

R-REAL Curriculum Program Alignment Proposal

Department or School: Enter dept/school name: Geology Date: October 7, 2020

Degree type: BS BA BBA BSN BM BFA BSW Minor Certificate

Program: Enter program name including concentration, etc. Geology Minor

REAL Area Program Designation Sought (check all that apply): R E A L

Dept/School Contact: Jonathan Tso (jtso@radford.edu)

BS/BA Requirements: N/A

- Any degree program that fulfills a REAL area must include at least 9 unique credit hours for each area covered. At least 3 of these 9 credit hours must be at the 300 level or above
- A single major degree program may fulfill no more than three REAL areas for any one student, unless all four REAL areas are fulfilled by accreditation or licensure requirements.
- A single minor or certificate degree program may fulfill no more than two REAL areas.
- Degree program may cover up to two REAL areas using a single prefix.
- All courses documenting the coverage of a REAL area must fulfill all learning outcomes and be designated in that area.
- All courses that document fulfillment of a REAL area within a degree program of study are NOT required to be taught by the department/school. However, departments/schools are expected to formally communicate with other departments about reliance on and inclusion of courses in their degree program plans of study. Indicate this through signature of chair or director of the partnering department or school in the areas below.
- Departments or schools that seek to fulfill REAL areas must acknowledge assessment requirements for those areas. Assessment of degree seeking students is required to be conducted yearly by the department or school offering the degree program.
- If departments or schools want to use a menu of courses to fulfill a particular area, please duplicate the sections below for each REAL area and include information for each course included in the menu of options.
- Please save this file for submission as PROGRAM NAME_ProgramType.docx (Example: Criminal Justice_BS.docx)

By signing, the department/school acknowledges the above conditions and considerations:

Dept/School Signature	Date:
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Geology Minor

A student who wishes to elect a minor in geology is required to take:

GEOL 120 – Earth Science and Society (3)

GEOL 121 – Earth Science and Society Laboratory (1)

GEOL 105 – Exploring Earth (4)

GEOL 106 – It's About Time: A History of Earth, Life, and Global Change (4)

Plus a minimum of four additional semester hours from a choice of following geology courses:

GEOL 310 – Mineralogy (4)

GEOL 320 – Sedimentary Petrology and Stratigraphy (4)

GEOL 360 – Geomorphology (4)

GEOL 365 – Earth's Ocean and Climate Systems (4)

SCIENTIFIC AND QUANTITATIVE REASONING

<p>R Area: Course Prefix: GEOL Course Number: 105 Course Title: Exploring Earth Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 200</p>	<p>Is this course required or an elective for your degree program? <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input checked="" type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input checked="" type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 106 Course Title: It's About Time: A History of Earth, Life and Global Change Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Projected student enrollment per academic year: 20</p>	<p>Is this course required or an elective for your degree program? <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 310 Course Title: Mineralogy Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year:</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 320 Course Title: Sedimentary Petrology and Stratigraphy Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 15</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 360 Course Title: Geomorphology Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 20</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input checked="" type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below.</p>

Course Number: 365 Course Title: Earth's Ocean and Climate Systems Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Projected student enrollment per academic year: 24	Course Rotation: <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input checked="" type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
R Designated Course Required within the Program of Study Approved for Inclusion in the General Education Coursework: (please list at least one, can also be listed above but does not need to be) GEOL 120, GEOL 121, GEOL 105, GEOL 106	

R Area: Learning Goal: To apply scientific and quantitative reasoning to questions about the natural world, mathematics, or related areas.	
Learning Outcome 1: Students apply scientific and quantitative information to test problems and draw conclusions.	Description of learning outcome assessment plan: Data will be collected from the REAL General Studies Minor assessments conducted in the student's senior year. The data will be analyzed yearly by the Geology Department's assessment committee to determine the effectiveness of the course in meeting the learning objectives. Results will be incorporated into the course's improvement plan.
Learning Outcome 2: Students evaluate the quality of data, methods, or inferences used to generate scientific and quantitative knowledge.	Description of learning outcome assessment plan: Data will be collected from the REAL General Studies Minor assessments conducted in the student's senior year. The data will be analyzed yearly by the Geology Department's assessment committee to determine the effectiveness of the course in meeting the learning objectives. Results will be incorporated into the course's improvement plan.
Additional information for REAL Council consideration:	

Are existing material resources adequate to support this program alignment proposal?

Yes No If not, what additional material resources would be needed?

Are existing space resources adequate to support this program alignment proposal?

Yes No If not, what additional space resources would be needed?

Are existing human resources adequate to support this program alignment proposal?

Yes No If not, what additional human resources would be needed?

Department Curriculum Committee Recommendation:	Signature:	Date:
Chair/Dean on Behalf of Dept/School:	Signature:	Date:
College Curriculum Committee Approval:	Signature:	Date:
Dean/AVP Approval:	Signature:	Date:
REAL Council Recommendation:	Signature:	Date:
Faculty Senate Curriculum Committee Recommendation:	Signature:	Date:
Faculty Senate Approval:	Signature:	Date:
Provost Approval:	Signature:	Date:

I REAL Curriculum Program Alignment Proposal

Department or School: Department of Geology

Date: October 7, 2020

Degree type: BS BA BBA BSN BM BFA BSW Minor Certificate

Program: Planetary Science minor

REAL Area Program Designation Sought (check all that apply): R E A L

Dept/School Contact: Ryan Sincavage, rsincavage@radford.edu

BS/BA Requirements: N/A

- Any degree program that fulfills a REAL area must include at least 9 unique credit hours for each area covered. At least 3 of these 9 credit hours must be at the 300 level or above
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Dept/School Signature	Date:
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Official Program Description:

The Department of Geology at Radford University proposes a new minor in Planetary Science. Research in the solar system and the celestial bodies within it advance fundamental science knowledge, and provide pathways for technological advances that benefit the entire human species. By deepening our understanding of the Earth and its neighbors, we not only gain insights into the changes Earth has undergone through its long history, but we are awarded windows into its possible future through knowledge of natural systems and processes on other planets in our solar system. A recent resurgence in interest of space exploration, fostered by groundbreaking research on Mars, makes a dedicated program to the study of our solar system desirable to today's undergraduate population. Providing a sequence of planetary science courses increases scientific awareness and literacy among our graduates, to the benefit of society as a whole.

Planetary Science minor (minimum 17 credits)

GOAL: To understand the structure, composition, and evolution of Earth and the other planets and celestial bodies of the solar system.

TARGET: Majors outside of the natural sciences with an interest in the physical processes operating on Earth and within our solar system.

Required core courses (7-8 credits):

GEOL 105 (4): Exploring Earth

ASTR 111 (4): General Astronomy I

OR

ASTR 220 (3): Introduction to Astrophysics

Electives (choose *three* additional courses from the list below):

ASTR 310 (3): Observational Methods in Astronomy (*prerequisite - ASTR 220*)

ASTR 421 (3): Solar System Astronomy (*prerequisite - ASTR 220*)

GEOL 106 (4): It's About Time: A History of Earth, Life, and Global Change (*prerequisite- GEOL 105 or permission of instructor*)

GEOL 310 (4): Mineralogy (*prerequisite- GEOL 105, corequisite CHEM 111 or permission of instructor*)

GEOL 320 (4): Sedimentary Petrology and Stratigraphy (*prerequisite- GEOL 310*)

GEOL 365 (4): Earth's Ocean and Climate Systems (*prerequisite- 7 hours of natural science*)

PHYS 301 (4): Atmospheric Physics (*prerequisite- PHYS 111 or 221, or ASTR 220*)

SCIENTIFIC AND QUANTITATIVE REASONING

<p>R Area: Course Prefix: GEOL Course Number: 105 Course Title: Exploring Earth Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 200</p>	<p>Is this course required or an elective for your degree program? <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: ASTR Course Number: 111 Course Title: General Astronomy I Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 125</p>	<p>Is this course required or an elective for your degree program? <input checked="" type="checkbox"/> Required <input type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
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<p>R Area: Course Prefix: ASTR Course Number: 310 Course Title: Observational Methods in Astronomy Credit Hours: 3 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 20</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: ASTR Course Number: 220 Course Title: Introduction to Astrophysics Credit Hours: 3 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Projected student enrollment per academic year: 20</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below) Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 365</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below.</p>

<p>Course Title: Earth's Ocean and Climate Systems Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Course Rotation: <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below)</p> <p>Intended Frequency: <input type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input checked="" type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other</p>
<p>Projected student enrollment per academic year: 20</p>	<p>Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: PHYS Course Number: 301 Course Title: Atmospheric Physics Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below.</p> <p>Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below)</p> <p>Intended Frequency: <input type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input checked="" type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other</p>
<p>Projected student enrollment per academic year: 20</p>	<p>Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Area: Course Prefix: GEOL Course Number: 320 Course Title: Sedimentary Petrology and Stratigraphy Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below.</p> <p>Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below)</p> <p>Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other</p>
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<p>R Area: Course Prefix: GEOL Course Number: 310 Course Title: Mineralogy Credit Hours: 4 New course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Revised course: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Is this course required or an elective for your degree program? <input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective Is this course offered within your dept/school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, collaborating dept/school must also complete the remaining elements, and must sign below.</p> <p>Course Rotation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Intersession <input type="checkbox"/> Other (Explain below)</p> <p>Intended Frequency: <input checked="" type="checkbox"/> Every academic year <input type="checkbox"/> Every semester <input type="checkbox"/> Every other year <input type="checkbox"/> At least once every three years <input type="checkbox"/> Other</p>
<p>Projected student enrollment per academic year: 20</p>	<p>Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:</p>
<p>R Designated Course Required within the Program of Study Approved for Inclusion in the General Education Coursework: (please list at least one, can also be listed above but does not need to be): GEOL 105</p>	

<p>R Area: Learning Goal: To apply scientific and quantitative reasoning to questions about the natural world, mathematics, or related areas.</p>	
<p>Learning Outcome 1: Students apply scientific and quantitative information to test problems and draw conclusions.</p>	<p>Description of learning outcome assessment plan: Data will be collected from the REAL General Studies Minor assessments conducted by the university in the student's senior year. Once the data is received in the department the department's assessment committee will review the data to determine if corrective action is necessary. If needed the assessment committee will develop an improvement plan in combination with faculty teaching classes in this area and the department's curriculum committee. The</p>

	agreed upon changes will be incorporated into the classes. The department's assessment committee will then continue monitoring the collected assessment data to determine the effectiveness of the corrective action and determine further actions if necessary.
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Chair/Dean on Behalf of Dept/School:	Signature:	Date:
College Curriculum Committee Approval:	Signature:	Date:
Dean/AVP Approval:	Signature:	Date:
REAL Council Recommendation:	Signature:	Date:

01/14/2020

Faculty Senate Curriculum Committee Recommendation:	Signature:	Date:
Faculty Senate Approval:	Signature:	Date:
Provost Approval:	Signature:	Date: