



U N I V E R S I T Y of

UC 9434 07F

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COLLEGE OF NATURAL SCIENCES AND MATHEMATICS
OFFICE OF THE DEAN

RECEIVED SEP 27 2007

Memorandum

From: Ian Evans, Associate Dean, NS&M

To: Marsha Daly

Subject: Changes in the BS in Environmental Sciences

Date: 26 September 2007

I am enclosing a request for changes in requirements for the BS degree in Environmental Sciences. These changes were approved by the NSM Curriculum Committee in Fall 2006 but the relevant paperwork entered a black hole and consequently was not reviewed by the UC – hence the year old dates on some of the documents.

Cc: Dr. W. Dupre, GEOL

NEEDS CB APPROVAL

EFFECTIVE: FALL 2008

October 9, 2006

To: NSM Curriculum Committee
From: William Dupre'
Re: Changes on BS Environmental Science degree

We are submitted a series of requested changes to the BS in Environmental Science degree, most of which were agreed upon by the departments involved Fall of 2005, and a minor revision done in Fall 2006.

A letter (Appendix A) was submitted to the chairs of Math and Chemistry in October of 2005, summarizing the requested changes. A summary of those changes is as followed:

- A. Change in the name of the degree from "Bachelor of Science in Environmental Science and Program in Environmental Systems and Modeling" to Bachelor of Science in "Environmental Science", per recommendation of the Coordinating Board. *I believe this change has already been approved, however the old degree title is what is in the catalogue description presently on the university website (Appendix B)!*
- B. Reduce the total number of hours required from 128 to 122 (~~further reduced to 120 in Fall, 2006~~) as mandated by state requirements.
- C. Changes to the general degree requirements include:
- GEOL 1130,1330 (Physical Geology w/ lab) can substitute for required GEOL 1340 (Earth Systems)
 - GEOL 1350 (Intro Meteorology) can substitute for required GEOL 1302 (Global Climate Change)
 - COSC 3361 (Numerical Methods I), MATH 3331 (Differential Equations), GEO 3377 (Introduction to Oceanography), and GEOL 3378 (Introduction to Atmospheric Science) were previously required. These courses (plus GEOL 3331-Environmental Geology and GEOL 3342-Introduction to Air Pollution) now form a group of 6 courses from which students must select 4.
 - Five ENV5 courses were previously required. These courses (plus LAW 5390-Environmental Law) now form a group of six courses from which students must select 3. This is based in part on the need to reduce the total number of hours for the degree, and in part because of the lack of these courses being offered on a regular basis.

D. Changes to the Options include:

Reduce hours required in each option from 15 to 12, to accommodate reduction in total required hours.

Option 1:

- Change the name of Option 1 from *Atmospheric Chemistry* to *Environmental Chemistry*
- Move GEOL 3342 (Intro Air Pollution) from an approved course within Option 1 to an approved course in a general requirements option.

Option 3a:

- Move GEOL 1130 and 1330 (Physical Geology & lab), and GEOL 3331 (Environmental Geology) from approved courses within Option 3a (Environmental Geosciences) to approved courses in general requirements options.
- Add GEOL 3383 (Remote Sensing) and GEOL 4331 (Intro to GIS) to approved courses in Option 3a.
- Remove GEOL 3177 (Oceanography lab) from approved courses in Option 3a.
- Replace GEOL 3325 (Rocks and Minerals – no longer offered) with GEOL 3370 (Mineralogy) – a change added in Fall 2006 due to a departmental change of required courses.

Option 3b:

- Add GEOL 3382 (Atmospheric Chemistry) to approved courses in Option 3b (Atmospheric Sciences).

I have also included appropriate catalogue language for these changes (Appendix C), as well as idealized course descriptions for Options 3a and 3b (Appendices D), to be put on our department website.

Department of Geosciences
University of Houston
Houston, TX 77204-5007
October 14, 2005

Chairpersons of Mathematics and Chemistry
College of Natural Sciences and Mathematics

Dear Chairpersons:

A revision of the Bachelor of Environmental Science degree in the College of Natural Sciences and Mathematics has been completed and approved by the faculty of the Geosciences Department. These revisions were undertaken to reflect the commitment of the faculty of the Geoscience and Mathematics Departments to the Environmental Science degree program and to make a better fit with the expertise of the new atmospheric science faculty in the Geoscience Department. The changes from the old program (in the 2005-2007 Undergraduate Catalog) to the proposed new program are outlined below.

The old version had a total requirement of 128 hours. The new version has a total requirement of 122 hours.

The old version had 39 hours of required courses (Category A) in Mathematics, Computer Science, Biology and Physics. The new version has 50 hours of required courses in Mathematics, Computer Science, Biology, Physics, Chemistry and Geosciences. A new course, Introduction to Meteorology GEOL 1350, has been added to the required courses in Geosciences. The courses, Physical Geology Laboratory GEOL 1130 and Physical Geology GEOL 1330 have been moved from Option 3a to the Geosciences required courses list. Two optional pathways have been created within the Geosciences required courses list.

The old version had 38 hours of courses central to the BS in Environment Science (Category B). The new version has 24 hours of courses central to the BS in Environment Science. This change primarily reflects the transfer of basic chemistry and geosciences courses from Category B to Category A.

Both the old and the new version have four options in Environmental Science. Option 1 has a name change from Atmospheric Chemistry to Environmental Chemistry. Options 2, 3a and 3b remain the same in name: Environmental Modeling, Environmental Geosciences and Atmospheric Sciences. The number of hours required for each option has been reduced from 15 in the old version to 12 in the new version. Changes have been made to some of the courses in the 4 options. The course, Introduction to Air Pollution GEOL 3342, has been moved from Option 1 to Option 3b. No changes have been made to Option 2. The course, Introductory Oceanography Laboratory GEOL 3177, has been removed from Option 3a. The courses, Physical Geology Laboratory GEOL 1130 and Physical Geology GEOL 1330, have been moved out of Option 3a and placed in the

Geosciences required courses as one of two options. The course, Atmospheric Chemistry GEOL 3382, has been added to Option 3b.

The 6 hour requirement of a Natural Sciences and Math Capstone remains in place.

Sincerely,

James R Lawrence
Associate Professor

Students who major in Environmental Science must complete the following requirements.

	Required Courses (does not include prerequisites)	Hours
Geology	GEOL1130 and 1330 or GEOL 1340 GEOL 1302 or GEOL 1350	6-7
Biology	BIOL 1161, 1361, 1162, 1362	8
Computer Science	COSC 1410	4
Chemistry	CHEM1111, 1112, 1331, 1332	8
Mathematics	MATH1431, 1432, 2431, 2433	16
Physics	PHYS1121, 1122, 1321, 1322	8
ENVS Electives	^{12 hours} 4 courses from: ENVS 3301, 4301, 4302, 4351, 4352, LAW 5390	12
Group 1 Electives	4 courses from: MATH 3331, COSC 3361, GEOL 3331, 3342, 3377, 3378	12
Group 2 Electives	4 courses from Option 1, 2, 3a, or 3b list (see below)	12
Other Core requirements (excluding capstone)		30
Electives (including course(s) required for capstone)		6
Total (minimum number of hours)		122

The Bachelor of Science degree requires completion of a minimum of 122 hours, at least 36 of which are to be advanced. Students must earn a minimum 2.00 cumulative grade point average in all courses attempted at the university. In addition, students must earn a minimum 2.00 cumulative grade point average in all courses in the major and in core courses attempted at the university. Students must have no more than 6 semester hours with grades below C- in all courses attempted in the major. Any student exceeding that limit must retake sufficient courses and obtain acceptable grades so that they do not exceed the ~~two-course~~ ^{two-course} limit.

Capstone Requirement

All students in NSM must complete the Capstone Requirement. Students may satisfy the Capstone in a number of ways, e.g. by completing an approved minor, a double major, a senior research project, a senior honors thesis, 6 hours of NSM-designated interdisciplinary capstone courses (e.g. GEOL3355-3360), or 9 hours selected from an approved list (see current catalogue for details).

Options

All students must complete one of the following options:

Option 1: Environmental Chemistry

Students must complete 12 hours selected from the following: CHEM 3119, 3221, 3222, 3331, 3332, 3369, 4229, 4373 or approved 4000-level elective.

Option 2: Environmental Modeling

Students must complete 12 hours selected from the following: MATH 3338, 3339, 3363, 4364 or approved 4000-level elective.

Option 3a: Environmental Geosciences

Students must complete 12 hours selected from the following: GEOL 3370, 3338, 3340, 3383, 4431, 4366 or approved upper-division elective. 3331?

Option 3b: Atmospheric Sciences 3b

Students must complete 12 hours selected from the following: GEOL 3380, 3381, 3382, 3383, 4433, 4341 or approved upper-division elective.

Departmental requirements

No geoscience course with a grade below C- can be used as a prerequisite for a more advanced geoscience course.

Students with more than 6 hours in geoscience courses with grades below C- are not allowed to enroll in subsequent geoscience courses without written permission from the undergraduate advisor.

Note that all undergraduate majors should meet with the undergraduate advisor prior to registration each semester.

Bachelor of Science in Environmental Science Suggested Program for Environmental Geology Option (3a)

First Year

Fall Semester	Hours
ENGL 1303. Freshman Composition I	3
CHEM 1331 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
BIOL 1361 and 1161. Introduction to Biological Science and Biological Science Laboratory	4
MATH 1431. Calculus I	4
Total	15

Spring Semester	Hours
ENGL 1304. Freshman Composition II	3
CHEM 1332 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
MATH 1432. Calculus II	4
BIOL 1362 and 1162. Introduction to Biological Science and Biological Science Lab	4
Total	15

Second Year

Fall Semester	Hours
GEOL 1350. Introduction to Meteorology or GEOL1302. Global Climate Change	3
MATH 2431. Linear Algebra	4
HIST 1376 or 1377. The United States to 1877 or equivalent	3
Social and Behavioral Science Core	3
Humanities Core	3
Total	16

Spring Semester	Hours
GEOL 1340. Intro to Earth Systems or GEOL1330 & 1130. Physical Geology and Lab	3-4
COSC 1410. Introduction to Computer Science	4

PHYS 1321. University Physics I	3
PHYS1121. Physics I laboratory	1
HIST 1378 or 1379. The United States since 1877 or equivalent	3
Total	14

Third Year

Fall Semester	Hours
MATH 2433. Calculus III	4
GEOL 3331. Environmental Geology	3
PHYS 1322. University Physics II	3
PHYS 1112. Physics II Laboratory	1
Visual and Performing Arts Core	3
Choice from Option 3a or 3b	3
Total	17

Spring Semester	Hours
GEOL 3342. Introduction to Air Pollution	3
GEOL 3377. Oceanography	3
Choice from Option 3a or 3b	3
Writing Intensive Core	3
ENVS elective	3
Total	15

Fourth Year

Fall Semester	Hours
GEOL 3378 Principles of Atmospheric Science	3
ENVS 3301 Data Analysis in Environmental Science	3
POLS 1336. U. S. and Texas Constitutions and Politics or equivalent	3
Elective (capstone?)	3
Choice from Option 3a or 3b	3
Total	15

Spring Semester	Hours
Elective (capstone?)	3
Choice from Option 3a or 3b	3
POLS 1337. U.S. Government: Congress, President and Courts or equivalent	3
ENVS 4301 Environmental Science and Public Policy	3
ENVS 4351 Environmental Mathematics and Differential Equations	3
Total	15

**Bachelor of Science in Environmental Science Suggested Program for
Atmospheric Science Option (3b)**

First Year

Fall Semester	Hours
ENGL 1303. Freshman Composition I	3
CHEM 1331 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
BIOL 1361 and 1161. Introduction to Biological Science and Biological Science Laboratory	4
MATH 1431. Calculus I	4
Total	15

Spring Semester	Hours
ENGL 1304. Freshman Composition II	3
CHEM 1332 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
MATH 1432. Calculus II	4
BIOL 1362 and 1162. Introduction to Biological Science and Biological Science Laboratory	4
Total	15
 Second Year	
Fall Semester	Hours
GEOL 1350. Introduction to Meteorology	3
MATH 2431. Linear Algebra	4
HIST 1376 or 1377. The United States to 1877 or equivalent	3
Social and Behavioral Science Core	3
Humanities Core	3
Total	16
 Spring Semester	
Hours	
GEOL 1340. Introduction to Earth Systems	3
COSC 1410. Introduction to Computer Science	4
PHYS 1321. University Physics I	3
PHYS1121. Physics I laboratory	1
HIST 1378 or 1379. The United States since 1877 or equivalent	3
Total	14
 Third Year	
Fall Semester	Hours
MATH 2433. Calculus III	4
GEOL 3331. Environmental Geology	3
PHYS 1322. University Physics II	3
PHYS 1112. Physics II Laboratory	1
Visual and Performing Arts Core	3
Choice from Option 3a or 3b	3
Total	17
 Spring Semester	
Hours	
GEOL 3342. Introduction to Air Pollution	3
GEOL 3377. Oceanography	3
Choice from Option 3a or 3b	3
ENVS elective	3
Writing Intensive Core	3
Total	15
 Fourth Year	
Fall Semester	Hours
GEOL 3378 Principles of Atmospheric Science	3
ENVS 3301 Data Analysis in Environmental Science	3
POLS 1336. U. S. and Texas Constitutions and Politics or equivalent	3
Choice from Option 3a or 3b	3
Elective (capstone?)	3

Total **15**

Spring Semester

Elective (capstone?) **Hours**
3

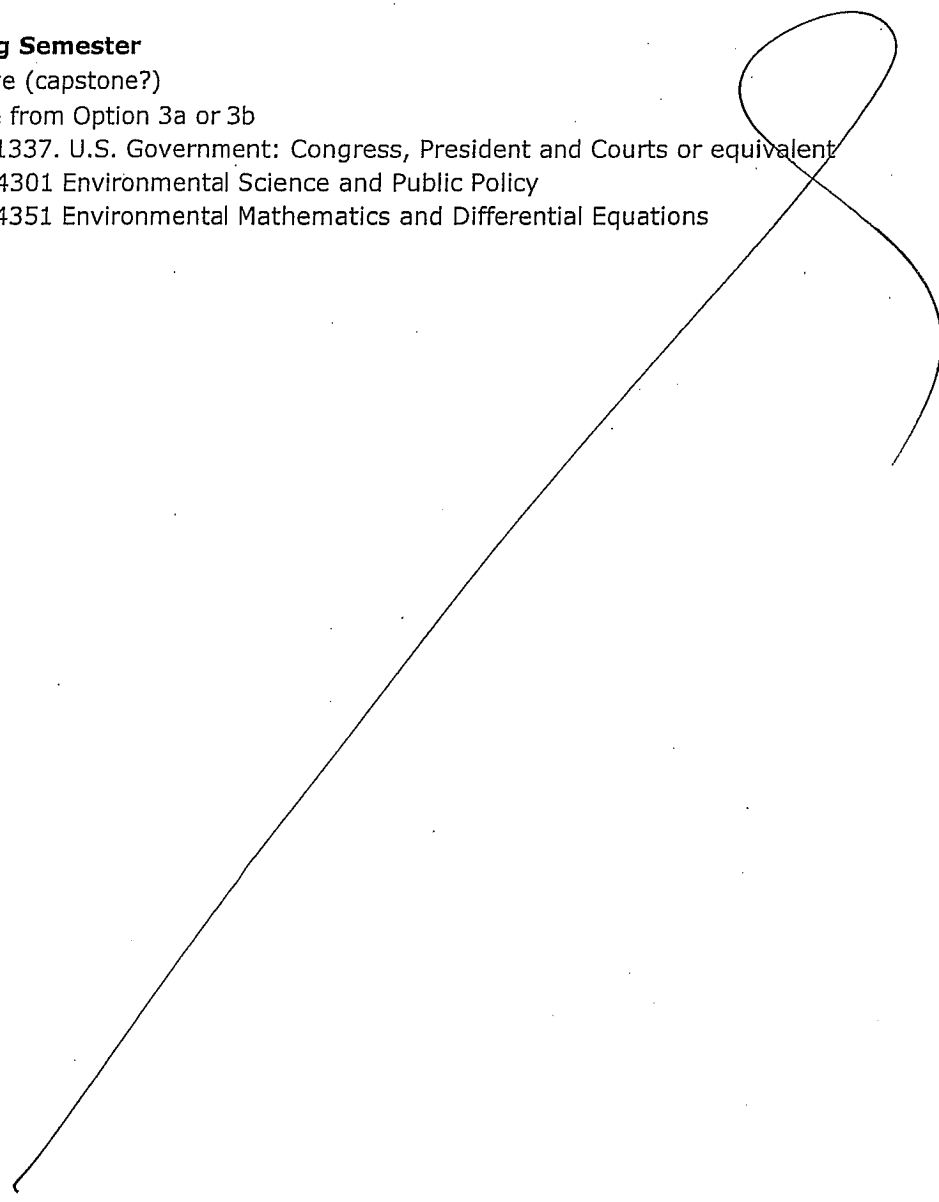
Choice from Option 3a or 3b 3

POLS 1337. U.S. Government: Congress, President and Courts or equivalent 3

ENVS 4301 Environmental Science and Public Policy 3

ENVS 4351 Environmental Mathematics and Differential Equations 3

Total **15**



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Biology	BIOL 1161, 1361, 1162, 1362	8
Computer Science	COSC 1410	4
Chemistry	CHEM1111, 1112, 1331, 1332	8
Mathematics	MATH1431, 1432, 2331, 2433	15
Physics	PHYS1121, 1122, 1321, 1322	8
ENVS Electives	At least 9 hours from: ENVS 3301, 4301, 4302, 4351, 4352	9
Group 1 Electives	At least 12 hours from: MATH 3331, COSC 3361, GEOL 3331, 3342, 3377, 3378	12
Group 2 Electives	At least 12 hours from one of the following Options: 1, 2, 3a, or 3b (see below)	12
Other Core requirements (excluding capstone)		30
Electives (including course(s) required for capstone)		9-10
Total (minimum number of hours)		122

The Bachelor of Science degree requires completion of a minimum of 122 hours, at least 36 of which are to be advanced. Students must earn a minimum 2.00 cumulative grade point average in all courses attempted at the university. In addition, students must earn a minimum 2.00 cumulative grade point average in all courses in the major and in core courses attempted at the university. Students must have no more than 6 semester hours with grades below C- in all courses attempted in the major, which includes all the ENVS Electives and Group 2 Electives. Any student exceeding that limit must retake sufficient courses and obtain acceptable grades so that they do not exceed the two-course limit.

Capstone Requirement

All students in NSM must complete the Capstone Requirement. Students may satisfy the Capstone in a number of ways, e.g. by completing an approved minor, a double major, a senior research project, a senior honors thesis, 6 hours of NSM-designated interdisciplinary capstone courses (e.g. GEOL3355-3360), or 9 hours selected from an approved list (see current catalogue for details).

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Students must complete 12 hours selected from the following: MATH 3338, 3339, 3363, 4364 or approved 4000 level elective.

Option 3a: Environmental Geosciences

Students must complete 12 hours selected from the following: GEOL 3370, 3338, 3340, 3383, 4331, 4366 or approved upper-division elective.

Option 3b: Atmospheric Sciences 3b

Students must complete 12 hours selected from the following: GEOL 3380, 3381, 3382, 3383, 4333, 4341 or approved upper-division elective.

Departmental requirements

No geoscience course with a grade below C- can be used as a prerequisite for a more advanced geoscience course.

Students with more than 6 hours in geoscience courses with grades below C- are not allowed to enroll in subsequent geoscience courses without written permission from the undergraduate advisor.

Note that all undergraduate majors should meet with the Faculty Advisor prior to registration each semester.

Bachelor of Science in Environmental Science Suggested Program for Environmental Chemistry Option (1) or Environmental Modeling Option (2)

First Year	
Fall Semester	Hours
ENGL 1303. Freshman Composition I	3
CHEM 1331 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
BIOL 1361 and 1161. Introduction to Biological Science and Biological Science Laboratory	4
MATH 1431. Calculus I	4
Total	15
Spring Semester	Hours
ENGL 1304. Freshman Composition II	3
CHEM 1332 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
MATH 1432. Calculus II	4
BIOL 1362 and 1162. Introduction to Biological Science and Biological Science Lab	4
Total	15
Second Year	
Fall Semester	Hours
GEOL 1350. Introduction to Meteorology or GEOL1302. Global Climate Change	3
MATH 2331. Linear Algebra	3
HIST 1376 or 1377. The United States to 1877 or equivalent	3
Social and Behavioral Science Core	3
Humanities Core	3
Total	15
Spring Semester	Hours
GEOL1330 & 1130. Physical Geology and Lab or GEOL 1340. Introduction to Earth Systems	3-4
COSC 1410. Introduction to Computer Science	4
PHYS 1321. University Physics I	3
PHYS1121. Physics I laboratory	1
HIST 1378 or 1379. The United States since 1877 or equivalent	3
Total	14-15

Third Year	
Fall Semester	Hours
MATH 2433. Calculus III	4
Group 1 elective	3
PHYS 1322. University Physics II	3
PHYS 1112. Physics II Laboratory	1
Group 2 elective (selected from Option 1 or Option 2)	3
Elective	3
Total	17

Spring Semester	Hours
Group 1 elective	3
Group 1 elective	3
Group 2 elective (selected from Option 1 or Option 2)	3
Visual and Performing Arts Core	3
Social Sciences Core Writing Intensive	3
Total	15

Fourth Year	
Fall Semester	Hours
Group 1 elective	3
ENVS elective	3
POLS 1336. U. S. and Texas Constitutions and Politics or equivalent	3
Group 2 elective (selected from Option 1 or Option 2)	3
ENVS elective	3
Total	15

Spring Semester	Hours
Elective (capstone?)	3-4
Group 2 elective (selected from Option 1 or Option 2)	3
POLS 1337. U.S. Government: Congress, President and Courts or equivalent	3
ENVS elective	3
ENVS elective	3
Total	15-16

**Bachelor of Science in Environmental Science Suggested Program for
Environmental Geology Option (3a)**

First Year	
Fall Semester	Hours
ENGL 1303. Freshman Composition I	3
CHEM 1331 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
BIOL 1361 and 1161. Introduction to Biological Science and Biological Science Laboratory	4
MATH 1431. Calculus I	4
Total	15

Spring Semester	Hours
ENGL 1304. Freshman Composition II	3
CHEM 1332 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
MATH 1432. Calculus II	4
BIOL 1362 and 1162. Introduction to Biological Science and Biological Science Lab	4
Total	15

Second Year	
Fall Semester	Hours
GEOL 1350. Introduction to Meteorology or GEOL1302. Global Climate Change	3
MATH 2331. Linear Algebra	3
HIST 1376 or 1377. The United States to 1877 or equivalent	3

Social and Behavioral Science Core	3
Humanities Core	3
Total	15

Spring Semester	Hours
GEOL 1340, GEOL1330 & 1130, Physical Geology and Lab	4
COSC 1410, Introduction to Computer Science	4
PHYS 1321, University Physics I	3
PHYS1121, Physics I laboratory	1
HIST 1378 or 1379, The United States since 1877 or equivalent	3
Total	15

Third Year	
Fall Semester	Hours
MATH 2433, Calculus III	4
Group 1 elective	3
PHYS 1322, University Physics II	3
PHYS 1112, Physics II Laboratory	1
Group 2 elective (Choice from Option 3a)	3
Elective	3
Total	17

Spring Semester	Hours
Group 1 elective	3
Group 1 elective	3
Group 2 elective (Choice from Option 3a)	3
Visual and Performing Arts Core	3
Social Sciences Core Writing Intensive	3
Total	15

Fourth Year	
Fall Semester	Hours
Group 1 elective	3
ENVS elective	3
POLS 1336, U. S. and Texas Constitutions and Politics or equivalent	3
Group 2 elective (Choice from Option 3a)	3
ENVS elective	3
Total	15

Spring Semester	Hours
Elective (capstone?)	3
Group 2 elective (Choice from Option 3a)	3
POLS 1337, U.S. Government: Congress, President and Courts or equivalent	3
ENVS elective	3
ENVS elective	3
Total	15

**Bachelor of Science in Environmental Science Suggested Program for
Atmospheric Science Option (3b)**

First Year	
Fall Semester	Hours
ENGL 1303, Freshman Composition I	3
CHEM 1331 and 1112, Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
BIOL 1361 and 1161, Introduction to Biological Science and Biological Science Laboratory	4
MATH 1431, Calculus I	4
Total	15

Spring Semester	Hours
ENGL 1304. Freshman Composition II	3
CHEM 1332 and 1112. Fundamentals of Chemistry and Fundamentals of Chemistry Laboratory	4
MATH 1432. Calculus II	4
BIOL 1362 and 1162. Introduction to Biological Science and Biological Science Laboratory	4
Total	15

Second Year

Fall Semester	Hours
GEOL 1350. Introduction to Meteorology	3
MATH 2331. Linear Algebra	3
HIST 1376 or 1377. The United States to 1877 or equivalent	3
Social and Behavioral Science Core	3
Humanities Core	3
Total	15

Spring Semester	Hours
GEOL 1340. Introduction to Earth Systems or GEOL1330 & 1130. Physical Geology and Lab	3-4
COSC 1410. Introduction to Computer Science	4
PHYS 1321. University Physics I	3
PHYS1121. Physics I laboratory	1
HIST 1378 or 1379. The United States since 1877 or equivalent	3
Total	14-15

Third Year

Fall Semester	Hours
MATH 2433. Calculus III	4
Group 1 elective	3
PHYS 1322. University Physics II	3
PHYS 1112. Physics II Laboratory	1
Group 2 elective (Choice from Option 3b)	3
Elective	3
Total	17

Spring Semester	Hours
Group 1 elective	3
Group 1 elective	3
Group 2 elective (Choice from Option 3b)	3
Visual and Performing Arts Core	3
Social Sciences Core Writing Intensive	3
Total	15

Fourth Year

Fall Semester	Hours
Group 1 elective	3
ENVS elective	3
POLS 1336. U. S. and Texas Constitutions and Politics or equivalent	3
Group 2 elective (Choice from Option 3b)	3
ENVS elective	3
Total	15

Spring Semester	Hours
Elective (capstone?)	3-4
Group 2 elective (Choice from Option 3b)	3
POLS 1337. U.S. Government: Congress, President and Courts or equivalent	3
ENVS elective	3
ENVS elective	3
Total	15-16

