

## Environmental Science Program and Career Information



Welcome to the **Environmental Science program!** This program is designed to provide educational opportunities leading to rewarding careers in the field of environmental science. The SHSU Environmental Science program is an interdisciplinary program consisting of coursework from the departments of Agricultural Sciences and Engineering Technology, Biological Sciences, Chemistry, and Geography and Geology. The program consists of two tracks – an **Environmental Pollution Abatement** track and a more general **Environmental Sustainability** track. The former is geared for students seeking employment in the more technical areas of environmental science, such as those pertaining to air and water pollution, and waste management. Accordingly, it requires more chemistry than the Sustainability track. The latter includes more social science coursework. Both tracks contain a common set of core courses to serve as a strong foundation for the degree, and both have 11-12 hours of electives to choose from, depending upon the track. (See the table on page 6 titled *Required Courses, by Discipline, for Each Track.*)

### What do Environmental Scientists do?



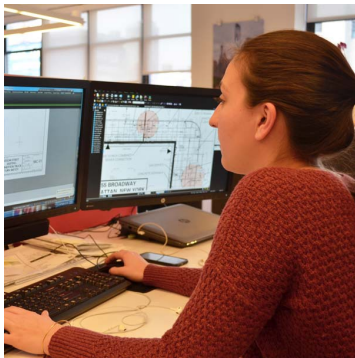
Environmental scientists seek to protect both the environment and human health by conducting research geared toward identifying, controlling, or eliminating sources of pollutants or hazards. Their work generally involves collecting and analyzing soil, water, or air samples. They may also prepare reports, such as Environmental Impact Assessments (EIAs), to document and explain their findings.



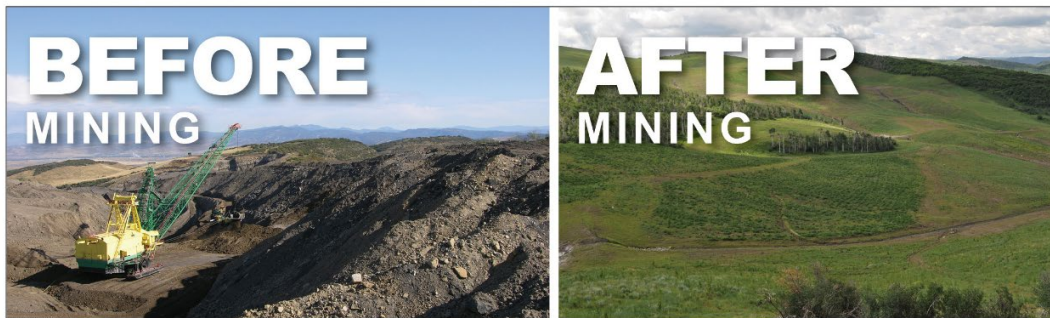
Environmental scientists also develop plans to prevent, control, or ameliorate environmental problems, such as those pertaining to water quality or soil contamination. They may also advise government officials responsible for developing policies which may impact the environment, as well as businesses which must adhere to environmental regulations. Others assess possible impacts of development projects in order to prevent environmental degradation and health problems associated with the projects.



Given the interdisciplinary nature of this field, which includes coursework in such areas as energy and the environment, environmental science, soil science, chemistry, ecology, geology, hydrogeology, soil and water conservation, sustainability, and geospatial technology/GIS, among others, students who obtain this degree will have the knowledge necessary to work in a variety of positions.



Representative environmental science career positions include: *environmental scientist; environmental consultant; environmental health and safety officer; environmental compliance officer; environmental data analyst; environmental field technician; environmental emissions specialist; environmental waste characterization specialist; environmental planner; land reclamation specialist; environmental educator; natural resource specialist; park ranger; and land use planner*, among others.



*Example of land reclamation following coal strip mining*

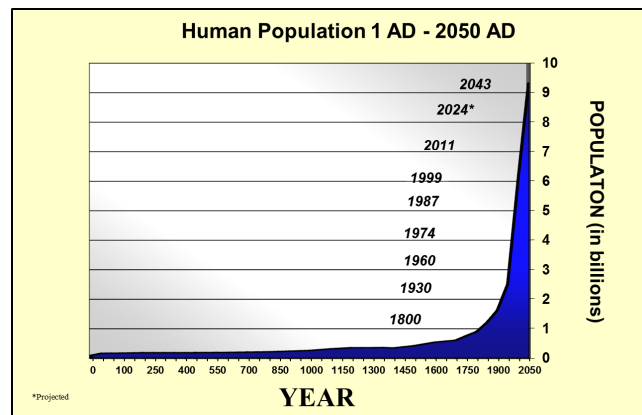
As a graduates of this program, you will be able to:

- 1) Understand fundamental physical and biological principles that govern natural processes;
- 2) Identify and explain potential sources of environmental degradation (e.g., water pollution and soil erosion) and environmental hazards (e.g., slope instability, earthquakes, and chemical runoff into water bodies);
- 3) Demonstrate the ability to integrate knowledge of various aspects of the environment (e.g., soil, water, air) to understand the consequences of an environmental problem;

- 4) Understand fundamental concepts from physical and social sciences underlying environmental thought and governance;
- 5) Integrate and apply perspectives from across the natural sciences and social sciences, in the context of complex environmental problems;
- 6) Develop plans to ameliorate or remediate environmental problems based on an understanding of interrelationships among physical and biological components of the environment, as well as political and economic factors;
- 7) Integrate principles of ecology and sustainability in the design of plans to address environmental problems;
- 8) Evaluate the effects of population growth on resource use and environmental degradation;
- 9) Compare and contrast sustainable and non-sustainable sources of energy;
- 10) Evaluate agricultural practices and their relative impacts on the environment;
- 11) Use geospatial tools to identify, demarcate, and address environmental problems;
- 12) Demonstrate an understanding of the impacts of climate change on the environment – both natural and human-made;
- 13) Collect and interpret scientific data in both field and laboratory settings; and
- 14) Develop critical thinking skills as they pertain to data analysis and remediation planning, and demonstrate problem-solving skills using scientific techniques.

### Why is Environmental Science Important?

The world's population reached 7.7 billion in 2019 and is expected to reach **9-10 billion** by the middle of the century (PRB, 2015). To put this number into perspective, it would take **316 years** to count to 10 billion if you counted one number per second – about 4 human lifetimes! The resource and energy demands required to meet the needs of 9-10 billion people will be staggering. For example, just to produce the food required to feed people over the next 50 years will require a 70-percent increase in the amount of food now produced. This requires abundant, clean water, adequate topsoil, and energy to produce fertilizers, plant and harvest crops, process food materials, and transport and store food. It also requires the conversion of natural habitats to farmland, and/or considerably more efficient use of existing farmland.



*Amazonian rainforest clear-cut to create soy fields*

In the last 50 years, we have consumed more resources than in all of previous human history – and the demand continues to grow (EPA, 2009). The provision of materials, goods, and services to support the growing human population requires vast amounts of energy, and the global energy demand is expected to double by mid-century.

With approximately 324 million people, the U.S. has the third largest population in the world (after China and India), and the population grows by about 0.71% per year – or roughly 2.2 million people per year. By 2060, the U.S. population is expected to reach between 402 and 417 million people. The State of Texas (the second most populous state in the U.S.), has approximately 27 million residents (as of 2018), and its population has grown by about 2 million since 2010. This corresponds to a growth rate during that 5-year interval of 7.2%.

The impact on the environment associated with meeting the resource and energy demands for the world’s population cannot be overemphasized. They include such things as *air and water pollution, climate change, ocean acidification, groundwater and surface water contamination and depletion, soil erosion, hazardous waste disposal, loss of habitat and associated extinction of species, and hazards to human health*. Furthermore, the *nonrenewable energy sources on which we currently depend for most of our energy production are being depleted, and their current use has significant, adverse environmental impacts*. In response to these concerns, the United Nations held a Sustainable Development Summit in September 2015 in which 150 world leaders adopted the [2030 Agenda for Sustainable Development](#), which includes a set of 17 Sustainable Development Goals. These issues are formidable and the need for individuals educated to deal with the various types of environmental issues has never been greater.

### Job Market Need

The need for environmental scientists derives directly from the increasing energy and resource needs, and corresponding environmental impacts, associated with population growth - globally, nationally, and in Texas. The growing demand for individuals with this degree is demonstrated by the following information:

1. According to the Occupational Outlook Handbook (2016) published by the U.S. Department of Labor, Bureau of Labor and Statistics, Employment of environmental scientists and specialists is projected to grow 11 percent from 2016 to 2026, faster than the average for all occupations. Heightened public interest in the hazards facing the environment, as well as increasing demands placed on the environment by population growth, are expected to spur demand for environmental scientists and specialists..” If the category is expanded to include protection technician, the “...employment of environmental science and protection technicians is projected to grow 19 percent from 2012 to 2022, faster than the average for all occupations...”. (See table below)

<b>1. Quick Facts: Environmental Scientists and Specialists</b>	
2. <a href="#">2018 Median Pay</a>	3. \$71,130 \$34.20 per hour
4. <a href="#">Typical Entry-Level Education</a>	5. Bachelor's degree
6. <a href="#">Work Experience in a Related Occupation</a>	7. None
8. <a href="#">On-the-job Training</a>	9. None
10. <a href="#">Number of Jobs, 2016</a>	11. 89,500
12. <a href="#">Job Outlook, 2016-26</a>	13. 11% (Faster than average)
14. <a href="#">Employment Change, 2016-26</a>	15. 9,900

2. A search of Texas job listings on Indeed.com (accessed 5-14-2019) using the search term “environmental science”, identified approximately 2000 job listings. Of these, 615 were in the Houston area; i.e., approximately 31% of the Environmental Science jobs in Texas were in the Houston area.

(<https://www.indeed.com/jobs?q=Environmental+science&l=Texas>)

This and previous searches included the following titles (among others): environmental scientist (including those related to environmental compliance), environmental scientist/wetlands biologist, environmental technician, environmental engineer/environmental scientist, environmental project manager, air quality scientist, natural resources specialist, hydrogeologist, wildlife route specialist, environmental field specialist, environmental planner, and ecology project manager.

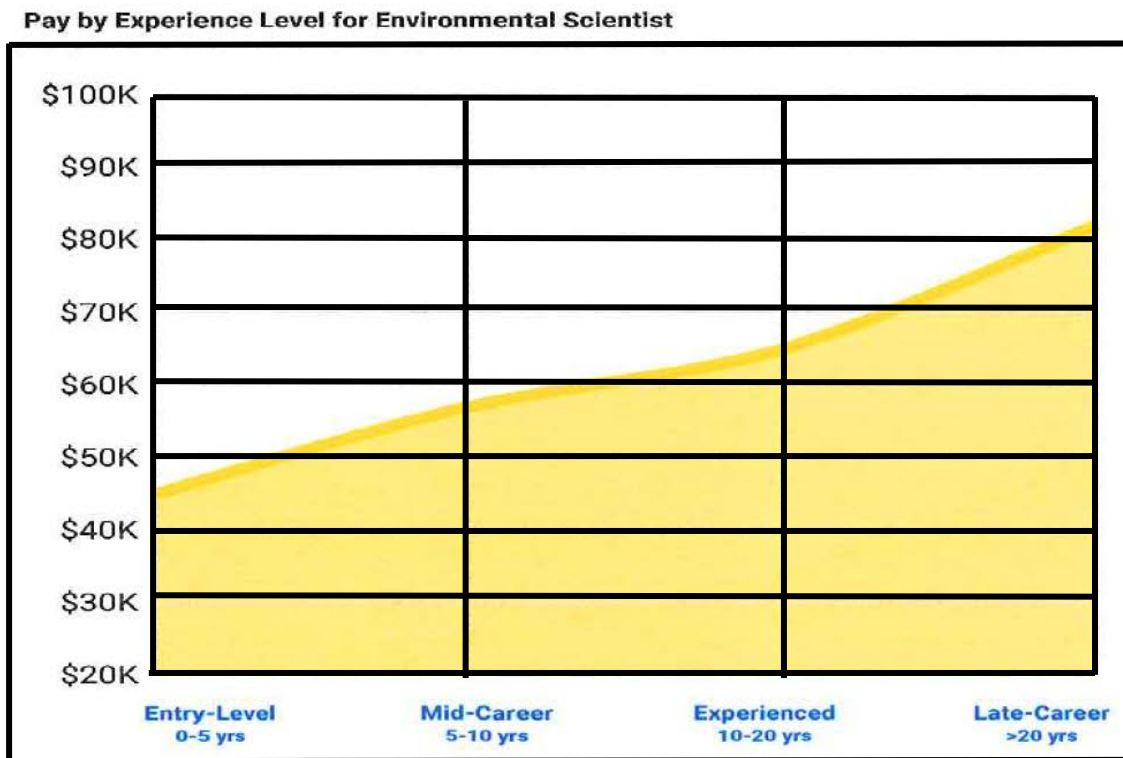
3. According to CareerOneStop (accessed 5-14-2019), there were 900 job listings under the search term “Environmental Science” in Texas in May, 2019.

([https://www.careeronestop.org/Toolkit/Jobs/find-jobs.aspx?keyword=environmental science&location=Texas&sortcolumns=acquisitiondate&sortdirections=ASC](https://www.careeronestop.org/Toolkit/Jobs/find-jobs.aspx?keyword=environmental+science&location=Texas&sortcolumns=acquisitiondate&sortdirections=ASC))

### Job Salaries

As is evident, there is a demand for graduates with degrees in environmental science, and the salaries, and salary growth potential, are good. According to [https://www.payscale.com/research/US/Job=Environmental\\_Scientist/Salary](https://www.payscale.com/research/US/Job=Environmental_Scientist/Salary), the average annual salary for an environmental scientist ranges from about \$38,000 per year to \$74,000 per year. The median annual salary is \$71,000 (<https://www.bls.gov/emp/tables/occupational->

[projections-and-characteristics.htm](#)). The chart below shows the average salaries for those entering the field, to those with more than 20 years of experience (as of 2018).



### Curriculum Requirements for the Environmental Science Degree

As mentioned above, there are two degree tracks in this program, *Pollution Abatement* and *Sustainability*. On the next page is the list of Degree-Specific courses required for each track, showing a side-by-side comparison of the track-specific coursework by discipline area (biology, geology, etc.). It also shows the prerequisites for those courses which have them, and the semesters in which the courses are normally offered. All Gen-Ed courses are offered every fall and spring and usually in the summer as well.

\*Eight hours of the required freshman-level science courses also count toward the 42-hour General Education Core, as does MATH 1420 (or the prerequisites to this course, which include [MATH 1410](#) or [MATH 1314](#) or [MATH 1316](#) with a grade of C or higher; or high school equivalent.)

\*CA refers to a Component Area in the General Education Core. There are 10 component areas totaling 42 hours of required coursework.

The prerequisites are indicated in italics. (\*Prereq = prerequisites) *If the prerequisite is italicized and in maroon font, this means that the prerequisite is not already part of the degree requirements or the Gen Ed Core, and so taking the prerequisite would add hours to your degree.*

<b>Pollution Abatement Track</b>	<b>Sustainability Track</b>
<b>General Education Core</b>	<b>General Education Core</b>
	MATH 1314 Pre-Calculus Algebra (CA 2) *This is needed for CHEM 1411 and BIOL 4374
MATH 1420 (Calculus I) is required for the degree, as is MATH 1314. If you are ready for Calculus I upon admission to the university, then you may take this course to satisfy your Gen Ed CA2 requirement. *MATH 1420 has the following prerequisites: C or better in <u>MATH 1410</u> or <u>MATH 1314</u> and <u>MATH 1316</u> with a grade of C or higher; or high school equivalent or Calculus-ready. If you are not able to take Calculus I (MATH 1420 upon admission to the program, then take MATH 1314 (Elementary Functions) to satisfy the CA2 requirement and the prerequisite requirement for MATH 1420.	
SOCI 2319 Intro to Ethnic Studies (CA 4) *This is needed for SOCI 3336 and SOCI 4337	SOCI 2319 Intro to Ethnic Studies (CA 4) *This is needed for SOCI 3336 and SOCI 4337
POLS 2305 and POLS 2306 (CA 7) *These are needed for POLS 3395	POLS 2305 and POLS 2306 (CA 7) *These are needed for POLS 3395
ECON 2301 or ECON 2302 (CA 8) *One of these is needed for ECON 3352	ECON 2301 or ECON 2302 (CA 8) *One of these is needed for ECON 3352
GEOG 2355 or GEOG 2356 (These courses are in CA 4 but can satisfy CA 9. One of these courses is needed if you wish to take Population Geography (GEOG 4357) as an elective. If you do not wish to take this, then take any 3-credit course indicated for CA 9.	GEOG 2355 or GEOG 2356 (These courses are in CA 4 but can satisfy CA 9. One of these courses is needed if you wish to take Population Geography (GEOG 4357) as an elective. If you do not wish to take this, then take any 3-credit course indicated for CA 9.
	Choose one of the 1-credit courses from CA 9
<b>Agriculture</b>	<b>Agriculture</b>
	PLSC 1307/1107 (CHEM 1411) Fall, Spring, Summer 1 and 2
PLSC 3440 Soil Science (PLSC 1307, CHEM 1306, 1307, 1311 or 1312. ***PLSC	PLSC 3440 Soil Science (PLSC 1307 and CHEM 1411) Fall

1307/1107 will be waived for Pollution Abatement students and CHEM 1411 will sub for the Chemistry classes listed) Fall	
<b>Biology</b>	<b>Biology</b>
BIOL 1401 Environmental Science (CL: R,W,M) Fall, Spring	BIOL 1401 Environmental Science (CL: R,W,M) Fall, Spring
BIOL 1411 General Botany (CL: R,W,M) Fall, Spring, Summer	BIOL 1411 General Botany (CL: R,W,M) Fall, Spring, Summer
	BIOL 2320/GEOG 2320 Sustainability and the Environment (BIOL 1401) Every other fall: 2019, 2021, 2023, etc)
BIOL 1413 General Zoology (CL: R,W,M) Fall, Spring, Summer	BIOL 1413 General Zoology (CL: R,W,M) Fall, Spring, Summer
BIOL 3409 General Ecology (C in BIOL 1411 & 1413) Fall, Spring	BIOL 3409 General Ecology (C in BIOL 1411 & 1413) Fall, Spring
BIOL 4374 Biostatistics (PreReq: <b>MATH 1314</b> or <b>MATH 1420</b> ) Fall	BIOL 4374 Biostatistics (PreReq: <b>MATH 1314</b> or <b>MATH 1420</b> ) Fall
BIOL 4330 Aquatic Biology (C+ in BIOL 1411 & 1413 and junior standing) Fall	
<b>Chemistry</b>	<b>Chemistry</b>
CHEM 1411 General Chemistry I (Minimum grade of C in <a href="#">MATH 1410</a> , <a href="#">MATH 1314</a> , <a href="#">MATH 1324</a> or <a href="#">MATH 2384</a> or equivalent, or a minimum Math score of 23 on the ACT or 560 on the SAT (580 on new SAT) or equivalent.) Offered Fall, Spring, Summer I	CHEM 1411 General Chemistry I (Minimum grade of C in <a href="#">MATH 1410</a> , <a href="#">MATH 1314</a> , <a href="#">MATH 1324</a> or <a href="#">MATH 2384</a> or equivalent, or a minimum Math score of 23 on the ACT or 560 on the SAT (580 on new SAT) or equivalent.) Offered Fall, Spring, Summer I
CHEM 1412 General Chemistry II (PreReq: A minimum grade of C in <a href="#">CHEM 1411</a> . CHEM 1412 offered Fall, Spring, Summer II	
CHEM 2323/2123 Organic Chemistry I (PreReq: CHEM 1411 and CHEM 1412). Offered Fall, Spring, Summer I	
CHEM 2325/2125 Organic Chemistry II (PreReq: CHEM 1411 and CHEM 1412 and CHEM 2323/2123). Offered Fall, Spring, Summer II	
<b>Geography/Geology</b>	<b>Geography/Geology</b>



GEOG 1401 Weather and Climate Fall, Spring, Summer	GEOG 1401 Weather and Climate Fall, Spring, Summer
	GEOG 2364 Geospatial Technology ( <i>No prereq</i> ) Spring and Summer
GEO 1403 Physical Geology Fall, Spring, Summer	GEO 1403 Physical Geology Fall, Spring, Summer
GEO 3326 Environmental Geology ( <i>GEO 1403</i> ) Fall even years	GEO 3326 Environmental Geology ( <i>GEO 1403</i> ) Fall even years
GEOG 4331 Conservation of Natural Resources ( <i>No prereq</i> ) Fall even years	GEOG 4331 Conservation of Natural Resources ( <i>No prereq</i> ) Fall even years
	GEOG 4432 Geomorphology ( <i>GEO 1403</i> ) Spring even years
	GEOG 4468 Remote Sensing ( <i>No prereq</i> ) Spring
<b>Math/Statistics</b>	<b>Math/Statistics</b>
STAT 1369 Elementary Statistics ( <i>TSI math requirement met</i> ) Fall, Spring, Summer 1&2	STAT 1369 Elementary Statistics ( <i>TSI math requirement met</i> ) Fall, Spring, Summer 1&2
MATH 1420 (Take this course <b>if</b> MATH 1314 or MATH 1410 was taken as the Gen Ed CA2 requirement)	
<b>Non-STEM Disciplines</b>	<b>Non-STEM Disciplines</b>
ECON 3352 Energy & Environmental Econ ( <i>50+ hours and ECON 2301 or ECON 2302</i> ) Spring	ECON 3352 Energy & Environmental Econ ( <i>50+ hours and ECON 2301 or ECON 2302</i> ) Spring
PHIL 3372 Philosophy of Science ( <i>No prereq</i> ) Fall, Spring	
SOCI 4337 Environment and Society (SOCI 1301 or 2319. <u>Should take SOCI 2319 for CA IV</u> ) Spring	SOCI 4337 Environment and Society (SOCI 1301 or 2319. <u>Should take SOCI 2319 for CA IV</u> ) Spring
POLS 3395 Environmental Policy ( <i>POLS 2305 &amp; 2306</i> ) Fall	POLS 3395 Environmental Policy ( <i>POLS 2305 &amp; 2306</i> ) Fall
	SOCI 3336 Social Change and Development (SOCI 1301 or <b>2319 taken in CA IV</b> ) Spr
<b>Electives – Choose 11-15 hours. If took MATH 1420 for CA2 requirement, then take 15 hours. If took MATH 1410 for CA2 requirement and MATH 1420 for DSR, then take 11 hours.</b>	<b>Electives – Choose 12 hours</b>

AGET 3383 Soil and Water Conservation Engineering ( <i>AGET 2303 which adds 3 hours to degree</i> ) Spring	AGET 3383 Soil and Water Conservation Engineering ( <i>AGET 2303 and would add 3 hours to degree</i> ) Spring
PLSC 4330 Soil Fertility Management and Fertilizers ( <i>PLSC 1307/1107 and PLSC 3440 and Junior standing</i> ) Fall even years	PLSC 4330 Soil Fertility Management and Fertilizers ( <i>PLSC 1307/1107 and PLSC 3440 and Junior standing</i> ) Fall even years
PLSC 4370 Forage Crops and Pasture Management ( <i>Junior standing</i> ) Fall, Spring	PLSC 4370 Forage Crops and Pasture Management ( <i>Junior standing</i> ) Fall, Spring
PLSC 4397 Integrated Pest Management ( <i>PLSC 1307/1107 and Sophomore standing</i> ) Fall	PLSC 4397 Integrated Pest Management ( <i>PLSC 1307/1107 and Sophomore standing</i> ) Fall
BIOL 2420 Intro Applied Microbiology ( <i>BIOL 2401 and BIOL 2402, CHEM 1411 or CHEM 1406.</i> ) Fall, Spring	
BIOL 3470 General Microbiology ( <i>BIOL 1411, BIOL 1413, BIOL 2440, CHEM 1411, CHEM 1412</i> ) Fall	
BIOL 4320 Environmental Toxicology ( <i>BIOL 1411, BIOL 1413, either BIOL 2401, BIOL 2402 and BIOL 2420, or BIOL 2440 and BIOL 3470; and either BIOL 4374 or MATH 3379</i> )	
BIOL 3461 Wildlife Biology ( <i>BIOL 1411, BIOL 1413, and BIOL 3409</i> ) Spring even years	BIOL 3461 Wildlife Biology ( <i>BIOL 1411, BIOL 1413, and BIOL 3409</i> ) Spring even years
CHEM 3368 Environmental Chemistry ( <i>CHEM 2401 Quantitative Analysis</i> ). Offered Spring in even years	
CHEM 4442 Air Quality ( <i>CHEM 2401 Quantitative Analysis</i> ). Spring only in alternating years	
GEOG 4357 Population Geography ( <i>GEOG 1321 or GEOG 2355 or GEOG 2356</i> ) Fall odd years	GEOG 4357 Population Geography ( <i>GEOG 1321 or GEOG 2355 or GEOG 2356</i> ) Fall odd years
	GEOG 4365 Applied Geographic Info Systems ( <i>GEOG 2464</i> ) Fall
GEOG 4432 Geomorphology ( <i>GEOL 1403</i> ) Spring even years	
GEOG 4468 Remote Sensing ( <i>No prereq</i> ) Spring	
GEOL 4426 Hydrogeology ( <i>GEOL 1403 and MATH 1316, which would add 3 hours to degree</i> ) Fall	GEOL 4426 Hydrogeology ( <i>GEOL 1403 and MATH 1316, which would add hours to degree</i> ) Fall
	PHIL 3372 Philosophy of Science ( <i>No prereq</i> ) Fall, Spring

PHIL 4306 Philosophy of Biology ( <i>No prereq</i> ) Spring in even years)	PHIL 4306 Philosophy of Biology ( <i>No prereq</i> ) Spring in even years)
SOCI 3336 Social Change and Development ( <i>SOCI 2319 taken as Gen ED Core CA IV</i> ) Spring	
Note: The Pollution Abatement track has a total of 43-47 advanced credit hours	Note: The Sustainability track has a total of 49 advanced credit hours

\*See next page to see the curriculum organized by Component Areas within the degree tracks.  
(This is the same information as in the previous table, just organized differently.)

## Curriculum Organized by Component Areas within the Degree

Pollution Abatement track	LD	UD	Sustainability Track
<b>General Education Core</b>			<b>General Education Core</b>
Area 1: ENGL 1301, ENGL 1302	6		Area 1: ENGL 1301, ENGL 1302
Area 2: <b>Take MATH 1420 if eligible; otherwise MATH 1314</b> *Will need to take both MATH 1314 and MATH 1420 for degree requirements. ** <b>MATH 1314 is a prereq for CHEM 1411, STAT 1369, BIOL 4374)</b>	4		Area 2: <b>Take MATH 1314</b> *This is a prereq for <b>CHEM 1411, STAT 1369 and BIOL 4374)</b>
Area 3: CHEM 1411, CHEM 1412 ( <i>C in MATH 1314 or 1410 or 1324 or 2384</i> )	8		Area 3: GEOG 1401, CHEM 1411 ( <i>For Chem: C in MATH 1314 or 1410 or 1324 or 2384</i> )
Area 4: Lang, Phil & Cultural ( <b>*Take SOCI 2319. This is a prereq for SOCI 3336</b> )	3		Area 4: Lang, Phil & Cultural ( <b>*Take SOCI 2319. This is a prereq for SOCI 3336</b> )
Area 5: Creative Arts	3		Area 5: Creative Arts
Area 6: HIST 1301, HIST 1302	6		Area 6: HIST 1301, HIST 1302
Area 7: POLS 2305, POLS 2306	6		Area 7: POLS 2305, POLS 2306
Area 8: Soc & Behav Science ( <b>Take ECON 2301 or ECON 2302. This is a prereq for ECON 3352</b> )	3		Area 8: Soc & Behav Science ( <b>Take ECON 2301 or ECON 2302. This is a prereq for ECON 3352</b> )
Area 9: Communication or Lang, Phil, Cultural (Take GEOG 2355 or GEOG 2356 as this is a prereq for one of the electives - GEOG 4357 Population Geog)	3		Area 9: Communication or Lang, Phil, Cultural (Take GEOG 2355 or GEOG 2356 as this is a prereq for one of the electives - GEOG 4357 Population Geog)
Area 10: Extra 1 credit covered in Area 2 above when taking MATH 1410 or MATH 1420; otherwise, take 1-credit course	0		Area 10: Choose one of the 1-credit courses
<b>Degree Specific Requirements</b>			<b>Degree Specific Requirements</b>
BIOL 1401 Environmental Science (CL: R,W,M) Fall, Spring	4		BIOL 1401 Environmental Science (CL: R,W,M) Fall, Spring
BIOL 1411 General Botany (CL: R,W,M) Fall, Spring, Summer	4		BIOL 1411 General Botany (CL:R,W,M) Fall, Spring, Summer
BIOL 1413 General Zoology (CL: R,W,M) Fall, Spring, Summer	4		BIOL 1413 General Zoology (CL:R,W,M) Fall, Spring, Summer
STAT 1369 Statistics ( <i>TSI math requirement met</i> ) Fall, Spring, Summer 1&2	3		STAT 1369 Statistics ( <i>TSI math requirement met</i> ) Fall, Spring, Summer 1&2
<i>CHEM 1411 (already applied in Area 3 above)</i>	0		<i>CHEM 1411 (already applied in Area 3 above)</i>

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<b>Environmental Science Major Foundation</b>		<b>Environmental Science Major Foundation</b>	
GEOG 1401 Weather and Climate (Fall, Spring, Summer)	4	GEOG 1401 Weather and Climate ( <i>already applied in Gen Ed Core</i> ) (Fall, Spring, Summer)	
GEO 1403 Physical Geology (Fall, Spring, Summer)	4	GEO 1403 Physical Geology (Fall, Spring, Sum)	
GEO 3326 Environmental Geology ( <i>GEO 1403</i> ) (Fall even years)		GEO 3326 Environmental Geology ( <i>GEO 1403</i> ) (Fall even years)	3
GEOG 4331 Conservation of Natural Resources ( <i>No prereq</i> ) Fall even years		GEOG 4331 Conservation of Natural Resources ( <i>No prereq</i> ) Fall even years	3
PLSC 3440 Soil Science ( <i>PLSC 1307, CHEM 1306, 1037, 1311 or 1312</i> ) Fall		PLSC 3440 Soil Science ( <i>PLSC 1307, CHEM 1306, 1037, 1311 or 1312</i> ) Fall	4
BIOL 3409 General Ecology ( <i>C in BIOL 1411 &amp; 1413</i> ) Fall, Spring		BIOL 3409 General Ecology ( <i>C in BIOL 1411 &amp; 1413</i> ) Fall, Spring	4
BIOL 4374 Biostatistics ( <i>MATH 1314</i> ) Fall		BIOL 4374 Biostatistics ( <i>MATH 1314</i> ) Fall	3
POLS 3395 Environmental Policy ( <i>POLS 2305 &amp; 2306</i> ) Fall		POLS 3395 Environmental Policy ( <i>POLS 2305&amp;2306</i> ) Fall	3
ECON 3352 Energy & Environmental Econ ( <i>50+ hours and ECON 2301 or 2302</i> ) Spring		ECON 3352 Energy & Environmental Econ ( <i>50+ hours and ECON 2301 or 2302</i> ) Spring	3
SOCI 4337 Environment and Society ( <i>SOCI 1301 or 2319. Should take SOCI 2319 for CA IV</i> ) Spring		SOCI 4337 Environment and Society ( <i>SOCI 1301 or 2319</i> ) <i>Should take SOCI 2319 for CA IV</i> ) Spring	3
<b>Pollution Abatement concentration</b>		<b>Sustainability Concentration</b>	
		BIOL 2320/GEOG 2320 Sustainability and the Environment ( <i>BIOL 1401</i> ) Every other Fall: 2019, 2021, 2023, etc)	
CHEM 1412 (already applied in Area 3 above)	0		
CHEM 2323/2123 Organic Chemistry I ( <i>C+ in CHEM 1411&amp;1412</i> ) Fall, Spring, Summer 1	4	PLSC 1307/1107 Plant Science ( <i>No prereq</i> ) Fall, Spring, Sum 1 & 2	
CHEM 2325/2125 Organic Chemistry II ( <i>C+ in CHEM 1411&amp;1412&amp;2323/2123</i> ) Fall, Spr, Sum 2	4	GEOG 2364 Geospatial Technology ( <i>No prereq</i> ) Spring and Summer	
MATH 1420 Calculus (included in Area 2 above) Fall, Spring, Summer 2	0	GEOG 4468 Remote Sensing ( <i>No prereq</i> ) Spring	
PHIL 3372 Philosophy of Science ( <i>No prereq</i> ) Fall, Spring		GEOG 4432 Geomorphology ( <i>Geol 1403</i> ) Spring even years	3
BIOL 4330 Aquatic Biology ( <i>C+ in BIOL 1411 &amp; 1413</i> ) Fall		SOCI 3336 Social Change and Development ( <i>SOCI 1301 or SOCI 2319 taken in CA IV</i> ) Spring	3

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<p><b>Prescribed Electives:</b> Take 11 -15 Hours of Prescribed Electives listed below. (Take 15 hours if took MATH 1420 as CA2 requirement. Take 11 hours if took MATH 1410 for CA2 requirement and MATH 1420 for DSR)</p> <p>*Some of these elective courses have prerequisites (indicated in parentheses and italics) that are not part of the degree and would require additional coursework beyond 120 hours. These extra prerequisites are indicated in maroon font.</p>		<p><b>Prescribed Electives:</b> Take 11 hours of prescribed electives.</p> <p>*Some of these elective courses have prerequisites (indicated in parentheses and italics) that are not part of the degree and would require additional coursework beyond 120 hours. These extra prerequisites are indicated in maroon font.</p>
<p>AGET 3383 Soil and Water Conservation Engineering (AGET 2303 which adds 3 hours to degree) Spring</p>		<p>AGET 3383 Soil and Water Conservation Engineering (AGET 2303 which adds 3 hours to degree) Spring</p>
		<p>BIOL 3461 Wildlife Biology (BIOL 1411, BIOL 1413, and BIOL 3409) Spring even years</p>
<p>BIOL 2420 Intro Applied Microbiology (BIOL 2401 and BIOL 2402, CHEM 1411 or CHEM 1406 or CHEM 1411 or CHEM 1406. *You do not need the course shown in green given that you will have taken CHEM 1411 as a required course) Fall, Spring</p>		<p>GEOG 4357 Population Geography (GEOG 1321 or GEOG 2355 or GEOG 2356) Fall odd years</p>
<p>BIOL 3461 Wildlife Biology (BIOL 1411, BIOL 1413, and BIOL 3409) Spring even years</p>		<p>GEOG 4365 Applied Geographic Info Systems (GEOG 2464) Fall</p>
<p>BIOL 3470 General Microbiology (BIOL 1411, BIOL 1413, BIOL 2440, CHEM 1411, CHEM 1412) Fall</p>		<p>GEOL 4426 Hydrogeology (GEOL 1403 and MATH 1316, which would add 3 hours to degree; however, instructor might grant permission with MATH 1314) Fall</p>
<p>BIOL 4320 Environmental Toxicology (PreReq, BIOL 1411, BIOL 1413, either BIOL 2401, BIOL 2402 and BIOL 2420, or BIOL 2440 and BIOL 3470; and either BIOL 4374 or MATH 3379) Offered rarely</p>		<p>PHIL 3372 Philosophy of Science (No prereq) Fall, Spring</p>
<p>CHEM 3368 Environmental Chemistry (CHEM 2401 Quantitative Analysis). Offered Spring in even years</p>		<p>PHIL 4306 Philosophy of Biology (No prereq) Spring in even years)</p>
<p>CHEM 4442 Air Quality (CHEM 2401 Quantitative Analysis). Offered in Spring only in alternating years</p>		<p>PLSC 4330 Soil Fertility Management and Fertilizers (PLSC 3440 and PLSC 1307/1107) Fall even years</p>
<p>GEOG 4357 Population Geography (GEOG 1321 or GEOG 2355 or GEOG 2356) Fall odd years</p>		<p>PLSC 4370 Forage Crops and Pasture Management (Junior standing) Fall, Spring</p>
<p>GEOG 4432 Geomorphology (GEOL 1403) Spring even years</p>		<p>PLSC 4397 Integrated Pest Management (PLSC 1307/1107 and Sophomore standing) Fall</p>
<p>GEOG 4468 Remote Sensing (No prereq) Spring</p>		
<p>GEOL 4426 Hydrogeology (GEOL 1403 and MATH 1316, which would add 3 hours to degree; however, instructor might grant permission with MATH 1314) Fall</p>		
<p>PHIL 4306 Philosophy of Biology (No prereq) Spring in even years)</p>		
<p>PLSC 4330 Soil Fertility Management and Fertilizers (PLSC 3440 and PLSC 1307/1107) Fall even years</p>		
<p>PLSC 4370 Forage Crops and Pasture Management (Junior standing) Fall, Spring</p>		
<p>PLSC 4397 Integrated Pest Management (PLSC 1307/1107 and Sophomore standing) Fall</p>		
<p>SOCI 3336 Social Change and Development (SOCI 1301 or SOCI 2319 taken in CA IV) Spring</p>		

## List of When Courses are Offered: Pollution Abatement Track

Pollution Abatement track	Fall	Spring	Summer	Sum 1	Sum 2	Even Fall	Even Spr	Odd Fall	Odd Spr	Fall alt	Spr alt
<b>Gen-Ed Core</b>											
Area 1: ENGL 1301, ENGL 1302	x	x	x								
Area 2: <b>Take MATH 1420 if eligible; otherwise MATH 1314</b> *Will need to take both MATH 1314 and MATH 1420 for degree requirements. <b>**MATH 1314 is a prereq for CHEM 1411, STAT 1369, BIOL 4374)</b>											
Area 3: CHEM 1411, CHEM 1412 (C in MATH 1314 or 1410 or 1324 or 2384)	x	x	x								
Area 4: Lang, Phil & Cultural ( <b>*Take SOCI 2319. This is a prereq for SOCI 3336</b> )	x	x	x								
Area 5: Creative Arts	x	x	x								
Area 6: HIST 1301, HIST 1302	x	x	x								
Area 7: POLS 2305, POLS 2306	x	x	x								
Area 8: Soc & Behav Science ( <b>Take ECON 2301 or ECON 2302. This is a prereq for ECON 3352</b> )	x	x	x								
Area 9: Communication or Lang, Phil, Cultural (Take GEOG 2355 or GEOG 2356 as this is a prereq for one of the electives - GEOG 4357 Population Geog)	x	x	x								
Area 10: Extra 1 credit covered in Area 2 above when taking MATH 1410 or MATH 1420; otherwise, take 1-credit course	x	x	x								
<b>Degree Specific Requirements</b>											
BIOL 1401 Environmental Science (CL: R,W,M)	x	x									
BIOL 1411 General Botany (CL: R,W,M)	x	x	x								
BIOL 1413 General Zoology (CL: R,W,M)	x	x	x								
STAT 1369 Statistics (TSI math requirement met)	x	x	x	x	x						
<b>CHEM 1411 (already applied in Area 3 above)</b>	x	x		x							
<b>Environmental Science Major Foundation</b>											
GEOG 1401 Weather and Climate	x	x	x								
GEOL 1403 Physical Geology	x	x	x								
GEOL 3326 Environmental Geology (GEOL 1403)							x				
GEOG 4331 Conservation of Natural Resources (No prereq)							x				
PLSC 3440 Soil Science (PLSC 1307, CHEM 1306, 1037, 1311 or 1312)	x										
BIOL 3409 General Ecology (C in BIOL 1411 & 1413)	x	x									
BIOL 4374 Biostatistics (MATH 1314)	x										
POLS 3395 Environmental Policy (POLS 2305 & 2306)	x										
ECON 3352 Energy & Environmental Econ (50+ hours and ECON 2301 or 2302)		x									
SOCI 4337 Environment and Society (SOCI 1301 or 2319. Should take SOCI 2319 for CA IV)		x									
<b>Pollution Abatement concentration</b>											
<b>CHEM 1412 (already applied in Area 3 above)</b>	x	x			x						
<b>CHEM 2323/2123 Organic Chemistry I (C+ in CHEM 1411&amp;1412)</b>	x	x		x							
<b>CHEM 2325/2125 Organic Chemistry II (C+ in CHEM 1411&amp;1412&amp;2323/2123)</b>	x	x				x					
<b>MATH 1420 Calculus (included in Area 2 above)</b>	x	x			x						
<b>PHIL 3372 Philosophy of Science (No prereq)</b>	x	x									
<b>BIOL 4330 Aquatic Biology (C+ in BIOL 1411 &amp; 1413)</b>	x										

<p><b>11 -15 Hours of Prescribed Electives listed below. *Take 15 hours if took MATH 1420 as CA2 requirement. Take 11 hours if took MATH 1410 for CA2 requirement and MATH 1420 for DSR)</b>     <i>*Some of these elective courses have prerequisites (indicated in parentheses and italics) that are not part of the degree and would require additional coursework beyond 120 hours. These extra prerequisites are indicated in maroon font.</i></p>											
<p>AGET 3383 Soil and Water Conservation Engineering (<i>AGET 2303</i> which adds 3 hours to degree ) Spring</p>		x									
<p>BIOL 2420 Intro Applied Microbiology (BIOL 2401 and BIOL 2402, CHEM 1411 <i>or</i> CHEM 1406 <i>or</i> CHEM 1411 <i>or</i> CHEM 1406. <i>*You do not need the course shown in green given that you will have taken CHEM 1411 as a required course</i> )</p>	x	x									
<p>BIOL 3461 Wildlife Biology (BIOL 1411, BIOL 1413, and BIOL 3409 )</p>							x				
<p>BIOL 3470 General Microbiology (BIOL 1411, BIOL 1413, <i>BIOL 2440</i>, CHEM 1411, CHEM 1412 )</p>	x										
<p>BIOL 4320 Environmental Toxicology (PreReq, BIOL 1411, BIOL 1413, either <i>BIOL 2401</i>, <i>BIOL 2402</i> and <i>BIOL 2420</i>, or <i>BIOL 2440</i> and <i>BIOL 3470</i>; and either BIOL 4374 or <i>MATH 3379</i>) Offered rarely</p>											
<p>CHEM 3368 Environmental Chemistry (<i>CHEM 2401 Quantitative Analysis</i> ). Offered Spring in even years</p>							x				
<p>CHEM 4442 Air Quality (<i>CHEM 2401 Quantitative Analysis</i> ). Offered in Spring only in alternating years</p>											x
<p>GEOG 4357 Population Geography (GEOG 1321 or GEOG 2355 or GEOG 2356 )</p>								x			
<p>GEOG 4432 Geomorphology (GEOL 1403 )</p>							x				
<p>GEOG 4468 Remote Sensing (No prereq )</p>		x									
<p>GEOL 4426 Hydrogeology (GEOL 1403 and <i>MATH 1316</i> , which would add 3 hours to degree )</p>	x										
<p>PHIL 4306 Philosophy of Biology (No prereq )</p>							x				
<p>PLSC 4330 Soil Fertility Management and Fertilizers (PLSC 3440 and PLSC 1307/1107 ) every 1.5 years</p>			spring 2020								
<p>PLSC 4370 Forage Crops and Pasture Management (Junior standing )</p>	x	x									
<p>PLSC 4397 Integrated Pest Management (PLSC 1307/1107 and Sophomore standing )</p>	x										
<p>SOCI 3336 Social Change and Development (SOCI 1301 or <i>SOCI 2319 taken in CA IV</i>)</p>		x									



## List of When Courses are Offered: Sustainability Track

Sustainability Track	Fall	Spring	Summer	Sum 1	Sum 2	Even Fall	Even Spring	Odd Fall	Odd Spring	Fall alt	Spr alt
Area 1, ENGL 1301, ENGL 1302	x	x	x								
Area 2: <b>Take MATH 1314</b> *This is a prereq for <b>CHEM 1411, STAT 1369 and BIOL 4374</b> )	x	x	x								
Area 3: GEOG 1401, CHEM 1411 (For Chem: C in MATH 1314 or 1410 or 1324 or 2384)	x	x	x								
Area 4: Lang, Phil & Cultural (*Take <b>SOCI 2319</b> . <b>This is a prereq for SOCI 3336</b> )	x	x	x								
Area 5: Creative Arts	x	x	x								
Area 6: HIST 1301, HIST 1302	x	x	x								
Area 7: POLS 2305, POLS 2306	x	x	x								
Area 8: Soc & Behav Science ( <b>Take ECON 2301 or ECON 2302. This is a prereq for ECON 3352</b> )	x	x	x								
Area 9: Communication or Lang, Phil, Cultural (Take GEOG 2355 or GEOG 2356 as this is a prereq for one of the electives - GEOG 4357 Population Geog)	x	x	x								
Area 10: Choose one of the 1-credit courses	x	x	x								
<b>Degree Specific Requirements</b>											
BIOL 1401 Environmental Science (CL: R,W,M)	x	x									
BIOL 1411 General Botany (CL:R,W,M)	x	x	x								
BIOL 1413 General Zoology (CL:R,W,M)	x	x	x								
STAT 1369 Statistics (TSI math requirement met) Fall, Spring, Summer 1&2	x	x		x	x						
CHEM 1411 (already applied in Area 3 above)	x	x		x							
<b>Environmental Science Major Foundation</b>											
GEOG 1401 Weather and Climate (already applied in Gen Ed Core)	x	x	x								
GEOL 1403 Physical Geology	x	x	x								
GEOL 3326 Environmental Geology (GEOL 1403)							x				
GEOG 4331 Conservation of Natural Resources (No prereq) ???											
PLSC 3440 Soil Science (PLSC 1307, CHEM 1306, 1037, 1311 or 1312)	x										
BIOL 3409 General Ecology (C in BIOL 1411 & 1413)	x	x									
BIOL 4374 Biostatistics (MATH 1314)	x										
POLS 3395 Environmental Policy (POLS 2305&2306)	x										
ECON 3352 Energy & Environmental Econ (50+ hours and ECON 2301 or 2302) ???											
SOCI 4337 Environment and Society (SOCI 1301 or 2319) Should take SOCI 2319 for CA IV)		x									

<b>Sustainability Concentration</b>										
BIOL 2320/GEOG 2320 Sustainability and the Environment (BIOL 1401)										x
PLSC 1307/1107 Plant Science (No prereq)	x	x			x	x				
GEOG 2364 Geospatial Technology (No prereq)		x	x							
GEOG 4468 Remote Sensing (No prereq)		x								
GEOG 4432 Geomorphology (Geol 1403)								x		
SOCI 3336 Social Change and Development (SOCI 1301 or SOCI 2319 taken in CA IV)		x								
<b>Prescribed Electives for Sustainability (11 hours)</b>										
AGET 3383 Soil and Water Conservation Engineering (AGET 2303 which adds 3 hours to degree )		x								
BIOL 3461 Wildlife Biology (BIOL 1411, BIOL 1413, and BIOL 3409 )								x		
GEOG 4357 Population Geography (GEOG 1321 or GEOG 2355 or GEOG 2356 )									x	
GEOG 4365 Applied Geographic Info Systems (GEOG 2464 )	x									
GEOL 4426 Hydrogeology (GEOL 1403 and MATH 1316 , which would add 3 hours to degree; however, instructor might grant permission with MATH 1314 )	x									
PHIL 3372 Philosophy of Science (No prereq )	x	x								
PHIL 4306 Philosophy of Biology (No prereq )								x		
PLSC 4330 Soil Fertility Management and Fertilizers (PLSC 3440 and PLSC 1307/1107 )							x			
PLSC 4370 Forage Crops and Pasture Management (Junior standing )	x	x								
PLSC 4397 Integrated Pest Management (PLSC 1307/1107 and Sophomore standing ) Fall	x									

## Student Support

The faculty involved with the Environmental Science program want you to succeed and want to encourage you to contact us if you have questions, or if you are having difficulties in some of your coursework. Dr. Marcus Gillespie is the Program Coordinator for the Environmental Science degree and primary advisor. However, several other members of the College of Science and Engineering Technology faculty are also involved with student support. Below is the contact information for these faculty members. Again, if you have any questions, please don't hesitate to contact us. We're here to support you!



Dr. Marcus Gillespie - Associate Dean in the College of Science and Engineering  
Technology and Program Coordinator/Advisor for the Environmental  
Science degree program

LDB Suite 200 [marcusg@shsu.edu](mailto:marcusg@shsu.edu)

936-294-1945



Dr. Doug Ullrich - Chair and Advisor for the Department of Agricultural Sciences

Pirkle Center 400

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936-294-1188



Dr. Bobby Lane – Advisor for the Plant and Soil Science program

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Dr. Tami Cook – Chair of Department of Biological Sciences

Life Sciences building 105D

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936-294-1557



Dr. Jeffrey Wozniak - Assistant Professor of Biology (ecology and  
sustainability)

BIOL 400L [jrw034@shsu.edu](mailto:jrw034@shsu.edu) 936-294-3759



Dr. Rick Norman – Chair and Advisor for the Department of Chemistry

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Dr. Brian Cooper Chair and Advisor for the Department of Geography and Geology

LDB 332G

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936-294-1566



Dr. Samuel Adu-prah – Assistant Professor of Geography (GIS, environmental, and health)

LDB 324

[sxa054@shsu.edu](mailto:sxa054@shsu.edu)

936-294-2478



Dr. Ross Guida – Assistant Professor of Geography (hydrogeology & geomorphology)

LDB 336

[Ross.guida@shsu.edu](mailto:Ross.guida@shsu.edu)

936-294-1233

## Other Sources of Support/Assistance



Please remember that the university has an **Academic Success Center** to assist with writing and math tutoring. The Center is located in Farrington 111 and is open Monday-Friday: 10:00 AM -3:00 PM.

To inquire about Writing Center services, please call 936-294-3680 or email [asc@shsu.edu](mailto:asc@shsu.edu).

To inquire about Math Center services, please call 936-294-1565 or email [asc@shsu.edu](mailto:asc@shsu.edu).