

**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).

<b>EXISTING PROGRAM</b>	<b>PROPOSED PROGRAM</b>
<p><b>Name of Degree Program</b></p> <ul style="list-style-type: none"> <li>• Bachelor of Science in Biology</li> <li>• Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology</li> <li>• Bachelor of Science in Biology with an Emphasis in Medical Imaging</li> <li>• Minor in Biology</li> <li>• Certificate in Biotechnology</li> </ul>	<p><b>Name of Degree Program</b></p> <ul style="list-style-type: none"> <li>• Bachelor of Science in Biology</li> <li>• Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology</li> <li>• Bachelor of Science in Biology with an Emphasis in Medical Imaging</li> <li>• Minor in Biology</li> <li>• Certificate in Biotechnology</li> </ul>
<p><b>Catalog Description of the Program</b></p> <p>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.</p> <p>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. The Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology</p>	<p><b>Catalog Description of the Program</b></p> <p>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.</p> <p>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.</p>

<p>also 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.</p> <p>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.</p> <p>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.</p> <p><b>CONTACT INFORMATION</b> Biology@csuci.edu</p> <p><b>FACULTY</b></p> <p>Ching-Hua Wang, MD, PhD, Professor of Biology Academic Coordinator</p>	<p><b>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.</b></p> <p>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.</p> <p>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.</p> <p>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.</p> <p><b>CONTACT INFORMATION</b> Biology@csuci.edu</p> <p><b>FACULTY</b></p> <p>Ching-Hua Wang, MD, PhD, Professor and Chair of Biology</p>
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<p>Academic Advisor Phone: (805) 437-8870 Email: <a href="mailto:ching-hua.wang@csuci.edu">ching-hua.wang@csuci.edu</a></p> <p><u>Simone Aloisio, PhD, Assistant Professor of Chemistry</u> Phone: (805) 437-8999 Email: <a href="mailto:simone.aloisio@csuci.edu">simone.aloisio@csuci.edu</a></p> <p><u>Nikolaos Diamantis, PhD, Assistant Professor of Mathematics</u> Phone: (805) 437-8991 Email: <a href="mailto:nikolaos.diamantis@csuci.edu">nikolaos.diamantis@csuci.edu</a></p> <p>Geoffrey Dougherty, PhD, Professor of Physics Phone: (805) 437-8990 Email: <a href="mailto:geoffrey.dougherty@csuci.edu">geoffrey.dougherty@csuci.edu</a></p> <p><u>Ivona Grzegorzczak, PhD, Professor of Mathematics</u> Phone: (805) 437-8868 Email: <a href="mailto:ivona.grze@csuci.edu">ivona.grze@csuci.edu</a></p> <p><u>Philip Hampton, PhD, Professor of Chemistry</u> Phone: (805) 437-8869 Email: <a href="mailto:philip.hampton@csuci.edu">philip.hampton@csuci.edu</a></p> <p>Louise Lutze-Mann, PhD, Associate Professor of Biology Phone: (805) 437-8873 Email: <a href="mailto:louise.lutze-mann@csuci.edu">louise.lutze-mann@csuci.edu</a></p> <p>Nancy Mozingo, PhD, Assistant Professor of Biology Phone: (805) 437-8989 Email: <a href="mailto:Nancy.mozingo@csuci.edu">Nancy.mozingo@csuci.edu</a></p> <p><b>Requirements for the Degree Program</b></p> <p><b><u>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY- for pre-professional and general biology students</u></b> (120 units):</p> <p>LOWER DIVISION REQUIREMENTS (31 units):</p> <p>1. Biology BIOL 200 Principles of Organismal and Population Biology (4) BIOL 201 Principles of Cell and Molecular</p>	<p>Academic Advisor Phone: (805) 437-8870 Email: <a href="mailto:ching-hua.wang@csuci.edu">ching-hua.wang@csuci.edu</a></p> <p>AMY DENTON, PH.D., ASSISTANT PROFESSOR OF BIOLOGY PHONE (805) 437-8458 EMAIL: <a href="mailto:AMY.DENTON@CSUCI.EDU">AMY.DENTON@CSUCI.EDU</a></p> <p>Geoffrey Dougherty, PhD, Professor of Physics Phone: (805) 437-8990 Email: <a href="mailto:geoffrey.dougherty@csuci.edu">geoffrey.dougherty@csuci.edu</a></p> <p>Louise Lutze-Mann, PhD, Associate Professor of Biology Phone: (805) 437-8873 Email: <a href="mailto:louise.lutze-mann@csuci.edu">louise.lutze-mann@csuci.edu</a></p> <p>Nancy Mozingo, PhD, Assistant Professor of Biology Phone: (805) 437-8989 Email: <a href="mailto:Nancy.mozingo@csuci.edu">Nancy.mozingo@csuci.edu</a></p> <p><b>Requirements for the Degree Program</b></p> <p><b>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY</b> (120 units)</p> <p><b>Lower Division Requirements (31 units)</b></p> <p>1. Biology BIOL 200 Principles of organismal and population biology (4) BIOL 201 Principles of cell and molecular biology (4) BIOL 202 Biostatistics (3)</p>
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<p>Biology (4) BIOL202 Biostatistics (3)</p> <p>2. Mathematics MATH 150 Calculus I (4)</p> <p>3. <u>Chemistry</u> CHEM 121 General Chemistry I (4) CHEM 122 General Chemistry II (4)</p> <p>4. <u>Physics</u> 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)</p> <p>(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different disciplines)</p> <p><u>UPPER DIVISION REQUIREMENTS (33 units):</u></p> <p>1. <u>Biology</u> BIOL 300 Cell Physiology (4) BIOL 302 Genetics and Evolution (4) BIOL 400 Molecular Biology and Molecular Genetics (4) BIOL 433* Ecology and the Environment (4)</p> <p>2. <u>Organic Chemistry</u> CHEM 311 &amp; 312 Organic Chemistry I (4) CHEM 314 &amp; 315 Organic Chemistry II (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.)</p> <p>3. <u>Ethics</u> Select one of the following: BIOL 346* Scientific and Professional Ethics (3) PHYS/ENGL 338* Science and Conscience (3)</p> <p>4. <u>Computing in Biology</u> Select one of the following courses: BIOL 410 Computer Applications in Biomedical Fields (3)</p>	<p>2. Mathematics MATH 105 PRE-CALCULUS or MATH 150 Calculus I (4)</p> <p>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.</p> <p><b>Upper Division Requirements (21 UNITS)</b> 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) BIOL 494 Independent research or BIOL 497 Directed study (2) BIOL 499 Senior capstone colloquium (1)</p> <p><b>Electives in biology (10-12)</b> Select at least three courses from the following list, one of which must be a lab course. BIOL 301 BIOL 310 BIOL 311 BIOL 312 BIOL 313 BIOL 316 BIOL 317 BIOL 329 BIOL 400 BIOL 401 BIOL 402 BIOL 420 BIOL 421 BIOL 422 BIOL 423 BIOL 424 BIOL 425 BIOL 427 BIOL 428 BIOL 431 BIOL 432 BIOL 450</p>
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<p><u>BIOL 430* Research Design and Data Analysis (3)</u></p> <p><u>BIOL431* Bioinformatics (4)</u></p> <p>5. Service Learning A minimum of 2 units taken from the following: BIOL 494 Independent Research (1-3) BIOL 497 Directed Study (1-3)</p> <p>6. Capstone BIOL 499 Senior Capstone Colloquium (1)</p> <p>(Courses with * are double-counted toward upper-division GE credits.)</p> <p>ELECTIVES IN BIOLOGY (14 units) A minimum of 14 units chosen from 300 to 400 level upper division biology courses, with at least one lab-based course and no more than two courses that could be taken at 300 level (no courses from BIOL 331 to 343 would be counted toward the major). CHEM 318 or CHEM 400 could also be taken to satisfy the electives.</p> <p>ELECTIVES IN ANY DISCIPLINE (6 units)</p> <p>REQUIRED SUPPORTING AND OTHER GE COURSES (36 units): ENGL 330 Writing in the Disciplines (3) American Institutions Requirement (6) Other GE Courses in Categories A-E (27)</p> <p><b>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN CELL AND MOLECULAR BIOLOGY (120 units):</b></p> <p>LOWER DIVISION REQUIREMENTS (31 units):</p> <p>1. Biology BIOL 200 Principles of Organismal and Population Biology (4) BIOL 201 Principles of Cell and Molecular Biology (4) BIOL 202 Biostatistics (3)</p> <p>2. Mathematics MATH 150 Calculus I (4)</p>	<p><b>Required Supporting and other GE Courses</b> American institutions requirement (6) Other GE courses (39) University electives (12-14)</p> <p><b>Additional Courses for SUBJECT MATTER PREPARATION IN BIOLOGY (14)</b> Subject matter preparation in biology can be met by fulfilling the requirements for the BS in Biology and successfully completing the following 14 units: PHYS 105 Introduction to the Solar System (4) GEOL 121 Physical Geology (4) BIOL 335 THE BIOSPHERE (3) EDUC 330 Introduction to secondary schooling (3) TOTAL: 14</p> <p><b>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN CELL AND MOLECULAR BIOLOGY (120 units):</b></p> <p>LOWER DIVISION REQUIREMENTS (31 units):</p> <p>1. Biology BIOL 200 Principles of Organismal and Population Biology (4) BIOL 201 Principles of Cell and Molecular Biology (4) BIOL 202 Biostatistics (3)</p> <p>2. Mathematics MATH 150 Calculus I (4)</p> <p>3. PHYSICAL SCIENCE</p>
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<p><u>3. Chemistry</u>  <u>CHEM 121 General Chemistry I (4)</u>  <u>CHEM 122 General Chemistry II (4)</u></p> <p><u>4. Physics</u>  <u>Select either</u>  <u>PHYS 100 Introduction to Physics I (4)</u>  <u>PHYS 101 Introduction to Physics II (4)</u>  <u>or</u>  <u>PHYS 200 General Physics I (4)</u>  <u>PHYS 201 General Physics II (4)</u></p> <p>(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different disciplines)</p> <p>UPPER DIVISION REQUIREMENTS (41-42 units):</p> <p>1. Biology  <u>BIOL 300 Cell Physiology (4)</u>  BIOL 301 Microbiology (4)  <u>BIOL 302 Genetics and Evolution (4)</u>  BIOL 400 Molecular Biology and Molecular Genetics (4)  BIOL 401 Biotechnology and Recombinant DNA Techniques (5)  <u>BIOL 433* Ecology and the Environment (4)</u></p> <p>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)  <u>CHEM 318 Biological Chemistry (3)</u></p> <p>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</p>	<p>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)</p> <p>(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different disciplines)</p> <p>UPPER DIVISION REQUIREMENTS (44 units):</p> <p>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  BIOL 494 Independent research or BIOL 497 Directed study (1-3)  BIOL 499 Senior capstone colloquium (1)</p> <p>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)</p> <p>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:</p>
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<p>311, 312, 314, 315.)</p> <p>3. Ethics Select one of the following: BIOL 346* Scientific and Professional Ethics (3) PHYS/ENGL 338* Science and Conscience (3)</p> <p>4. Computing in Biology Select one of the following: <u>BIOL 430* Research Design and Data Analysis</u> (3) BIOL 431* Bioinformatics (4)</p> <p>5. Service Learning 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)</p> <p>6. Capstone BIOL 499 Senior Capstone Colloquium (1)</p> <p>(Courses with * are double-counted toward upper-division GE credits.)</p> <p>ELECTIVES IN BIOLOGY (8-9 units): A minimum of 8-9 units chosen from 400 level courses, excluding BIOL 410.</p> <p>ELECTIVES IN ANY DISCIPLINE (6 units)</p> <p>REQUIRED SUPPORTING AND OTHER GE COURSES (33 units): ENGL 330 Writing in the Disciplines (3) American Institutions Requirement (6) <u>Other GE Courses in Categories A-E (24)</u></p>	<p>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.)</p> <p>3. Required General Education Courses ENGL 330 WRITING IN THE DISCIPLINES AND Select one of the following: BIOL 346* Scientific and Professional Ethics (3) PHYS/ENGL 338* Science and Conscience (3)</p> <p>(Courses with * are double-counted toward upper-division GE credits.)</p> <p>ELECTIVES IN BIOLOGY (9 units) Select at least 9 units of courses from the following list: BIOL 402 BIOL 416 BIOL 420 BIOL 421 BIOL 422 BIOL 423 BIOL 424 BIOL 425 BIOL 427 BIOL 428 BIOL 432 BIOL 433</p> <p>ELECTIVES IN ANY DISCIPLINE (6 units)</p> <p>REQUIRED SUPPORTING AND OTHER GE COURSES (36 UNITS): American Institutions Requirement (6) OTHER GE COURSES IN CATEGORIES A-E (30)</p>
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<p><b>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN MEDICAL IMAGING (120 units):</b></p> <p>LOWER DIVISION REQUIREMENTS (36 units):</p> <ol style="list-style-type: none"> <li>1. Biology <ul style="list-style-type: none"> <li>BIOL 200 Principles of Organismal and Population Biology (4)</li> <li>BIOL 201 Principles of Cell and Molecular Biology (4)</li> <li>BIOL 210 Human Anatomy and Physiology I (4)</li> <li>BIOL 211 Human Anatomy and Physiology II (4)</li> </ul> </li> <li>2. Mathematics <ul style="list-style-type: none"> <li>MATH 150 Calculus I (4)</li> </ul> </li> <li>3. Chemistry <ul style="list-style-type: none"> <li><u>CHEM 121 General Chemistry I (4)</u></li> <li><u>CHEM 122 General Chemistry II (4)</u></li> </ul> </li> <li>4. Physics <ul style="list-style-type: none"> <li><u>Select either</u></li> <li><u>PHYS 100 Introduction to Physics I (4)</u></li> <li><u>PHYS 101 Introduction to Physics II (4)</u></li> <li><u>or</u></li> <li><u>PHYS 200 General Physics I (4)</u></li> <li><u>PHYS 201 General Physics II (4)</u></li> </ul> </li> </ol> <p>(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different science disciplines)</p> <p>UPPER DIVISION REQUIREMENTS (41 units):</p> <ol style="list-style-type: none"> <li>1. Biology <ul style="list-style-type: none"> <li>BIOL 300 Cell Physiology (4)</li> <li>BIOL 301 Microbiology (4)</li> <li>BIOL 400 Molecular Biology and Molecular Genetics (4)</li> </ul> </li> <li>2. Organic Chemistry and Biochemistry</li> </ol>	<p><b>REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN BIOLOGY WITH AN EMPHASIS IN MEDICAL IMAGING (120 units):</b></p> <p>LOWER DIVISION REQUIREMENTS (36 units):</p> <ol style="list-style-type: none"> <li>1. Biology <ul style="list-style-type: none"> <li>BIOL 200 Principles of Organismal and Population Biology (4)</li> <li>BIOL 201 Principles of Cell and Molecular Biology (4)</li> <li>BIOL 210 Human Anatomy and Physiology I (4)</li> <li>BIOL 211 Human Anatomy and Physiology II (4)</li> </ul> </li> <li>2. Mathematics <ul style="list-style-type: none"> <li>MATH 150 Calculus I (4)</li> </ul> </li> <li>3. PHYSICAL SCIENCE <ul style="list-style-type: none"> <li>CHEM 121 General Chemistry I (4)</li> <li>CHEM 122 General Chemistry II (4)</li> <li>AND select either</li> <li>PHYS 100 Introduction to Physics I (4)</li> <li>PHYS 101 Introduction to Physics II (4)</li> <li>or</li> <li>PHYS 200 General Physics I (4)</li> <li>PHYS 201 General Physics II (4)</li> </ul> </li> </ol> <p>(12 units of the above courses will be counted toward lower-division GE credits, 4 units in each of three different science disciplines)</p> <p>UPPER DIVISION REQUIREMENTS (38 units):</p> <ol style="list-style-type: none"> <li>1. Biology and Physics <ul style="list-style-type: none"> <li>BIOL 300 CELL BIOLOGY (4)</li> <li>BIOL 301 Microbiology (4)</li> <li>BIOL 400 Molecular Biology and Molecular Genetics (4)</li> <li>PHYS 492 Physics Internship (3) OR</li> <li>BIOL 494/PHYS 494 Independent Research (1-3) OR BIOL/PHYS 497 Directed Study (1-3)</li> <li>BIOL/PHYS 499 Senior Capstone</li> </ul> </li> </ol>
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<p>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.)</p> <p>3. Ethics  Select one of the following:  BIOL 346* Scientific and Professional Ethics (3)  PHYS/ENGL 338* Science and Conscience (3)</p> <p>4. Medical Imaging  BIOL/PHYS 416 Radiobiology and Radionuclides (3)  BIOL/PHYS 434* Introduction to Biomedical Imaging (3)  BIOL/PHYS 464 Biomedical Instrumentation (4)</p> <p><u>5. Computing in Medical Imaging</u>  <u>BIOL 410 Computer Applications in Biomedical Fields (3)</u>  <u>BIOL 430* Research Design and Data Analysis (3)</u></p> <p>6. Service Learning  A minimum of 2 units taken from the following:  PHYS 492 Physics Internship (3)  BIOL 494 Independent Research (1-3)    PHYS 494 Independent Research (3)  BIOL 497 Directed Study (1-3)  PHYS 497 Directed Study (3)</p> <p>7. Capstone  BIOL/PHYS 499 Senior Capstone Colloquium (1)</p> <p>(Courses with * are double-counted toward upper-division GE credits.)</p> <p>ELECTIVES IN BIOLOGY AND PHYSICS (10):  10 units chosen from upper-division courses in Biology and/ or Physics.</p>	<p>Colloquium (1)</p> <p>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.)</p> <p>3. Required General Education Courses  ENGL 330 WRITING IN THE DISCIPLINES AND Select one of the following:  BIOL 346* Scientific and Professional Ethics (3)  PHYS/ENGL 338* Science and Conscience (3)</p> <p>4. Medical Imaging  BIOL/PHYS 416 Radiobiology and Radionuclides (3)  BIOL/PHYS 434* Introduction to Biomedical Imaging (3)  BIOL/PHYS 464 Biomedical Instrumentation (4)</p> <p>(Courses with * are double-counted toward upper-division GE credits.)</p> <p>ELECTIVES IN BIOLOGY AND PHYSICS (10):  Select at least 10 units of courses from the following list:  BIOL 302  BIOL/PHYS 315  BIOL 401  BIOL 402  BIOL 420  BIOL 421  BIOL 422  BIOL 423  BIOL 424  BIOL 425  BIOL 427  BIOL 428  BIOL 431  BIOL 432  BIOL 433  PHYS 445</p>
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<p><u>REQUIRED SUPPORTING AND OTHER GE COURSES (33 units):</u></p> <p>ENGL 330 Writing in the Disciplines (3)</p> <p>American Institutions Requirement (6)</p> <p><u>Other GE Courses in Categories A-E (24)</u></p>	<p><u>REQUIRED SUPPORTING AND OTHER GE COURSES (36 units):</u></p> <p>American Institutions Requirement (6)</p> <p><u>OTHER GE COURSES IN CATEGORIES A-E (30)</u></p>
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## **1. Bachelor of Science in Biology**

### **SUMMARY OF CHANGES**

- The number of units required for the BS in Biology was reduced from 78 units to 62-64 units.
- The lower division core is unchanged except for allowing MATH 105 instead of MATH 150.
- The upper division requirements were modified to include coursework covering a broader range of topics including the addition of an evolutionary biology course and a physiology course.

### **JUSTIFICATION**

There were two motivations for proposing these changes to the Bachelor of Science in Biology degree:

A) A reduction in the number of units in the major was deemed desirable to allow students expanded opportunities to engage in cross-disciplinary opportunities such as the pursuit of minors and double majors.

B) A degree program was needed that would provide students with subject matter preparation in biology. The proposed changes in the degree were designed to meet the CCTC standards. The CCTC standards for subject matter preparation in biology are more general than the existing general biology degree. Students interested in subject matter preparation in Biology can meet the standards by completing the BS in Biology along with 14 additional units.

## **2. Bachelor of Science in Biology with an emphasis in Cell and Molecular Biology**

### **SUMMARY OF CHANGES**

- BIOL 433 was replaced by BIOL 303 as a requirement.
- BIOL 431 was made a requirement
- Required and supporting and other GE courses category changed from 33 to 39 units

### **JUSTIFICATION**

Three minor modifications were made to this emphasis. Since evolution is a central, unifying theme throughout all biological fields, a course in evolution (BIOL 303) was made a requirement rather than ecology (BIOL 433). Previously, students could choose either BIOL 430 or BIOL 431, however, since knowledge of bioinformatics is essential for students choosing this emphasis, BIOL 431 was made a requirement rather than an option. The number of units for GE courses was changed due to a miscalculation.

## **3. Bachelor of Science in Biology with an emphasis in Medical Imaging.**

### **SUMMARY OF CHANGES**

- Required and supporting and other GE courses category changed from 33 to 39 units
- Computing in biology courses were dropped as a requirement

### **JUSTIFICATION**

The number of units for GE courses was changed due to a miscalculation. The Medical Imaging emphasis is computer-intensive, thus it was redundant to have an additional computing in biology requirement for this emphasis, thus it was removed.

**OTHER CHANGES:** Program faculty was updated.

\_\_\_\_Nancy Mozingo and Ching-Hua Wang\_\_\_\_5 Dec03\_\_\_\_  
Proposer of Program Modification                      Date

## Approvals

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Program Chair

Date

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Curriculum Committee Chair

Date

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Dean

Date

**California State University Channel Islands**  
**Program Modification Consultation Sheet**

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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				

