REAL Curriculum Program Alignment Proposal

Department or School: Enter dept/school name: Geospatial Science   Date: 2/6/2020

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

Program: Geospatial Science – Concentrations: Geoinformatics and Environmental

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

Dept/School Contact: Andrew Foy afoy@radford.edu

BS/BA Requirements: Eight hours of natural science in addition to Core Curriculum requirements.

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- 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/:4/21/20

Official Program Description:

Please paste the entire official program description from the Radford University catalog in the space within this box. Find those here: https://catalog.radford.edu/

Please note that every department/school will have to submit a catalog change proposal for program that asks the Registrar's Office to insert language about the program coverage of the REAL areas into the official Radford University catalog upon approval.

Degree Core Courses (31 credits)

GEOG 103 - Introduction to Human Geography
GEOS 125 - Intro to Geospatial Data and Technologies (T)
GEOS 130 - Physical Geography (PS)
GEOG 211 - Perspectives in Geography
GEOS 250 - Introduction to GIS (T)
GEOS 270 - Fundamentals of Cartography (T)
GEOS 380 - Spatial Analysis Techniques (T)
GEOS 490 - Field Research Methods (T)
GEOS 496 - Senior Capstone Project

Concentrations (29-33 credits)

Majors must choose at least one of the two concentrations shown below.

Environmental Concentration (29-31 credits)

Required Courses (20 credits)

GEOS 241 - Environmental Regulation
GEOG 305 - Population Geography (SS)
GEOS 315 - Intermediate GIS Concepts (T)
GEOS 335 - Biogeography (PS)
GEOS 425 - Remote Sensing (T)

ECON 272 - Natural Resource Economics or
ECON 375 - Environmental Economics

Two chosen from among the following in consultation with advisor: (6-7 credits)

GEOS 362 - Water Resources (PS)
GEOS 492 - Land Use
GEOS 480 - Seminar
GEOS 498 - Independent Study

One course from among the following: (3-4 credits)

ANSC 361 - Human Impacts on the Prehistoric Environment *
BIOL 215 - Plants and Society *
BIOL 216 - General Zoology *
BIOL 217 - Flora of Virginia *
BIOL 390 - Conservation Biology *
BIOL 392 - Environmental Toxicology *
BIOL 476 - Forest and Wetland Ecology *
CHEM 215 - Environmental Chemistry *
CHEM 324 - Analytical Chemistry *
CHEM 424 - Instrumental Methods of Analysis *
GEOL 360 - Geomorphology *
GEOS 350 - Geomorphology (PS) *
GEOL 455 - Principles of Engineering Geology *
GEOL 474 - Hydrogeology *

PHSC 301 - Meteorology or *
PHYS 301 - Meteorology *

PHSC 431 - Energy and the Environment *

Notes: *Please note that these courses have prerequisites, in some cases more than one. Consult this catalog for current requirements.

Geoinformatics Concentration (30-33 credits)

Required Geospatial Science Courses (15-16 credits)

GEOS 315 - Intermediate GIS Concepts (T)
GEOS 410 - Advanced GIS: Data Management, Modeling, Programming and Web Application Development (T)
GEOS 425 - Remote Sensing (T)

GEOS 480 - Seminar or *
GEOS 498 - Independent Study

Must be in an area of applied GIS.*
Required Courses outside Geospatial Science (15-17 credits)

ENGL 306 - Professional Writing
ITEC 304 - Database from the Manager's Perspective
Three courses from among the following:

ARTG 280 - Introduction to Graphic Design
ENGL 406 - Advanced Technical Writing
ITEC 120 - Principles of Computer Science I

ITEC 122 - Discrete Mathematics
ITEC 220 - Principles of Computer Science II
ITEC 281 - Data Management and Analysis with Spreadsheets
MATH 138 - Precalculus
MATH 168 - Calculus I with Integrated Precalculus I
MATH 169 - Calculus I with Integrated Precalculus II
MATH 171 - Calculus and Analytic Geometry I
MATH 172 - Calculus and Analytic Geometry II
MATH 271 - Calculus and Analytic Geometry III

SCIENTIFIC AND QUANTITATIVE REASONING

R Area: Course Prefix: GEOS Course Number: 130 Course Title: Physical Geography Credit Hours: 4 New course: ☐ Yes ☒ No Revised course: ☐ Yes ☒ No Projected student enrollment per academic year: 23	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☒ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☒ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
R Area: Course Prefix: GEOS Course Number: 380 Course Title: Spatial Data Analysis Techniques Credit Hours: 4 New course: ☐ Yes ☒ No Revised course: ☐ Yes ☒ No Projected student enrollment per academic year:20	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☒ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☒ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
R Area: Course Prefix: GEOS Course Number: 315 Course Title: Intermediate GIS Credit Hours: 4 New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year: 20	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☒ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☒ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ 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)
1. **GEOS 130**

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 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 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.
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 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 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.
Additional information for REAL Council consideration:	

HUMANISTIC OR ARTISTIC EXPRESSION

E Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
E Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
E Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other

	Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:

E 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)

E Area: Learning Goal: To explore humanistic or artistic expression through inquiry or creativity.	
Learning Outcome 1: Students demonstrate understanding of diverse ideas, languages, products, or processes of humanistic inquiry or artistic expression.	Description of learning outcome assessment plan:
Learning Outcome 2: Students critically evaluate, synthesize, or create forms of human expression or inquiry.	Description of learning outcome assessment plan:
Additional information for REAL Council consideration:	

CULTURAL OR BEHAVIORAL ANALYSIS

A Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
A Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
A Area: Course Prefix: Course Number: Course Title: Credit Hours: New course: ☐ Yes ☐ No Revised course: ☐ Yes ☐ No Projected student enrollment per academic year:	Is this course required or an elective for your degree program? ☐ Required ☐ Elective Is this course offered within your dept/school? ☐ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation: ☐ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency: ☐ Every academic year ☐ Every semester ☐ Every other year ☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:

A 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)

A Area: Learning Goal: To examine the context and interactions of culture(s) and/or behavior(s).	
Learning Outcome 1: Students describe behaviors, beliefs, cultures, social institutions, and/or environments.	Description of learning outcome assessment plan:
Learning Outcome 2: Students analyze the interactions of behaviors, beliefs, cultures, social institutions, and/or environments.	Description of learning outcome assessment plan:
Additional information for REAL Council consideration:	

01/14/2020

APPLIED LEARNING

L Area: Course Prefix: GEOS Course Number: 125 Course Title: Intro to Geospatial Data and Technology Credit Hours:3 New course: ☐ Yes ☒ No Revised course: ☐ Yes ☒ No Projected student enrollment per academic year: 15	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation:　　　☐ Fall ☒ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency:　☒ Every academic year ☐ Every semester ☐ Every other year 　　　　　　　　　　☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
L Area: Course Prefix: GEOS Course Number: 250 Course Title: Intro to GIS Credit Hours:4 New course: ☐ Yes ☒ No Revised course: ☐ Yes ☒ No Projected student enrollment per academic year: 120	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation:　　　☒ Fall ☒ Spring ☒ Intersession ☐ Other (Explain below) Intended Frequency:　☒ Every academic year ☐ Every semester ☐ Every other year 　　　　　　　　　　☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
L Area: Course Prefix: GEOS Course Number:425 Course Title: Remote Sensing Credit Hours: 4 New course: ☐ Yes ☒ No Revised course: ☐ Yes ☒ No Projected student enrollment per academic year: 20	Is this course required or an elective for your degree program? ☒ Required ☐ Elective Is this course offered within your dept/school? ☒ Yes ☐ No If no, collaborating dept/school must also complete the remaining elements, and must sign below. Course Rotation:　　　☒ Fall ☐ Spring ☐ Intersession ☐ Other (Explain below) Intended Frequency:　☒ Every academic year ☐ Every semester ☐ Every other year 　　　　　　　　　　☐ At least once every three years ☐ Other Signature of collaborating chair/director indicating acknowledgement for inclusion and designation if not offered in dept/school:
L 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)	

L Area: Learning Goal: To explore professional practice through the application of knowledge, skills, and critical reflection.	
Learning Outcome 1: Students apply acquired knowledge and skills to develop professional identity or professional practice.	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 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.

Learning Outcome 2: Students critically reflect on their learning, abilities, experiences, or role within professional contexts.	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 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.
Additional information for REAL Council consideration:	

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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?

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Department Curriculum Committee Recommendation:	Signature: *(signature)*	Date: 4/21/20
Chair/Dean on Behalf of Dept/School:	Signature: *(signature)*	Date: 4/21/20
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: