program.
- MATH 105 is deleted from the BS in Biology program.
- The section on Subject Matter Preparation in Biology is deleted from the BS in Biology program.
- The courses that are double-counted toward the GE credits and the required GE units in various categories are more explicitly stated throughout the program.
- The format of the curriculum description is rearranged.

JUSTIFICATION
The following are the reasons for proposing the above changes to the Bachelor of Science in Biology degree:
A) We are going to have a new BA in Biology degree program, starting in fall 2004. In the new BA program, there is an emphasis in Subject Matter Preparation in Teaching Biology. Because of this, there is no longer the need to keep a duplicate program under the BS in Biology program. The reinstatement of the organic chemistry and molecular biology courses and the deletion of the MATH 105 and the 14 units of subject matter preparation requirements from the BS in Biology program are due to this reason. With the above changes, all biology students, in both the BA and BS programs, are required to take molecular biology, which is one of the key components of modern biology. All students in the BS programs are required to take organic chemistry, which provides essential quantitative and analytical knowledge and skills for in-depth study in biology. Due to the quantitative demand, students in the BS programs are required to take MATH 150 Calculus, instead of MATH 105 Pre-Calculus.
B) The GE categories and their associated units are inserted explicitly for the convenience of our students and the academic advisors.
C) The rearrangement of the format of the curriculum description is to make it consistent with the description of our new BA in Biology program.

2. Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology
SUMMARY OF CHANGES

- The courses that are double-counted toward the GE credits and the required GE units in various categories are more explicitly stated throughout the program.
- The format of the curriculum description is rearranged without changing the requirements.

JUSTIFICATION
See 1. B and C.

3. Bachelor of Science in Biology with an Emphasis in Medical Imaging.
SUMMARY OF CHANGES

- BIOL 302 is added to the Medical Imaging Emphasis.
- The courses that are double-counted toward the GE credits and the required GE units in various categories are more explicitly stated throughout the program.
- The format of the curriculum description is rearranged.

JUSTIFICATION
A) Genetics is an essential component in biology. Hence, BIOL 302 Genetics is a required course in all biology programs, including the BA and the BS. It should be included in the Medical Imaging Emphasis as well. Since this is an interdisciplinary program between biology and physics, we have

consulted with the physics faculty member, Dr. Geoffrey Dougherty, who has agreed with the addition with no reservation.

Other justification, see 1. B and C.

OTHER CHANGES: Program faculty was updated. Some miscounting of units was corrected.

Ching-Hua Wang Oct 15, 04

Proposer of Program Modification Date

Approvals

_____

Program Chair Date

_____

Curriculum Committee Chair Date

_____

Dean Date

California State University Channel Islands
Program Modification Consultation Sheet

1. Course Title: _____

_____

2. Program Area: _____

Recommend Approval

Program Area/Unit	**Program/Unit Chair**	**YES**	**NO** (attach objections)	**Date**
Art				
Biology				
Business & Economics				
Education				
English				
History				
Liberal Studies				
Mathematics & CS				
Multiple Programs				
Psychology				
Library				
Information Technology				