

Date Submitted: 10/20/23 1:26 pm

Viewing: **ERSCBS : Earth Science, Bachelor of Science**

Last approved: 06/07/17 5:06 pm

Last edit: 12/08/23 9:11 am

Changes proposed by: jatullis

Catalog Pages Using this Program

- [Earth Science B.S.](#)
- [Earth Science \(ERSC\)](#)

Submitter: User ID: [jatullis crsteaf1](#) Phone: [479-575-8784 575-6731](#)

Program Status: Active

Academic Level: Undergraduate

Type of proposal: Major/Field of Study

Select a reason for this modification
 Revising Curriculum of an Existing Certificate or Degree (making a net change of more than 15 credit hours)--(LON)

Are you adding a concentration?
No

Are you adding or modifying a track?
No

Are you adding or modifying a focused study?
No

Effective Catalog Year: Fall 2024

College/School Code: Fulbright College of Arts and Sciences (ARSC)

Department Code:

In Workflow

1. ARSC Dean Initial
2. Provost Initial
3. Director of Curriculum Review and Program Assessment
4. Registrar Initial
5. Institutional Research
6. GEOS Chair
7. ARSC Curriculum Committee
8. ARSC Dean
9. Global Campus
10. Provost Review
11. Undergraduate Council
12. Faculty Senate
13. Provost Final
14. Provost's Office-- Documentation sent to System Office
15. Higher Learning Commission
16. Board of Trustees
17. ADHE Final
18. Provost's Office-- Notification of Approval
19. Registrar Final
20. Catalog Editor Final

Approval Path

1. 09/18/23 10:05 am Christopher Liner (liner): Approved for ARSC Dean Initial

Department of Geosciences (GEOS)

Program Code ERSCBS
 Degree Bachelor of Science
 CIP Code

2. 09/18/23 10:24 am
 Jim Gigantino
 (jgiganti): Approved
 for Provost Initial
3. 10/16/23 4:53 pm
 Lisa Kulczak
 (lkulcza): Rollback to
 Initiator
4. 10/23/23 9:16 am
 Christopher Liner
 (liner): Approved for
 ARSC Dean Initial
5. 10/23/23 9:19 am
 Jim Gigantino
 (jgiganti): Approved
 for Provost Initial
6. 10/31/23 11:52 am
 Lisa Kulczak
 (lkulcza): Approved
 for Director of
 Curriculum Review
 and Program
 Assessment
7. 10/31/23 12:17 pm
 Gina Daugherty
 (gdaugher):
 Approved for
 Registrar Initial
8. 10/31/23 12:47 pm
 Doug Miles
 (dmiles): Approved
 for Institutional
 Research
9. 11/01/23 6:25 am
 Jason Tullis (jatullis):
 Approved for GEOS
 Chair
10. 12/05/23 12:39 pm
 Nik Rowan
 (nrgreen): Approved

for ARSC Curriculum
Committee

11. 12/05/23 12:56 pm
Christopher Liner
(liner): Approved for
ARSC Dean
12. 12/05/23 2:26 pm
Suzanne Kenner
(skenner): Approved
for Global Campus
13. 12/05/23 2:51 pm
Jim Gigantino
(jgiganti): Approved
for Provost Review
14. 12/20/23 3:10 pm
Lisa Kulczak
(lkulcza): Approved
for Undergraduate
Council

History

1. Aug 15, 2014 by
Leepfrog
Administrator
(clhelp)
2. Jan 23, 2015 by
Donna Draper
(ddraper)
3. Jan 23, 2015 by
Charlie Alison
(calison)
4. Apr 1, 2015 by
Charlie Alison
(calison)
5. Apr 1, 2015 by
Charlie Alison
(calison)
6. Jun 1, 2017 by Lisa
Kulczak (lkulcza)

7. Jun 7, 2017 by Lisa
Kulczak (lkulcza)

40.0601 - Geology/Earth Science, General.

Program Title

Earth Science, Bachelor of Science

Program Delivery

Method

On Campus

Is this program interdisciplinary?

No

Does this proposal impact any courses from another College/School?

No

What are the total 120
hours needed to
complete the
program?

Program Requirements and Description

Requirements

~~In addition to the~~

~~Requirements for the B.S. Degree with a Major in Earth Science: University of Arkansas~~ Corerequisites and the Fulbright College of Arts and Sciences Graduation Requirements for a Bachelor of Science in Earth Science

The following credit hour requirements, ~~the following course requirements~~ must be met (see Degree Completion Program Policy for additional information). State minimum core requirements may vary by individual, based on placement and previous course credit earned. met. Once all core requirements are met, students may substitute with general electives in consultation with their academic advisor.

Basic Courses

Biology

8

Chemistry or Physics

8

GEOS 1113 & GEOS 1111L	Course GEOS 1113 Not Found and Course GEOS 1111L Not Found	4
GEOS 1133 & GEOS 1131L	Course GEOS 1133 Not Found and Course GEOS 1131L Not Found	4
Select one of the following:		3-4
MATH 2043	Course MATH 2043 Not Found	
MATH 2053	Course MATH 2053 Not Found	
MATH 2183	Course MATH 2183 Not Found	
MATH 2554	Course MATH 2554 Not Found	
6 hours in a single world language at the 1013 Elementary II level or higher ¹		6
ASTR 2003 & ASTR 2001L	Course ASTR 2003 Not Found and Course ASTR 2001L Not Found	4
Advanced Courses		
GEOS 3023	Course GEOS 3023 Not Found	3
GEOS 3043	Course GEOS 3043 Not Found	3
GEOS 4353	Course GEOS 4353 Not Found	3
or GEOS 4363	Course GEOS 4363 Not Found	
GEOS 2313	Course GEOS 2313 Not Found	3
GEOS 3413	Course GEOS 3413 Not Found	3
GEOS 4033	Course GEOS 4033 Not Found	3
GEOS 4924	Course GEOS 4924 Not Found	4
At least 6 additional hours, at the 3000 level or above, in GEOS.		6
<u>State Minimum Core (Some courses listed below may also count toward this requirement.)</u>		<u>35</u>
<u>MATH 2203</u>	<u>Survey of Calculus (ACTS Equivalency = MATH 2203)</u>	<u>3-4</u>
<u>or MATH 2404</u>	<u>Calculus I (ACTS Equivalency = MATH 2405)</u>	
<u>CHEM 14103</u> & <u>CHEM 14101</u>	<u>University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture)</u> and <u>University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)</u>	<u>4</u>
<u>PHYS 20103</u> & <u>PHYS 20101</u>	<u>College Physics I (ACTS Equivalency = PHYS 2014 Lecture)</u> and <u>College Physics I Laboratory (ACTS Equivalency = PHYS 2014 Lab)</u>	<u>4</u>
<u>Select one of the following three courses with the corequisite lab:</u>		<u>4</u>

<u>ASTR 20003</u> & <u>ASTR 20001</u>	<u>Survey of the Universe (ACTS Equivalency = PHSC 1204 Lecture)</u> <u>and Survey of the Universe Laboratory (ACTS Equivalency = PHSC 1204 Lab)</u>	
<u>BIOL 10103</u> & <u>BIOL 10101</u>	<u>Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture)</u> <u>and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)</u>	
<u>ENSC 10003</u> & <u>ENSC 10001</u>	<u>Environmental Science</u> <u>and Environmental Science Laboratory</u>	
<u>GEOL 11103</u> & <u>GEOL 11101</u>	<u>Physical Geology (ACTS Equivalency = GEOL 1114 Lecture)</u> <u>and Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)</u>	<u>4</u>
<u>or GEOS 11504</u>	<u>Introduction to Geology for Science Majors</u>	
<u>GEOL 11203</u> & <u>GEOL 11201</u>	<u>Earth Science (ACTS Equivalency = GEOL 1124 Lecture)</u> <u>and Earth Science Laboratory (ACTS Equivalency = GEOL 1124 Lab)</u>	<u>4</u>
<u>GEOS 30403</u>	<u>Sustaining Earth</u>	<u>3</u>
<u>GEOS 35403</u>	<u>Geospatial Applications and Information Science</u>	<u>3</u>
<u>GEOS 3673</u>	<u>Course GEOS 3673 Not Found (Environmental Field Methods)</u>	<u>3</u>
<u>GEOS 38703</u>	<u>Geological Data Analysis</u>	<u>3</u>
<u>GEOS 43503</u>	<u>Meteorology</u>	<u>3</u>
<u>or GEOS 43603</u>	<u>Climatology</u>	
<u>GEOS 43803</u>	<u>Hazard & Disaster Assessment, Mitigation, Risk & Policy</u>	<u>3</u>
<u>GEOS 4693</u>	<u>Environmental Justice</u>	<u>3</u>
<u>12 credit hours in geosciences (GEOS) courses, with at least six credit hours numbered at the 3000-level or higher</u>		<u>12</u>
<u>Any UA-Fayetteville credit hours numbered at the 3000-level or higher</u>		<u>3</u>
<u>Any credit hours numbered at the 3000-level or higher, or any 2000-level credit hours that have a course prerequisite</u>		<u>9-10</u>
<u>General Electives</u>		<u>16</u>
Total Hours		120

Bolded courses from the list below may be applied to portions of the University/state minimum core requirements.

¹World language courses taken are dependent on placement level in sequence.

8-Semester Plan

~~Earth Science B.S. Eight-Semester Degree Program~~ Students wishing to follow the eight-semester degree plan should see the ~~Eight-Semester Degree Policy~~ for university requirements of the program. **Nine-Semester Degree Plan for a Bachelor of Science in Earth Science**

State minimum core requirements ~~Core requirement hours~~ may vary by individual, based on placement and previous credit granted. Once all core requirements are met, students may substitute with a three-hour (or more) general electives ~~elective~~ in consultation with their academic advisor. ~~place of a core area.~~
This program requires a summer field experience after the junior year.

First Year	Units
	Fall Spring Summer
ENGL 1013 Course ENGL 1013 Not Found	3 - -
Select one of the following:	3-4 - -
MATH 1203 Course MATH 1203 Not Found	
MATH 2043 Course MATH 2043 Not Found ¹	
MATH 2053 Course MATH 2053 Not Found ¹	
MATH 2183 Course MATH 2183 Not Found ¹	
MATH 2554 Course MATH 2554 Not Found ¹	
GEOS 1113 Course GEOS 1113 Not Found	4 - -
& GEOS 1111L Course GEOS 1111L Not Found	
1013 Elementary II World Language Course (or higher level)	3 - -
University/State Core US History requirement	3 - -
<u>ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)</u> ¹	<u>3</u> = =
<u>MATH 11003 College Algebra (ACTS Equivalency = MATH 1103) (Satisfies General Education Outcome 2.1)</u> ¹	<u>3</u> = =
<u>GEOL 11103 Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) (Satisfies General Education Outcome 3.4)</u> ¹	<u>4</u> = =
<u>or GEOS 11504 Introduction to Geology for Science Majors</u>	
<u>GEOL 11101 Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)</u>	
<u>State Minimum Core—U.S. History or Government (Satisfies General Education Outcome 4.2)</u> ¹	<u>3</u> = =
<u>State Minimum Core—Fine Arts (Satisfies General Education Outcome 3.1)</u> ¹	<u>3</u> = =
ENGL 1023 Course ENGL 1023 Not Found	- 3 -
Select one of the following MATH if still needed, else General Elective:	- 3-4 -
MATH 2043 Course MATH 2043 Not Found ¹	
MATH 2053 Course MATH 2053 Not Found ¹	
MATH 2183 Course MATH 2183 Not Found ¹	
MATH 2554 Course MATH 2554 Not Found ¹	
General Elective	
GEOS 1123 Course GEOS 1123 Not Found	- 4 -

GEOS 1133 Course GEOS 1133 Not Found	-	<u>4</u>	-
& GEOS 1131L Course GEOS 1131L Not Found			
2003 Intermediate I World Language Course (or higher level)	-	<u>3</u>	-
University/State Core Fine Arts or Humanities Course requirement	-	<u>3</u>	-
<u>ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.1)¹</u>	=	<u>3</u>	=
<u>MATH 22003 Survey of Calculus (ACTS Equivalency = MATH 2203)</u>	=	<u>3-4</u>	=
<u>or MATH 24004 Calculus I (ACTS Equivalency = MATH 2405)</u>			
<u>CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) (Satisfies General Education Outcome 3.4)</u>		<u>4</u>	=
<u>CHEM 14101 University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)</u>			
<u>GEOL 11203 Earth Science (ACTS Equivalency = GEOL 1124 Lecture) (Satisfies General Education Outcome 3.4)</u>	=	<u>4</u>	=
<u>GEOL 11201 Earth Science Laboratory (ACTS Equivalency = GEOL 1124 Lab)</u>			
<u>General Electives (if needed for 15 semester hours)</u>	=	<u>1</u>	=
Year Total:		16	15
Second Year			Units
			Fall Spring Summer
GEOS 2313 Course GEOS 2313 Not Found	<u>3</u>	-	-
CHEM or PHYS Course (as needed)	<u>4</u>	-	-
<u>State Minimum Core—Social Science (Satisfies General Education Outcome 3.3)¹</u>	<u>3</u>	=	=
<u>State Minimum Core—Humanities (Satisfies General Education Outcomes 3.2 and 4.1)¹</u>	<u>3</u>	=	=
<u>PHYS 20103 College Physics I (ACTS Equivalency = PHYS 2014 Lecture) (Satisfies General Education Outcome 3.4)</u>		<u>4</u>	=
<u>PHYS 20101 College Physics I Laboratory (ACTS Equivalency = PHYS 2014 Lab)</u>			
<u>GEOS 35403 Geospatial Applications and Information Science</u>	<u>3</u>	=	=
GEOS Electives	3		
University/State Core Social Science requirement	<u>3</u>	-	-
General Elective	<u>3</u>	-	-
ASTR 2003 Course ASTR 2003 Not Found	-	<u>4</u>	-
& ASTR 2001L Course ASTR 2001L Not Found			
GEOS 3413 Course GEOS 3413 Not Found	-	<u>3</u>	-
<u>State Minimum Core—Social Science (Satisfies General Education Outcome 5.1)¹</u>	=	<u>3</u>	=
Select one set of courses from the following (all satisfy General Education Outcome 3.4):		4	
<u>ASTR 20003 Survey of the Universe (ACTS Equivalency = PHSC 1204 Lecture)</u>	=	=	=
<u>& ASTR 20001 Survey of the Universe Laboratory (ACTS Equivalency = PHSC 1204 Lab)</u>			
<u>BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture)</u>	=	=	=
<u>& BIOL 10101 Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)</u>			
<u>ENSC 10003 Environmental Science</u>	=	=	=
<u>& ENSC 10001 Environmental Science Laboratory</u>			
GEOS Electives		3	

Any UA-Fayetteville credit hours numbered at the 3000-level or higher

General Electives

Year Total:

= 3 =
= 2 =
16 15

Third Year

Units
FallSpringSummer

~~BIOL Course (as needed)~~

~~4 - -~~

~~GEOS 3023 Course GEOS 3023 Not Found^{1,2}~~

~~3 - -~~

State Minimum Core—Social Science

3

~~Advanced Level Elective¹~~

~~3 - -~~

~~Advanced Level Elective¹~~

~~3 - -~~

GEOS 30403 Sustaining Earth

3 = =

GEOS 38703 Geological Data Analysis

3 = =

GEOS Electives (3000-level or higher)

3 = =

General Electives

3 = =

~~GEOS 3043 Course GEOS 3043 Not Found~~

~~- 3 -~~

~~BIOL Course (as needed)~~

~~- 4 -~~

~~Advanced Level Elective¹~~

~~- 3 -~~

GEOS 43803 Hazard & Disaster Assessment, Mitigation, Risk & Policy

= 3 =

GEOS Electives (3000-level or higher)

3

~~General Elective~~

~~- 1 -~~

Any credit hours numbered at the 3000-level or higher, or any 2000-level credit hours that have a course prerequisite

6 =

General Electives

= 3 =

~~GEOS 3673 Course GEOS 3673 Not Found (Environmental Field Methods)~~

~~= - 3~~

Year Total:

15 15 3

Fourth Year

Units
FallSpringSummer

Select one of the following:

3 - -

~~GEOS 4353 Course GEOS 4353 Not Found (as needed)^{1,2}~~

~~or Advanced Level Elective¹~~

~~Upper Level GEOS Course^{1,2}~~

~~3 - -~~

~~3000-plus Level Elective¹~~

~~3 - -~~

GEOS 43503 Meteorology

3 = =

or General Electives (if planning to take GEOS 4363 Climatology in the following spring)

Any credit hours numbered at the 3000-level or higher, or any 2000-level credit hours that have 3-4 a course prerequisite

=

General Electives

8-9

~~GEOS 4924 Course GEOS 4924 Not Found~~

~~- 4 -~~

Select one of the following

- 3 -

~~GEOS 4363 Course GEOS 4363 Not Found~~

1. 1

or Advanced Level Elective			
Upper Level GEOS Course ^{1,2}	-	3	-
3000-plus Level Elective ¹	-	3	-
<u>GEOS 43603 Climatology (if GEOS 43503 Meteorology was not taken in the previous fall)</u>	=	<u>3</u>	=
<u>or General Electives</u>			
<u>GEOS 4693 Environmental Justice (Satisfies General Education Outcomes 1.2 and 6.1)¹</u>	=	<u>3</u>	=
<u>General Electives</u>	=	<u>4</u>	=
Year Total:		15	10

Total Units in Sequence: 120

¹ Students must complete the [State Minimum Core](#) and the requirements of their major(s) as outlined in the Catalog of Studies. These courses also fulfill many, if not all, of the [General Education Requirements](#). Please visit these pages in the links provided and consult with your academic advisor when making course selections to fulfill these requirements.

² ~~Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College Academic Regulations.~~

Are Similar Programs available in the area?

No Yes

Estimated Student Demand for Program 45 N/A
 Scheduled Program 2028-2029 N/A
 Review Date

Program Goals and Objectives

Program Goals and Objectives

The goal of the program leading to the Bachelor of Science degree in Earth Science is to provide students with a broad education that focuses on studying the Earth as a system of interconnected systems and processes. This degree will provide students with a foundation in mathematics and science while offering specific focus in topics relating to the environment, natural hazards, Earth’s climate, and sustainability. This program is designed to prepare students for a career in applied science (e.g., environmental, geographic, science policy) and/or admission to graduate school in a broad range of inter-disciplinary fields (e.g., environmental Earth science, watershed science, science and policy). Elective pathways offer students the ability to specialize in geology, geography, geographic information science (GIS), and other key areas of the geosciences. N/A existing program

Learning Outcomes

Learning Outcomes

- Develop expertise in the interconnections between the atmosphere, biosphere, hydrosphere, and geosphere
- Create, manipulate, interpret, and present geospatial datasets using geographic information science (GIS)

Learning Outcomes

techniques

- Develop the quantitative thinking, data analysis, and scientific programming skills needed to be competitive in the Earth science job market
- Gain knowledge in the environmental aspects of Earth systems and potential impacts and hazards associated with human occupation
- Develop an appreciation of the Earth/atmospheric system processes that collectively develop the climates of the Earth
- Understand the causes and consequences of global environmental and climate change
- Conduct observations of and provide interpretations for Earth system processes based on field, laboratory and model simulations
- Develop sufficient mathematical, physical scientific, and social scientific knowledge to be able to apply these fields to environmental settings and problems within management and sustainability frameworks
- Understand and evaluate how Earth science processes and human practices are related to social structures, environmental ethics, and environmental justice
- Communicate scientific results to diverse audiences both orally and in writing

N/A existing program

Description and justification of the request

Description of specific change	Justification for this change
<p>This proposal a) simplifies math requirement to either Survey of Calculus or Calculus I (removing other options), b) removes world language requirement, c) specifically requires University Chemistry (+ lab) and College Physics (+ lab) as chemistry/physics requirement, d) removes Introduction to Cartography as a requirement, e) replaces 8-credit biology requirement with specifically Principles of Biology as well as Environmental Science, f) removes Mineralogy, Sedimentary Geology, Hydrogeology and Earth System History as requirements, g) adds Geospatial Applications and Information Science, Environmental Field Methods (new course proposed separately), Geological Data Analysis, "Hazard & Disaster Assessment, Mitigation, and Risk", and Environmental Justice (as a capstone) as requirements, h) streamlines wording on Geosciences and U of A electives, and i) ensures general education outcomes are added to eight-semester plan.</p> <p>Please note that general education outcome 3.4 has been entered into the appropriate comments in the eight-</p>	<p>The Earth Science, Bachelor of Science (ERSCBS) degree was originally designed to support students in meeting licensure requirements for teaching Earth science in public schools. However, the ERSCBS degree has not undergone a major revision since national accrediting bodies removed the requirement for Earth science courses for student licensure. This proposed revision will meet the needs of our students by equipping them with the critical skills and knowledge needed for a career as an Earth scientist. The revised curriculum decreases overlap with the Geology, Bachelor of Science degree while emphasizing the courses most relevant to training the next generation of Earth science students, including focusing on geographic information science (GIS), quantitative reasoning and coding, field methods, and topics relating to hazards, the environment, and climate. The proposed revisions also improve the degree</p>

Description of specific change	Justification for this change
<p>semester plan but due to a possible website glitch are not appearing in the "track changes"; this glitch will need to be resolved to ensure the catalog appropriately references the general education outcomes.</p>	<p>by (1) fixing prerequisite inconsistencies, (2) steering students into the most relevant science and mathematics courses, (3) removing world language requirements, and (4) adding an Earth Science-specific capstone course. We believe that the proposed revisions better leverage the strengths of the Department of Geosciences in preparing students for success in a world that requires expertise in the Earth and its interconnected systems and processes.</p>

Upload attachments

[before_after_curriculum.docx](#)

[ERSCBS LoN.pdf](#)

[ERSCBS - Curriculum Revision - Ltr of Notification_Rev_BOT.pdf](#)

Reviewer Comments

Lisa Kulczak (lkulcza) (10/16/23 4:03 pm): Uploaded revised LON with appropriate approval dates.

Lisa Kulczak (lkulcza) (10/16/23 4:22 pm): Updated next scheduled program review.

Lisa Kulczak (lkulcza) (10/16/23 4:53 pm): Rollback: Rolling back to address GEOS 3673 and the missing reference to learning outcome 3.4. Emailed submitter with details.

Lisa Kulczak (lkulcza) (10/30/23 4:35 pm): Updated listing for GEOS 1113/1111L in an attempt to have the General Education Outcome listing visible in the 8 semester plan; waiting on feedback from department/dean's office before approving.

Lisa Kulczak (lkulcza) (10/31/23 11:47 am): Updated listings for the science lecture/lab courses to incorporate Gen Ed outcome information. Added labs to the "select one" set of three courses listed in the Second Year Spring and added Gen Ed outcome info. College is encouraged to review for accuracy.

Key: 500