

Student ID: _____ Student Name: _____ Adviser Name: _____	Catalog: Semester Catalog 2017-2018 Program: Natural Science, B.S. Minimum Credits Required: _____
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Natural Science, B.S.

The Bachelor of Science Degree in Natural Science provides broad training across several science disciplines and is offered as three options: Interdisciplinary Science (Option I), Teaching (Option II), and Applied Science (Option III). Natural Science majors choose one option. Majors choosing the Interdisciplinary Science or Teaching option must select an emphasis area (biology, chemistry, geoscience, or physics), and majors choosing the Applied Science option must select an emphasis area in food science, medical science, or bridge to clinical laboratory science. The bridge to clinical laboratory science emphasis area prepares students to be eligible to apply for post-baccalaureate training programs in clinical laboratory science and is limited to students who have already completed a medical laboratory technician program of coursework and/or have obtained a medical laboratory technician license in the State of California. Students should speak with a Natural Science adviser before choosing an option.

High school preparation is recommended in algebra (two years), chemistry, geometry, physics, and trigonometry.

In each option students must earn a grade of C or higher in all courses that satisfy the following university, general education or major requirements.

The total number of units required for the Bachelor of Science degree in Natural Science, Interdisciplinary Science Option is 120 units, of which 71-79 units are in the major depending on the emphasis selected.

The total number of units required for the Bachelor of Science degree in Natural Science Teaching Option is 120 units, of which 81 units are in the major.

The total number of units required for the Bachelor of Science degree in Natural Science, Applied Science Option is 120 units, of which 70-76 units are in the major, depending on the emphasis selected.

Consult with an advisor for the specific number of units required in all areas of the degree including General Education, 40 upper-division unit graduation requirement, and elective units needed to complete the major.

Options

Option I - Bachelor of Science Degree in Natural Science (Interdisciplinary Science)

Option II - Bachelor of Science Degree in Natural Science (Teaching)

Option III - Bachelor of Science Degree in Natural Science (Applied Science)

Option I - Bachelor of Science Degree in Natural Science (Interdisciplinary Science)

The Interdisciplinary Science Option of the Bachelor of Science degree in Natural Science is of value to those seeking careers where a broad science background is useful, including careers in academia, business, government, law, medicine, nonprofit organizations, and other fields. Students study multiple natural science disciplines (i.e., biology, chemistry, geoscience, and physics) and choose one area from biology, chemistry, geoscience, and physics as an emphasis area of study. Total number of units required for the degree is 120.

Requirements for the Major (71-79 units)

Core Requirements (39-46 units)

Students must choose one emphasis area from among biology, chemistry, geology, or physics as a focus of study that determines additional Core requirements specific to each emphasis area.

Core requirements for all emphasis areas (18 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 1100 - Principles of Biology I	(5)			
BIOL 1200 - Principles of Biology II	(5)			
MATH 2110 - Calculus I	(4)			
MATH 2120 - Calculus II	(4)			

Capstone Course (3 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4950 - Natural Science Field Studies	(3)			

Additional Core requirements based on Emphasis area (18-25 units)

Biology Emphasis (20-25 units)

- CHEM 1100 - General Chemistry I (5)
- CHEM 1110 - General Chemistry II (5)

Choose two sets of courses from the following three sets:

Course Name	Credits:	Term Taken	Grade	Gen Ed
ASTR 1510 - Principles of Astronomy	(2)			
ASTR 1520 - Principles of Astronomy: Laboratory	(1)			
GEOL 1500 - Earth Revealed	(3)			
GEOL 2520 - Historical Geology	(4)			
PHYS 1100 - Physics	(4)			
PHYS 1200 - Physics	(4)			

Chemistry Emphasis (20-25 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 1100 - General Chemistry I	(5)			
CHEM 1110 - General Chemistry II	(5)			

Choose two sets of courses from the following three sets:

Course Name	Credits:	Term Taken	Grade	Gen Ed
ASTR 1510 - Principles of Astronomy	(2)			
ASTR 1520 - Principles of Astronomy: Laboratory	(1)			
GEOL 1500 - Earth Revealed	(3)			
GEOL 2520 - Historical Geology	(4)			
PHYS 1100 - Physics	(4)			
Note: PHYS 2100 - Physics A is recommended in lieu of PHYS 1100.				
PHYS 1200 - Physics	(4)			
Note: PHYS 2200 - Physics B is recommended in lieu of PHYS 1200.				

Geoscience Emphasis (18-25 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
GEOL 1500 - Earth Revealed	(3)			
GEOL 2520 - Historical Geology	(4)			

Choose two sets of courses from the following three sets:

Course Name	Credits:	Term Taken	Grade	Gen Ed
ASTR 1510 - Principles of Astronomy	(2)			
ASTR 1520 - Principles of Astronomy: Laboratory	(1)			
CHEM 1100 - General Chemistry I	(5)			
CHEM 1110 - General Chemistry II	(5)			

PHYS 1100 - Physics	(4)			
PHYS 1200 - Physics	(4)			
Physics Emphasis (20-23 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
ASTR 1510 - Principles of Astronomy	(2)			
ASTR 1520 - Principles of Astronomy: Laboratory	(1)			
PHYS 2100 - General Physics I: Mechanics	(5)			
PHYS 2200 - General Physics II: Electromagnetism and Circuits	(5)			
Choose one set of courses from the following two sets:				
Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 1100 - General Chemistry I	(5)			
CHEM 1110 - General Chemistry II	(5)			
GEOL 1500 - Earth Revealed	(3)			
GEOL 2520 - Historical Geology	(4)			
Select One Emphasis				
Students must choose the same emphasis area that was chosen to determine their additional Core requirements.				
Biology Emphasis (32 units)				
Required (20 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3000 - Biostatistics	(3)			
BIOL 3200 - Professional Writing in the Life Sciences	(3)			
BIOL 3400 - Cell Biology and Genetics	(3)			
BIOL 3800 - Ecology and Evolution	(3)			
CHEM 2200 - Organic Chemistry I	(4)			
MICR 3100 - General Microbiology	(4)			
Upper Division Electives (12 units)				
Select upper division electives with advisor approval from the following: upper division BIOL, CHEM, GEOG, GEOL, MATH, PHYS or NATS courses. A maximum of 3 units of directed study is allowed.				
Free Electives (3-10 units)				
Select lower and/or upper division electives with advisor approval. Completion of additional Core courses in ASTR (2,1 units), CHEM (5,5 units), GEOL (3,4 units) and/or PHYS (4,4 units) is strongly recommended.				
Chemistry Emphasis (32 units)				
Required Courses (22 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 2200 - Organic Chemistry I	(4)			
CHEM 3100 - Writing for Chemists	(3)			
CHEM 3200 - Organic Chemistry II	(4)			
CHEM 3500 - Quantitative Analysis †	(4)			
CHEM 3600 - Inorganic Chemistry	(4)			
CHEM 4300 - Introduction to Biochemistry	(3)			
Upper Division Electives (10 units)				
Select upper division electives with advisor approval from the following: upper division BIOL, CHEM, GEOG, GEOL, MATH, PHYS or NATS courses. A maximum of 3 units of directed study is allowed.				
Free Electives (3-8 units)				
Select lower and/or upper division electives with advisor approval. Completion of additional Core courses in ASTR (3 units), GEOL (3, 4 units), and/or PHYS (8 units) is strongly recommended.				
Geoscience Emphasis (32 units)				
Required (19 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3200 - Professional Writing in the Life Sciences	(3)			
GEOG 2680 - Introduction to Geospatial Sciences	(4)			
GEOG 4100 - Applied Climatology	(3)			
GEOL 3010 - Mineralogy and Petrology	(4)			
GEOL 3210 - Geology of Southern California	(3)			
GEOL 4350 - Coastal Processes and Environments	(3)			
Upper Division Electives (13 units)				
Select upper division electives with advisor approval from the following: upper division BIOL, CHEM, GEOG, GEOL, MATH, PHYS or NATS courses. A maximum of 3 units of directed study is allowed.				
Free Electives (3-10 units)				
Select lower and/or upper division electives with advisor approval. Completion of additional Core courses in ASTR (3 units), CHEM (5, 5 units), and/or PHYS (8 units) is strongly recommended.				
Physics Emphasis (35 units)				
Required (10 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 3100 - Writing for Chemists	(3)			
MATH 2130 - Calculus III	(3)			
PHYS 3400 - Modern Physics and Thermodynamics	(4)			
Upper Division Electives (25 units)				
Select upper division electives with advisor approval from the following: upper division BIOL, CHEM, GEOG, GEOL, MATH, PHYS or NATS courses. Must include one PHYS lab course. A maximum of 3 units of directed study is allowed.				
Free Electives (3-10 units)				
Select lower and/or upper division electives with advisor approval. Completion of additional Core courses in CHEM (5, 5 units), and/or GEOL (3,4 units) is strongly recommended.				
The table below summarizes the various unit requirements for each emphasis area of the Interdisciplinary Science Option of the Bachelor of Science degree in Natural Science.				
Table 1. Unit distribution for Interdisciplinary Science option (Option I) for each emphasis area.				
	Option I (Biology Emphasis)	Option I (Chemistry Emphasis)	Option I (Geoscience Emphasis)	Option I (Physics Emphasis)
¹ Lower division GE	30	30	30	30
Upper division GE	9	9	9	9
Lower division major core	28	18	18	18
Lower division major core (additional)	10-15	20-25	18-25	20-23

Upper division major core	3	3	3	3
Emphasis specific required courses	20	22	19	10
Upper division elective courses	12	10	13	25
² Free electives	3-10	3-8	3-10	2-5
Total units	120	120	120	120

¹Natural Science majors are required to take lower division core courses in science and math that also meet the requirements for Block B Natural Sciences and Mathematics (9 units).
²It is strongly recommended that Natural Science majors complete additional Core courses from ASTR, BIOL, CHEM, GEOL, and/or PHYS.

Option II - Bachelor of Science Degree in Natural Science (Teaching)

The Teaching Option of the Bachelor of Science degree in Natural Science is designed specifically for pre-service middle and high school science teachers. The degree option satisfies the subject matter requirement for a California Single Subject Teaching Credential in Science. In order to earn the Single Subject Teaching Credential, individuals must complete a separate program of professional education courses approved by the State of California as a teacher preparation program (credential program). Although the Teaching Option in Natural Science meets the subject matter requirement for obtaining a teaching credential, this degree option is not a credential program. Students should consult with a Natural Science program adviser and with a credential adviser in the Charter College of Education for additional requirements for earning a teaching credential in California. Students selecting the Teaching Option must choose one area from biology, chemistry, geoscience, and physics as an emphasis area of study. Total number of units required for the degree is 120.

Requirements for the Major (81 units)

Core Requirements (50-52 units)

* PHYS 2100 and 2200 (5,5) is required for Physics Emphasis students and recommended for Chemistry Emphasis students in lieu of PHYS 1100 and 1200.

Course Name	Credits:	Term Taken	Grade	Gen Ed
ASTR 1510 - Principles of Astronomy	(2)			
ASTR 1520 - Principles of Astronomy: Laboratory	(1)			
BIOL 1100 - Principles of Biology I	(5)			
BIOL 1200 - Principles of Biology II	(5)			
CHEM 1100 - General Chemistry I	(5)			
CHEM 1110 - General Chemistry II	(5)			
GEOL 1500 - Earth Revealed	(3)			
GEOL 1550 - Oceanography	(3)			
GEOL 2520 - Historical Geology	(4)			
MATH 2110 - Calculus I	(4)			
MATH 2120 - Calculus II	(4)			
NATS 3980 - Field Observations in Science Education	(1)			
* PHYS 1100 - Physics	(4)			
* PHYS 1200 - Physics	(4)			

Capstone Courses (4 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4960 - Natural Science Field Studies and Pedagogy	(4)			

Select One Emphasis

Biology Emphasis (31 units)

Required (20 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3000 - Biostatistics	(3)			
BIOL 3200 - Professional Writing in the Life Sciences	(3)			
BIOL 3400 - Cell Biology and Genetics	(3)			
BIOL 3800 - Ecology and Evolution	(3)			
CHEM 2200 - Organic Chemistry I	(4)			
MICR 3100 - General Microbiology	(4)			

Required Upper Division courses (6 units)

Choose two courses from the following:

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			

Upper Division Electives (5 units)

Select upper division BIOL course(s) as electives with advisor approval. A maximum of 3 units of directed study is allowed.

Chemistry Emphasis (31 units)

Required (23 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 2201 - Organic Chemistry Laboratory I †	(1)			
CHEM 2200 - Organic Chemistry I	(4)			
CHEM 3100 - Writing for Chemists	(3)			
CHEM 3200 - Organic Chemistry II	(4)			
CHEM 3500 - Quantitative Analysis †	(4)			
CHEM 3600 - Inorganic Chemistry	(4)			
CHEM 4300 - Introduction to Biochemistry	(3)			

Required Upper Division courses (6 units)

Choose two courses from the following:

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			

Upper Division Electives (2 units)

Select upper division CHEM course(s) as electives with advisor approval. A maximum of 2 units of directed study is allowed.

Geoscience Emphasis (31 units)

Required (19 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3200 - Professional Writing in the Life Sciences	(3)			

GEOG 2680 - Introduction to Geospatial Sciences	(4)			
GEOG 4100 - Applied Climatology	(3)			
GEOL 3010 - Mineralogy and Petrology	(4)			
GEOL 3210 - Geology of Southern California	(3)			
GEOL 4350 - Coastal Processes and Environments	(3)			

Required Upper Division courses (6 units)

Choose two courses from the following:

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			

Upper Division Electives (6 units)

Select upper division GEOL or GEOG course(s) as electives with advisor approval. A maximum of 3 units of directed study is allowed.

Physics Emphasis (29 units)

Required (6 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 3100 - Writing for Chemists	(3)			
MATH 2130 - Calculus III	(3)			

Required Upper Division courses (6 units)

Choose two courses from the following:

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			

Upper Division Electives (17 units)

Select upper division PHYS or MATH course(s) as electives with advisor approval. Must include one PHYS lab course. A maximum of two MATH courses is allowed. A maximum of 3 units of directed study is allowed.

The table below summarizes the various unit requirements for each emphasis area of the Teaching Option of the Bachelor of Science degree in Natural Science

Table 2. Unit distribution for Teaching option (Option II) for each emphasis area.

	Option II (Biology Emphasis)	Option II (Chemistry Emphasis)	Option II (Geoscience Emphasis)	Option II (Physics Emphasis)
Lower division GE*	30	30	30	30
Upper division GE	9	9	9	9
Lower division major core	45	45	45	47
Upper division major core	5	5	5	5
Emphasis specific required courses	26	29	25	12
Upper division elective courses	5	2	6	17
Total units	120	120	120	120

*Natural Science majors are required to take lower division core courses in science and math that also meet the requirements for Block B Natural Sciences and Mathematics (9 units).

Option III - Bachelor of Science Degree in Natural Science (Applied Science)

The Applied Science Option of the Bachelor of Science degree in Natural Science is designed primarily for preparation for broad careers in science requiring application of a general natural science background to human behavior. Total number of units required for the degree is 120. A minimum of 24 additional units of upper division coursework is required in the emphasis area, and two courses must be designated as GE Writing Intensive (WI).

Requirements for the Major (70-76 units)

Core Requirements (49 units)

Fundamentals of Biological and Chemical Sciences (33 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 1100 - Principles of Biology I	(5)			
BIOL 1200 - Principles of Biology II	(5)			
BIOL 2010 - Human Anatomy and Physiology I	(4)			
BIOL 2020 - Human Anatomy and Physiology II	(4)			
CHEM 1010 - Fundamentals of Chemistry	(4)			
CHEM 1020 - Fundamentals of Organic Chemistry	(4)			
CHEM 3000 - Nutritional Aspects of Biochemistry	(4)			
MATH 1020 - College Algebra *	(3)			

* Students in the bridge to clinical laboratory science emphasis area MATH 1050 - Precalculus for Life Sciences

Fundamentals of Applied Science and Human Behavior (16 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
MICR 2010 - Microbiology for Health Related Sciences	(3)			
MICR 2020 - Microbiology Laboratory for Health Related Sciences	(1)			
NATS 4100 - The Nature of Science or	(3)			
NATS 4200 - Cultures of Science or	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			
NTRS 3170 - Fundamentals for Human Nutrition	(3)			
PSY 1500 - Introductory Psychology	(3)			
SOC 2010 - Introduction to Sociology	(3)			

Select One Emphasis

Bridge to Clinical Laboratory Science Emphasis (30 units)

Required (15 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3000 - Biostatistics	(3)			

BIOL 3200 - Professional Writing in the Life Sciences	(3)			
MATH 1050 - Precalculus for Life Sciences	(6)			
PHYS 1560 - Physics for the Twenty-first Century	(2)			
PHYS 1570 - Physics for the Twenty-first Century Laboratory	(1)			

Upper Division Electives (15 units)
 Select upper division electives with advisor approval from the following list of courses:

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3400 - Cell Biology and Genetics	(3)			
BIOL 3401 - Cell and Molecular Laboratory	(2)			
BIOL 4120 - Human Genetics	(3)			
BIOL 4130 - Molecular Diagnostics	(3)			
BIOL 4160 - Molecular Genetics	(3)			
BIOL 4170 - Gene Manipulation	(3)			
MICR 3300 - Microbial Genetics	(3)			
MICR 3500 - Bacterial Physiology	(3)			
MICR 3700 - Medical Microbiology	(4)			
MICR 4600 - Theoretical and Applied Immunology	(4)			
MICR 4100 - General Virology	(3)			
MICR 4200 - Emerging and Re-Emerging Infectious Diseases	(3)			
MICR 4220 - Bioterrorism and Biosecurity	(3)			
MICR 4300 - Hematology	(3)			
MICR 4400 - Fungal Pathogenesis	(3)			

Free Electives (5 units)
 Select lower and/or upper division electives with advisor approval. Completion of additional bridge to CLS or other applied science courses is strongly recommended.

Food Science Emphasis (21 units)

Required (21 units)
 Select upper division NTRS courses totaling at least 21 units with advisor approval.

Free Elective (11 units)
 Select courses with advisor approval.

Medical Science Emphasis (21 units)

Required Upper Division Elective (21 units)
 Select upper division NURS courses totaling at least 21 units with advisor approval.

Free Elective (11 units)
 Select courses with advisor approval.

Table 3. Unit distribution for Applied Science option (Option III) for each emphasis area.

	Option III (Bridge to CLS Emphasis)	Option III (Food Science Emphasis)	Option III (Medical Science Emphasis)
Lower division GE*	30	30	30
Upper division GE	09	09	09
Lower division major core	36	39	39
Lower division major core(additional)	0	0	0
Upper division major core	16	10	10
Emphasis specific required courses	15	0	0
Upper division elective courses	15	21	21
Free Electives	05	11	11
Total units	120	120	120

*Natural Science majors are required to take lower division core courses in science and math that also meet the requirements for Block B Natural Sciences and Mathematics (9 units).

Natural Science Subject Matter Program
 For students who already possess a bachelor's degree, the California Commission on Teacher Credentialing has approved the following program as satisfying the subject matter requirements of the Single Subject teaching credential in Science. The following programs are not degree programs; they are intended to meet the subject matter requirements as part of the teacher credentialing process. Students should consult with a Natural Science program adviser and with a credential adviser in the Charter College of Education. Refer to the Charter College of Education section for regulations governing all teaching credential programs.

Single Subject Credential in Science (72 or 74 units)

Core Requirements (48 or 50 units)
 Same as core requirements for the Bachelor of Science degree in Natural Science, Teaching Option, except that NATS 3980 is not required and NATS 4950 replaces NATS 4960.

Capstone Course (3 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 4950 - Natural Science Field Studies	(3)			

Select One Emphasis

Biology Emphasis (24 units)

Required (17 units)

Course Name	Credits:	Term Taken	Grade	Gen Ed
BIOL 3000 - Biostatistics	(3)			
BIOL 3400 - Cell Biology and Genetics	(3)			
BIOL 3800 - Ecology and Evolution	(3)			
CHEM 2200 - Organic Chemistry I	(4)			
MICR 3100 - General Microbiology	(4)			

Upper Division Electives (7 units)
 Select upper division electives with advisor approval from the following list. A maximum of 3 units of directed study is allowed.

Upper division BIOL course(s)

Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 3980 - Field Observations in Science Education	(1)			
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			

NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			
Chemistry Emphasis (26 units)				
Required (20 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM 2200 - Organic Chemistry I	(4)			
CHEM 2201 - Organic Chemistry Laboratory I †	(1)			
CHEM 3200 - Organic Chemistry II	(4)			
CHEM 3500 - Quantitative Analysis †	(4)			
CHEM 3600 - Inorganic Chemistry	(4)			
CHEM 4300 - Introduction to Biochemistry	(3)			
Upper Division Electives (6 units)				
Select upper division electives with advisor approval from the following list. A maximum of 3 units of directed study is allowed.				
Upper division CHEM course(s)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 3980 - Field Observations in Science Education	(1)			
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			
Geoscience Emphasis (24 units)				
Required (16 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
GEOG 2680 - Introduction to Geospatial Sciences	(4)			
GEOG 4100 - Applied Climatology	(3)			
GEOL 3010 - Mineralogy and Petrology	(4)			
GEOL 3210 - Geology of Southern California	(3)			
GEOL 4350 - Coastal Processes and Environments	(3)			
Upper Division Electives (8 units)				
Select upper division electives with advisor approval from the following list. A maximum of 3 units of directed study is allowed.				
Upper division GEOL or GEOG course(s)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 3980 - Field Observations in Science Education	(1)			
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			
Physics Emphasis (22 units)				
Required (7 units)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
MATH 2130 - Calculus III	(3)			
PHYS 3400 - Modern Physics and Thermodynamics	(4)			
Upper Division Electives (15 units)				
Select upper division electives with advisor approval from the following list. Must include one PHYS lab course. A maximum of two MATH courses is allowed. A maximum of 3 units of directed study is allowed.				
Upper division MATH and PHYS course(s)				
Course Name	Credits:	Term Taken	Grade	Gen Ed
NATS 3980 - Field Observations in Science Education	(1)			
NATS 4000 - Crosscutting Concepts in Natural Science	(3)			
NATS 4100 - The Nature of Science	(3)			
NATS 4200 - Cultures of Science	(3)			
NATS 4540 - Current Topics in Natural Science	(3)			
Notes:				