University of Idaho
2022 – 2023 Faculty Senate Agenda
Meeting # 13
Tuesday, November 15, 2022 at 3:30 pm
Zoom Only

I. Call to Order

II. Approval of Minutes (Vote)
   • Minutes of the 2022-2023 Faculty Senate Meeting #12 (November 8, 2022) Attach. #1

III. Chair’s Report
   • Our Shared Success Story – Dakota Roberson, Electrical and Computer Engineering

IV. Provost’s Report

V. Committee Reports
   • University Curriculum Committee (Vote)
     o UCC 471: Graduate Certificate in Climate Change – Alistair Smith, Department Chair, Earth and Spatial Sciences Attach. #3
     o UCC 474: M.S. Geographic Information Science – Alistair Smith, Department Chair, Earth and Spatial Sciences Attach. #4
     o UCC 475: Earth and Spatial Sciences (BS) – Alistair, Department Chair, Earth and Spatial Sciences Attach. #5
     o UCC 476: Environmental Hydrogeology Academic Certificate – Alistair Smith, Department Chair, Earth and Spatial Sciences Attach. #6

VI. Other Policy Business
   • FSH 3065 Affirmative Action and Equal Employment Opportunity Hiring (vote) – Elissa Keim, Director, Employee Development & Workforce Diversity Attach. #7
   • *APM 01.01 Office of General Counsel Attach. #8

VII. Other Announcements and Communications
   • Green Dot – Cory Damron, Program Coordinator, Violence Prevention, Dean of Students

VIII. New Business

IX. Adjournment

Attachments:
- Attach. #1 Minutes of the 2022-2023 Faculty Senate Meeting #12 (November 8, 2022)
- Attach. #2 UCC 469
- Attach. #3 UCC 471
- Attach. #4 UCC 474
- Attach. #5 UCC 475
- Attach. #6 UCC 476

Meeting #13 Canceled
*Changes to the Administrative Procedures Manual (APM): Please forward any questions or comments directly to both the policy coordinator at ui-policy@uidaho.edu and to the policy originator (listed on the cover sheet) within five working days of the senate meeting at which the APM item is presented.
Present: Ahmadzadeh, Chapman (Vice Chair), Fuerst, Gauthier, Haltinner, Hickman, Hoffmann, Hunter, Justwan, Kolok, Long, Mittelstaedt, Murphy, Pfeifer, Quinnett (Chair), Raney, Rinker, Roberson, Sammarruca (w/o vote), Schiele, Silsby, Thorne, Tibbals, Walsh, Wargo, Webb
Absent: Fairley (excused), Schwarzlaender (excused), Kindall
Vice Provost for Faculty Kelly-Riley attending in place of Provost Lawrence

Guests/Speakers: Terence Soule, Jaap Vos, Tim Prather, Andres Trujillo, Barb Kirchmeier, Eric Anderson, Ryanne Pilgeram, Dan Ewart

Call to Order: Chair Quinnett called the meeting to order at 3:31 pm.

Approval of Minutes (vote):
Minutes of the 2022-23 Meeting #11 November 1, 2022 – Attach. #1
The minutes of the 2022-23 Meeting #11 November 1, 2022 were approved as distributed.

Chair’s Report:

- Our shared success stories: Senator Kristin Haltinner recognized the faculty she works with, Leontina Hormel, Ryanne Pilgeram, Dilshami Sarathchandra, and Deb Thorne. The books they have recently published have received great press coverage: *Inside the World of Climate Change Skeptics (Haltinner and Sarathchandra); No Perfect Birth (Kristin Haltinner); Pushed Out (Ryanne Pilgeram), Trailer Park America: Reimagining Community in the 21st Century (Leontina Hormel, forthcoming)*. Deborah Thorne is co-principal investigator on the nationally recognized *Consumer Bankruptcy Project.* Ryanne Pilgeram has been able to secure “Climate Smart” grants, one of them for a study on women farmers. Congratulations to the team for their amazing accomplishments!
- The spread-pay *ad hoc* committee had their first meeting. They expect to report to Senate in about two weeks.
- The non-tenure-track instructors support *ad hoc* group is also moving on. A survey will come out soon and the data will be shared. A series of inspiring stories about the innovative work our non-tenure-track peers do for the university may help amplify their achievements and successes. If you have success stories you would like to share, please send them our way.

Provost’s Report, delivered by Vice provost for Faculty Diane Kelly-Riley:

- A reminder of election day. Polls are open until 8pm today.
- Link for Faculty and Staff Excellence Awards: [https://www.uidaho.edu/governance/faculty-staff/university-awards/faculty/categories](https://www.uidaho.edu/governance/faculty-staff/university-awards/faculty/categories). The deadline is Friday, January 27, 2023, but a couple of awards have a nomination process with nominations to be submitted by December 9, 2022. We are planning the University Excellence Awards ceremony for May 4, 2023 – please hold the date. We hope to have an event as nice and well attended as last year at the IUCC arena. This year we have two additional awards that are not yet on the list: Excellence in
General Education Teaching and Excellence in General Education Service. General Education Teaching refers to courses with General Education designation (36 credits at the undergraduate level).

Committee Reports (vote):

- **Catalog Items**
  - UCC 477 Minor in Cybersecurity – Terence Soule, Department Chair, Computer Science Attach. #2.
    There is large and growing demand for employees in a wide range of fields with cybersecurity skills and knowledge. This minor will allow students in a wide range of majors (criminology, sociology, political science, etc.) to gain those skills, making them more attractive to employers and making the degrees more attractive to potential students.
    Vote: 27/27 in favor. Motion passes.
  - UCC 489 Natural Resources Enterprise Management (B.S.) – Jaap Vos, Interim Department Head, Natural Resources and Society Attach. #3
    This proposed program (Bachelor of Science in Natural Resource Enterprise Management) is a new program for the Department and the College. The focus area of the program was identified by stakeholders as a gap in natural resource education and also requested by students. The program builds on existing courses in the College of Natural Resources and the College of Business’ Entrepreneurship Minor to create a degree program that takes advantage of the legacy of the traditional natural resources industry, while expanding it to include private sector involvement in the use and management of natural resources. The goal of the program is to expose students to creative, entrepreneurial, and private sector approaches to natural resource management. There are two other programs (Auburn and Kansas State), but they are more limited in scope, which makes our program more innovative and better addresses student needs. Thus, the program has the potential to attract students both regionally and nationally.
    Discussion:
    There was a request for clarification about the nature of the course NRS 201 – a new introductory course to the major Natural Resources Enterprise Management. Jaap Vos said they expect over 210 students. In fact, the program has the potential to become the largest in the nation due to the component of more innovative private sector involvement in natural resources.
    Vote: 23/23 in favor. Motion passes.
  - UCC 77 Crop Sciences and Management (BSPLSC) - Tim Prather, Plant Sciences Attach. #4
    This proposal is to change the name of the major to reflect the program we are delivering for students. There was a major named Crop Management that was dropped in a previous cycle. Changing the name also helps recruiting students interested in management.
    Vote: 23/24 in favor; 1/24 against. Motion passes.
  - UCC 482 Minor in Agricultural Commodity Risk Management – Andres Trujillo, Program Director, Agricultural Economics & Rural Sociology Attach. #5
    The Department of Agricultural Economics and Rural Sociology (AERS) created the Agricultural Commodity Risk Management Program in the spring of 2017 as a collaborative effort with the College of Business and Economics (CBE) through the
Barker Trading Program. In Fall 2019 the 12 credit hours certificate in agricultural commodity risk management was added to the curriculum. Discussions and feedback from stakeholders, the industry, alumni, the Barker Trading program board, and current students identify a need for a minor in agricultural commodity risk management that provides additional training in analytics, international trade, and supply chain management. Moreover, a minor provides stronger signaling to potential employers in this field, like trading firms, merchandisers, cooperatives, financial institutions, originators, and overall risk management positions in agribusiness.

**Discussion:**
A discussion followed about the electives from which students must select at least 4 credits. The language is such that a student can select, for instance, to take a 1-credit lab course multiple times. Andres Trujillo explained that those labs are experiential learning courses, with trading of real money and where every situation is different. Thus, a student who takes the class more than once can participate in different roles, depending on their experience. Hence, the large flexibility.

Vote: 23/25 in favor; 2/25 against. Motion passes.

- **FSH Items**
  - Committee on Committees
    - FSH 1640.90 University Assessment & Accreditation Committee (UAAC) Directory
      Barb Kirchmeier, Director, Independent Study in Idaho Attach. #6
      The UAAC requests an update of their membership list to add two *ex-officio* non-voting members: the Director of General Education and the Director of CETL. The purpose is to receive feedback from others who are actively engaged in the process of assessment and accreditation. Moreover, our CETL member will help us streamline conversations about, for instance, Canvas and Anthology. The prospective new members have been attending the past few meetings and are fully onboard.
      Vote: 23/23 in favor. Motion passes.

**Other Announcements and Communications:**
- **Career Impact Award** – Eric Anderson, Interim Director of Career Services, Dr. Pilgeram, Culture, Society and Justice and Dr. Schiele, Chemical & Biological Engineering
  Eric Anderson is pleased to recognize the two award winners: Dr. Pilgeram, Culture, Society and Justice and Dr. Schiele, Chemical & Biological Engineering. They were chosen among 50 nominations!

- **Continued discussion on APM 30.16:**
  Senator Mittelstaedt is representing Senator Fairley who is unable to be present. A motion is before Senate from the previous meeting to request that President Green suspends APM 30.16 until a solution can be found. Senator Mittelstaedt reported that Senator Fairley would agree to referring the motion to an *ad hoc* committee for further consideration, as long as there is some flexibility on the OIT side for finding a “middle ground.” Vice President Dan Ewart said he is open to this approach. He also noted that we cannot just suspend APM 30.16, because a lot more than the hardware procurement issue is in the policy.
  The discussion continued, with some Senators reiterating the problems their constituents encountered (such as delivery timelines, costs, the fact that some funding agencies do not allow
PIs to use Lenovo computers, etc.), whereas Dan Ewart reiterated the benefits of the centralized approach from APM 30.16, which still offers some flexibility.

Secretary Sammarruca suggested that the debate is not moving us forward. Instead, let’s seek a constructive solution by assembling a well-balanced committee to do an in-depth analysis of the problem and make recommendations to Senate.

A secondary motion to refer the main motion to an ad hoc committee for further analysis was brought forward and seconded (Mittelstaedt/Chapman). Vote: 19/20 in favor; 1/20 against. Motion passes.

Some senators volunteered. Please email Chair Quinnett if you are interested in being part of this group.

**New Business:**
There was none.

**Adjournment:**
The agenda being completed, Chair Quinnett adjourned the meeting at 4:50pm.

Respectfully Submitted,

Francesca Sammarruca
Secretary of the University Faculty & Secretary to Faculty Senate
469: UNDERGRADUATE ROBOTICS SYSTEMS ACADEMIC CERTIFICATE

In Workflow
1. 131 Chair (tsoule@uidaho.edu; arleen@uidaho.edu)
2. 08 Curriculum Committee Chair (colberg@uidaho.edu)
3. 08 Dean (long@uidaho.edu)
4. Provost’s Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
5. Curriculum Review (sstubbs@uidaho.edu)
6. Degree Audit Review (rfrost@uidaho.edu)
7. Registrar’s Office (none)
8. Ready for UCC (disable)
9. UCC (none)
10. John Shovic (jshovic@uidaho.edu)
11. Faculty Senate Chair (mstout@uidaho.edu; jvalkovic@uidaho.edu; cari@uidaho.edu)
12. Assessment (sara@uidaho.edu)
13. Provost’s Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
14. State Approval (mstout@uidaho.edu; jvalkovic@uidaho.edu; lindalundgren@uidaho.edu)
15. NWCCU (sara@uidaho.edu; mstout@uidaho.edu)
16. Theodore Unzicker (tunzicker@uidaho.edu)

Approval Path
1. Fri, 12 Nov 2021 16:38:12 GMT
   Terence Soule (tsoule): Rollback to Initiator
2. Fri, 16 Sep 2022 23:27:12 GMT
   Terence Soule (tsoule): Approved for 131 Chair
   Patricia Colberg (colberg): Approved for 08 Curriculum Committee Chair
4. Wed, 19 Oct 2022 16:02:46 GMT
   Suzanna Long (long): Approved for 08 Dean
5. Fri, 21 Oct 2022 17:45:38 GMT
   Gwen Gorzelasky (gwen): Approved for Provost’s Office
   Steve Stubbs (sstubbs): Approved for Curriculum Review
7. Thu, 27 Oct 2022 17:30:34 GMT
   Rebecca Frost (rfrost): Approved for Degree Audit Review
8. Thu, 27 Oct 2022 23:57:31 GMT
   Steve Stubbs (sstubbs): Approved for Registrar’s Office
9. Wed, 02 Nov 2022 17:48:37 GMT
   Theodore Unzicker (tunzicker): Approved for Ready for UCC
10. Tue, 08 Nov 2022 21:07:17 GMT
    Theodore Unzicker (tunzicker): Approved for UCC
11. Fri, 11 Nov 2022 16:19:12 GMT
    John Shovic (jshovic): Approved for V00094955

New Program Proposal
Date Submitted: Wed, 14 Sep 2022 23:02:15 GMT

Viewing: 469 : Undergraduate Robotics Systems Academic Certificate
Last edit: Wed, 09 Nov 2022 19:25:09 GMT
Changes proposed by: John Shovic

Faculty Contact

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Faculty Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Shovic</td>
<td><a href="mailto:jshovic@uidaho.edu">jshovic@uidaho.edu</a></td>
</tr>
</tbody>
</table>

Will this request have a fiscal impact of $250K or greater?
No
Academic Level
Undergraduate

College
Engineering

Department/Unit:
Computer Science

Effective Catalog Year
2022-2023

Program Title
Undergraduate Robotics Systems Academic Certificate

Degree Type
Certificate

Please note: Majors and Certificates over 30 credits need to have a state form approved before the program can be created in Curriculum.

Program Credits
18

Attach Program Change
469 UnderGradRoboticsShort-091222-Proposal-Form_academic_FINAL+gg.pdf

CIP Code
11.0701 - Computer Science.

Will the program be Self-Support?
No

Will the program have a Professional Fee?
No

Will the program have an Online Program Fee?
No

Will this program lead to licensure in any state?
No

Will the program be a statewide responsibility?
No

Financial Information

What is the financial impact of the request?
Less than $250,000 per FY

Note: If financial impact is greater than $250,000, you must complete a Program Proposal Form

Describe the financial impact
None. Classes are already in CS Curriculum.

Curriculum:
Undergraduate Robotics Systems Academic Certificate
Certificate Objectives:
Robotic automation has spread through all different types of manufacturing, food processing and agriculture. The key to companies remaining competitive is to continue to increase productivity through automation using robotics. This certificate produces students that have a deep understanding of the Robotics stack from the lower level motors and controllers, through PLC controllers and into higher level cognitive processes including using modern AI techniques.
Il required coursework must be completed with a grade of 'C' or better (O-10-a (https://catalog.uidaho.edu/general-requirements-academic-procedures/o-miscellaneous/)).

Required Coursework:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CS 453</td>
<td>Advanced Robotics I</td>
<td>3</td>
</tr>
<tr>
<td>CS 454</td>
<td>Advanced Robotics II</td>
<td>3</td>
</tr>
<tr>
<td>CS 443</td>
<td>Embedded Systems</td>
<td>3</td>
</tr>
<tr>
<td>Any 3 courses of the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>CS 466</td>
<td>PLC Programming for Automation</td>
<td></td>
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<tr>
<td>CS 455</td>
<td>Machine Vision</td>
<td></td>
</tr>
<tr>
<td>CS 452</td>
<td>Real-Time Operating Systems</td>
<td></td>
</tr>
<tr>
<td>CS 470</td>
<td>Artificial Intelligence</td>
<td></td>
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<tr>
<td>CS 472</td>
<td>Evolutionary Computation</td>
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<tr>
<td>CS 474</td>
<td>Deep Learning</td>
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<tr>
<td>CS 475</td>
<td>Machine Learning</td>
<td></td>
</tr>
<tr>
<td>CS 477</td>
<td>Python for Machine Learning</td>
<td></td>
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<tr>
<td>CS 449</td>
<td>Fault-Tolerant Systems</td>
<td></td>
</tr>
<tr>
<td>CS 444</td>
<td>Supervisory Control and Critical Infrastructure Systems</td>
<td></td>
</tr>
<tr>
<td>ME 454</td>
<td>Assistive Technologies for Physical Impairment</td>
<td></td>
</tr>
<tr>
<td>ME 464</td>
<td>Robotics: Kinematics, Dynamics, and Control</td>
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</tr>
</tbody>
</table>

Total Hours 18

Courses to total 18 credits for this certificate
Students should consult with their academic advisor regarding this certificate.

Distance Education Availability

To comply with the requirements of the Idaho State Board of Education (SBOE) and the Northwest Commission on Colleges and Universities (NWCCU) the University of Idaho must declare whether 50% or more of the curricular requirements of a program which may be completed via distance education.

Can 50% or more of the curricular requirements of this program be completed via distance education?
Yes

If Yes, can 100% of the curricular requirements of this program be completed via distance education?
No

Note: Existing programs transitioning from less than 50% of its curricular requirements to 50% or more of its requirements being available via distance education is considered a Group C change and must complete the program proposal formwork before these changes will be processed.

Geographical Area Availability

In which of the following geographical areas can this program be completed in person?
Coeur d'Alene
Moscow

Student Learning Outcomes

List the intended learning outcomes for program component. Use learner centered statements that indicate what will students know, be able to do, and value or appreciate as a result of completing the program.

LO#1 - An ability to understand and apply engineering principles to software, hardware, safety and environmental aspects of robotic systems.
LO#2 - An ability to understand the entire robotic stack from control software down to the level of embedded systems and motors.
LO#3 - An ability to add modern software paradigms, such as Artificial Intelligence and Machine Learning to robotic systems.
LO#4 - Recognize professional responsibilities and make informed judgements in practices based on legal and ethical principles

Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program component.
An outside entity, specifically a representative from industry, will be used to review student presentations, project physical results and feedback gathered in CS454 Advanced Robotics II on an annual basis.
How will you ensure that the assessment findings will be used to improve the program?
Project results and difficulty will be reviewed each semester and adjusted as necessary. An important aspect of these classes is that most projects will be built upon previous class work and graduate student work so the content taught in the class will be evolving on an ongoing basis.

What direct and indirect measures will be used to assess student learning?
Traditional exams will be required. In addition, written and oral presentations will be graded. In the required courses, an oral exam of the students will be required at the end of the class to evaluate student learning.
In the spring semester, students will be surveyed to gain additional input.

When will assessment activities occur and at what frequency?
The size and scope of this program dictate that we will collect the assessment data during the courses and the survey data each Spring. Every fall semester the CS robotics and embedded systems committee will evaluate the assessment and take corrective actions if necessary.

Student Learning Outcomes

Learning Objectives
1. Graduates will be able to apply modern software design and engineering principles and practices to the hardware, software, safety and environmental aspects of a robotic system.
2. Graduates will be able to analyze, evaluate and design parts of the robotic stack and will be able to communicate with other disciplines working on robotic systems.

Rationale for the proposed change. Include an explanation of how the department will manage the added workload, if any.
Industrial automation in manufacturing is key to improving productivity and maintaining competitiveness both domestically and internationally. This certificate will produce students that have a deep understanding of the Robotics stack from the lower level motors and controllers, through PLC controllers and into higher level cognitive processes including using modern AI techniques.

Reviewer Comments
Terence Soule (tsoule) (Fri, 12 Nov 2021 16:38:12 GMT): Rollback: To make changes
Linda Lundgren (lindalundgren) (Fri, 21 Oct 2022 15:59:59 GMT): Uploaded revised state form, per GG.
Rebecca Frost (rfrost) (Thu, 27 Oct 2022 17:28:39 GMT): Adjusted curriculum to catalog standard. Certificate included statement referring to Regulation J-3 requiring a "B" grade. Appropriate catalog citation for undergraduate certificates requiring a "C" grade was added. The department added statement should be evaluated and removed if not necessary.
Theodore Unzicker (tunzicker) (Tue, 08 Nov 2022 20:58:49 GMT): Program approved by UCC. However, John Shovic will need to update the attached SBOE form to remove degree verbiage from item 5a. Also removed unneeded "B" or better verbiage from curriculum bloc.

Key: 469
**SHORT PROPOSAL FORM**

**Academic Programs**

<table>
<thead>
<tr>
<th>Date of Proposal Submission:</th>
<th>9/6/2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution Submitting Proposal:</td>
<td>University of Idaho</td>
</tr>
<tr>
<td>Name of College, School, or Division:</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>Name of Department(s) or Area(s):</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Official Name of Program or Instructional/Administrative Unit:</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Implementation Date:</td>
<td>Spring 2023</td>
</tr>
</tbody>
</table>

**Degree:**
- **Degree Level:** Undergraduate
- **Degree Type:** BS

**CIP code (consult IR /Registrar):** 11.0701

**Method of Delivery:**
- Face To Face: 30%
- Hybrid 70%
- Distance Delivery 0%

**Geographical Delivery:**
- Location(s): Moscow, Coeur d'Alene
- Region(s):  

**Proposed Action**
- New Certificate Addition of a degree to an existing program
- Undergraduate Certificate (30 credits or more)
- Graduate Certificate (30 credits or more)
- Specialized Certificate
- Addition of a certificate to an existing program
- Modification of Existing Undergraduate Programs
- Splitting an existing program into two or more programs
- Consolidating two or more programs into one program
- Converting one program option into a stand-alone program
- Converting or transitioning a degree level (i.e., BA to BS)
- Other
- Establishing a dual degree from existing programs
- New programs consisting of multiple certificates with similar coursework
- Program name changes related to Statewide Program Responsibilities (requires Board approval)
- Deviation of program credit definitions (i.e., increase in number of credits for a degree)
This proposal form must be completed for certificates and program changes as provided in Board Policy III.G.3.b. Actions Requiring a Short Proposal.

1. Provide an overview of the changes that includes need and rationale for the proposed modification or change. Identify any existing program that this program will replace.

   Industrial automation in manufacturing is key to improving productivity and maintaining competitiveness both domestically and internationally. This certificate will produce students that have a deep understanding of the Robotics stack from the lower level motors and controllers, through PLC controllers and into higher level cognitive processes including using modern AI techniques.

2. Discuss impact of proposed modification on student enrollment. Using the chart below, provide projected new enrollments for the proposed certificate or modified program:

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated New Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Headcount</td>
</tr>
<tr>
<td>2023-24</td>
<td>5</td>
</tr>
<tr>
<td>2024-25</td>
<td>10</td>
</tr>
<tr>
<td>2025-26</td>
<td>15</td>
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<tr>
<td>2026-27</td>
<td>20</td>
</tr>
<tr>
<td>2027-28</td>
<td>20</td>
</tr>
</tbody>
</table>

3. Teacher Education/Certification Programs. All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission prior to consideration and approval of the program by the State Board of Education. Will this program lead to certification?

   Yes_____ No____ X____

   If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission?

4. Three-Year Plan. If this is a new proposed certificate (30 credits or more) or degree, is it on your institution’s approved 3-year plan?

   Yes_____ No____
If yes, proceed to question 5. If no, please address A and B below:

a. Which of the following statements address the reason for adding this program outside of the regular three-year planning process.

Indicate (X) by each applicable statement:

| Program is important for meeting your institution’s regional or statewide program responsibilities. |
| The program is in response to a specific industry need or workforce opportunity. |
| The program is reliant on external funding (grants, donations) with a deadline for acceptance of funding. |
| There is a contractual obligation or partnership opportunity related to this program. |
| The program is in response to accreditation requirements or recommendations. |
| The program is in response to recent changes to teacher certification/endorsement requirements. |
| We failed to include it when we had the opportunity. |
| Other: |

b. Provide an explanation for all statements you selected.

Industrial Automation and Robotics are key to improving the productivity of modern manufacturing and maintaining a competitive position for Idaho manufacturers both domestically and internationally. There are numerous manufacturing partnerships possible such as Idaho Forest Group and other Idaho manufacturing companies.

5. Curriculum for the proposed program changes and its delivery.

a. Summary of requirements. Provide a summary of program requirements using the following table.

| Credit hours in required courses offered by the department (s) offering the program | 18 |
| Credit hours in required courses offered by other departments: | 0 |
| Credit hours in institutional general education curriculum | 0 |
| Credit hours in free electives | 9 |
| Total credit hours required for degree program: | 120 — BS Computer Science |

b. Curriculum. Provide the curriculum for the program, including a listing of course titles and credits in each.

Robots System Academic Certificate Curriculum:

Level: Undergraduate, 18 credits Expected submission: September 2022

Objectives:
- Produce students that have a deep understanding of the Robotics stack from the lower level motors and controllers, through PLC controllers and into higher level cognitive processes including using modern AI techniques.

Required:
CS453 Advanced Robotics I
CS454 Advanced Robotics II CS443
Embedded Systems

Any 3 of the following:
6. Resources Required for Implementation – Financial Impact and Budget.
   a. Discuss organizational arrangements required within the institution to accommodate the proposed action, including administrative, staff, and faculty hires, facilities, student services, library, etc. Include a statement regarding total cost to students. If there is no financial impact as defined in Board Policy III.G.1.f, include a statement to indicate there is no financial impact. Completion of the budget form is required if there is a financial impact.

   No financial impact. All courses for this certificate are already offered in the Computer Science and Mechanical Engineering Departments.

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1 Financial Impact shall mean the total financial resources, regardless of funding source, needed to support personnel costs, operating expenditures, capital outlay, capital facilities construction or major renovation, and indirect costs that are incurred as a direct result of establishing, modifying, or discontinuing a new instructional program, instructional unit, or administrative unit. This includes the impact of moving resources from existing programs to proposed programs.
471: GRADUATE CERTIFICATE IN CLIMATE CHANGE

In Workflow
1. Geol/Geog Review (renee@uidaho.edu)
2. 225 Chair (alistair@uidaho.edu)
3. 19 Curriculum Committee Chair (markn@uidaho.edu)
4. 19 Dean (gingercarney@uidaho.edu)
5. Provost's Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
6. Curriculum Review (sstubbs@uidaho.edu)
7. Degree Audit Review (rfrost@uidaho.edu)
8. Graduate Council Chair (slthomas@uidaho.edu)
9. Registrar's Office (none)
10. Ready for UCC (disable)
11. UCC (none)
12. Faculty Senate Chair (mstout@uidaho.edu; jvalkovic@uidaho.edu; cari@uidaho.edu)
13. State Approval (mstout@uidaho.edu; jvalkovic@uidaho.edu; lindalundgren@uidaho.edu)
14. NWCCU (sara@uidaho.edu; mstout@uidaho.edu)
15. Theodore Unzicker (tunzicker@uidaho.edu)

Approval Path
1. Tue, 05 Apr 2022 22:45:53 GMT
   Renee Jensen-Hasfurther (renee): Approved for Geol/Geog Review
2. Tue, 05 Apr 2022 22:49:35 GMT
   Alistair Smith (alistair): Approved for 225 Chair
3. Mon, 09 May 2022 07:54:03 GMT
   Mark Nielsen (markn): Approved for 19 Curriculum Committee Chair
4. Mon, 09 May 2022 15:19:06 GMT
   Ginger Carney (gingercarney): Approved for 19 Dean
5. Tue, 10 May 2022 16:15:13 GMT
   Dean Panttaja (panttaja): Approved for Provost's Office
   Steve Stubbs (sstubbs): Approved for Curriculum Review
7. Wed, 05 Oct 2022 18:30:57 GMT
   Rebecca Frost (rfrost): Approved for Degree Audit Review
8. Thu, 13 Oct 2022 19:17:16 GMT
   Stephanie Thomas (slthomas): Approved for Graduate Council Chair
9. Tue, 18 Oct 2022 16:54:03 GMT
   Steve Stubbs (sstubbs): Approved for Registrar's Office
10. Wed, 26 Oct 2022 17:01:09 GMT
    Theodore Unzicker (tunzicker): Approved for Ready for UCC
11. Wed, 02 Nov 2022 16:22:01 GMT
    Theodore Unzicker (tunzicker): Approved for UCC

New Program Proposal
Date Submitted: Thu, 24 Mar 2022 17:45:33 GMT

Viewing: 471: Graduate Certificate in Climate Change
Last edit: Tue, 18 Oct 2022 16:59:08 GMT
Changes proposed by: Alistair Smith

Faculty Contact

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Faculty Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alistair Smith</td>
<td><a href="mailto:alistair@uidaho.edu">alistair@uidaho.edu</a></td>
</tr>
</tbody>
</table>

Will this request have a fiscal impact of $250K or greater?
No

Academic Level
Graduate
College
Science

Department/Unit:
Geography & Geological Sciences

Effective Catalog Year
2023-2024

Program Title
Graduate Certificate in Climate Change

Degree Type
Certificate

Please note: Majors and Certificates over 30 credits need to have a state form approved before the program can be created in Curriculum.

Program Credits
12

CIP Code
40.0401 - Atmospheric Sciences and Meteorology, General.

Will the program be Self-Support?
No

Will the program have a Professional Fee?
No

Will the program have an Online Program Fee?
No

Will this program lead to licensure in any state?
No

Will the program be a statewide responsibility?
Yes

Financial Information

What is the financial impact of the request?
Less than $250,000 per FY

Note: If financial impact is greater than $250,000, you must complete a Program Proposal Form

Describe the financial impact
No financial impact. Courses required for the certificate are already being taught.

Curriculum:

At least half of the credits completed towards the certificate must be in graduate level coursework and all required coursework must be completed with a grade of 'B' or better (O-10-b).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 513</td>
<td>Global Climate Change</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three courses from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 553</td>
<td>Northwest Climate and Water Resources Change</td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
</tr>
<tr>
<td>GEOG 455</td>
<td>Societal Resilience and Adaptation to Climate Change</td>
</tr>
<tr>
<td>GEOG 488</td>
<td>Geography of Energy Systems</td>
</tr>
<tr>
<td>GEOG 517</td>
<td>Tree Rings and Environmental Change</td>
</tr>
<tr>
<td>GEOG 535</td>
<td>Climate Change Mitigation</td>
</tr>
<tr>
<td>GEOL 535</td>
<td>Glaciology and the Dynamic Frozen Earth</td>
</tr>
</tbody>
</table>
GEOL 562 | Petroleum Systems and Stratigraphic Concepts
SOC 466 | Climate Change and Society

Total Hours: 12

Courses to total 12 credits for this certificate

Distance Education Availability

To comply with the requirements of the Idaho State Board of Education (SBOE) and the Northwest Commission on Colleges and Universities (NWCCU) the University of Idaho must declare whether 50% or more of the curricular requirements of a program which may be completed via distance education.

Can 50% or more of the curricular requirements of this program be completed via distance education?

No

Note: Existing programs transitioning from less than 50% of its curricular requirements to 50% or more of its requirements being available via distance education is considered a Group C change and must complete the program proposal formwork before these changes will be processed.

Geographical Area Availability

In which of the following geographical areas can this program be completed in person?

Moscow

Student Learning Outcomes

List the intended learning outcomes for program component. Use learner centered statements that indicate what will students know, be able to do, and value or appreciate as a result of completing the program.

1. Demonstrate a depth of knowledge of global climate challenges and problems.
2. Demonstrate the ability to synthesize information related to solutions to current climate change challenges.
3. Demonstrate a depth of knowledge of global climate change adaptation and mitigation solutions.
4. Demonstrate a depth of knowledge of subject matter areas related to global climate change including water and energy systems and understand how they related to climate change.
5. Communicate effectively and professionally.

Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program component.

The required course in Global Climate Change will serve as an indicator course to act as an indicator of the overall quality of the certificate. This indirect measure of program performance will allow the program faculty to evaluate whether each cohort is maintaining a high degree of rigor in the certificate.

We will also conduct a survey of students who complete the certificate. The survey will assess the degree to which they felt the student demonstrated key concepts related to climate change.

How will you ensure that the assessment findings will be used to improve the program?

Annual meetings with faculty to discuss survey results and adjust curricula as necessary.

What direct and indirect measures will be used to assess student learning?

Indirect measures such as course grades will be used. Direct measures will be inferred from the survey results and interactions with future employers of the students.

When will assessment activities occur and at what frequency?

Annually.

Student Learning Outcomes

Learning Objectives

1. Demonstrate a depth of knowledge of global climate challenges and problems.
2. Demonstrate the ability to synthesize information related to solutions to current climate change challenges.
3. Demonstrate a depth of knowledge of global climate change adaptation and mitigation solutions.
4. Demonstrate a depth of knowledge of subject matter areas related to global climate change including water and energy systems and understand how they related to climate change.
5. Communicate effectively and professionally.
Rationale for the proposed change. Include an explanation of how the department will manage the added workload, if any.

Climate change is a global problem and its effects are apparent across the state of Idaho, with droughts, fires and other hazards. The department has always provided leadership in this area at the University of Idaho, specifically through the existing climate change undergraduate academic certificate. Over the years we have had several graduate students express interest in a graduate version of the certificate and this change is proposed to meet those needs.

Reviewer Comments
Ken Udas (kudas) (Mon, 09 May 2022 16:23:48 GMT): Changed "Self Support" from YES to NO following consultation with the department head.

Rebecca Frost (rfrost) (Wed, 05 Oct 2022 18:30:49 GMT): GEOG 411/512 and GEOL 574 both appear to be dormant courses. The department should submit course change forms to activate both courses if it is intended that they be available for this certificate. If these courses are not reactivated then the courses will be removed from the elective options for catalog purposes.

Key: 471
# 474: M.S. GEOGRAPHIC INFORMATION SCIENCE

## In Workflow
1. Geol/Geog Review (renee@uidaho.edu)
2. 225 Chair (alistair@uidaho.edu)
3. 19 Curriculum Committee Chair (markn@uidaho.edu)
4. Provost's Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
5. 19 Dean (gingercarney@uidaho.edu)
6. Curriculum Review (sstubbs@uidaho.edu)
7. Degree Audit Review (rfrost@uidaho.edu)
8. Graduate Council Chair (slthomas@uidaho.edu)
9. Ready for UCC (disable)
10. UCC (none)
11. Faculty Senate Chair (mstout@uidaho.edu; jvalkovic@uidaho.edu; cari@uidaho.edu)
12. State Approval (mstout@uidaho.edu; jvalkovic@uidaho.edu; lindalundgren@uidaho.edu)
13. NWCCU (sara@uidaho.edu; mstout@uidaho.edu)
14. Theodore Unzicker (tunzicker@uidaho.edu)

## Approval Path
1. Mon, 21 Mar 2022 15:36:04 GMT  
   Renee Jensen-Hasfurther (renee): Approved for Geol/Geog Review
2. Mon, 21 Mar 2022 15:36:42 GMT  
   Alistair Smith (alistair): Approved for 225 Chair
3. Mon, 21 Mar 2022 16:58:12 GMT  
   Mark Nielsen (markn): Approved for 19 Curriculum Committee Chair
   Ken Udas (kudas): Approved for Provost’s Office
5. Wed, 27 Apr 2022 20:40:01 GMT  
   Lindsey Brown (lindseybrown): Approved for 19 Dean
   Steve Stubbs (sstubbs): Approved for Curriculum Review
7. Wed, 05 Oct 2022 19:20:30 GMT  
   Rebecca Frost (rfrost): Approved for Degree Audit Review
8. Thu, 13 Oct 2022 20:17:24 GMT  
   Stephanie Thomas (slthomas): Approved for Graduate Council Chair
9. Wed, 26 Oct 2022 17:00:20 GMT  
   Theodore Unzicker (tunzicker): Approved for Ready for UCC
10. Wed, 02 Nov 2022 16:21:36 GMT  
    Theodore Unzicker (tunzicker): Approved for UCC

## New Program Proposal
Date Submitted: Fri, 11 Mar 2022 22:26:57 GMT

**Viewing: 474 : M.S. Geographic Information Science**

**Last edit: Thu, 03 Nov 2022 15:59:36 GMT**

Changes proposed by: Alistair Smith

**Faculty Contact**

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Faculty Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alistair Smith</td>
<td><a href="mailto:alistair@uidaho.edu">alistair@uidaho.edu</a></td>
</tr>
</tbody>
</table>

**Will this request have a fiscal impact of $250K or greater?**

Yes

**Academic Level**

Graduate

**College**

Science
**Department/Unit:**
Earth & Spatial Sciences

**Effective Catalog Year**
2023-2024

**Program Title**
M.S. Geographic Information Science

**Degree Type**
Major

Please note: Majors and Certificates over 30 credits need to have a state form approved before the program can be created in Curriculum.

**Program Credits**
30

**Attach Program Change**
Academic_Degree_and_Certificate_FullProposal_Form_MS-GIS-rev.doc
Budget - Full Proposal Form_GIS-MS-rev.xlsx

**CIP Code**
45.0702 - Geographic Information Science and Cartography.

**Emphasis/Option CIP Code(s)**

<table>
<thead>
<tr>
<th>Code(s)</th>
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</thead>
<tbody>
<tr>
<td>29.0203</td>
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</tbody>
</table>

**Will the program be Self-Support?**
No

**Will the program have a Professional Fee?**
No

**Will the program have an Online Program Fee?**
Yes

**Will this program lead to licensure in any state?**
No

**Will the program be a statewide responsibility?**
Yes

**Financial Information**

**What is the financial impact of the request?**
Greater than $250,000 per FY

**Note:** If financial impact is greater than $250,000, you must complete a Program Proposal Form

**Describe the financial impact**
The new degree will lead to significant increase in graduate enrollment and associated tuition revenue into the institution.
The proposed program will include the hiring of a new clinical faculty member to provide curricula leadership including working with the Department Chair on recruiting, marketing, and advising of non-thesis masters students. This clinical faculty member will also develop and teach online courses in the program and liaise with existing University of Idaho instructional resources (e.g., the Center for Excellence in teaching and Learning) to lead a team to develop and deliver high quality online courses.

**Curriculum:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Curriculum: 18 cr. (non-thesis-16 cr. plus 2 cr. 599) - 22 cr. (thesis) (16 cr. plus 6 cr. 500)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Intermediate GIS (Core Curriculum)</td>
<td>3</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Hours</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>GEOG 583</td>
<td>Remote Sensing IMAGE ANALYSIS/GIS Integration</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 507</td>
<td>Spatial Analysis and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 525</td>
<td>Course GEOG 525 Not Found (Graduate GIS Fundamentals) at UCC approval</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 593</td>
<td>Course GEOG 593 Not Found (Geovisualization) at UCC approval</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 596</td>
<td>Geography Department Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

**Thesis or Non-Thesis Track:**

**Thesis Track (6 credits):**

- GEOG 500: Master's Research and Thesis (Thesis students will take 6 thesis credits)
- or GEOL 500: Master's Research and Thesis

**Non-Thesis Track (2 credits):**

- GEOG 599: Research (Research students will take 2 research credits)
- or GEOL 599: Research

**Application Areas**

Select one of the Following Application Areas:

- **Remote Sensing**
- **GIS Programming**
- **Natural Hazards and Emergency Planning**
- **Geospatial Aspects of Sustainable Planning**
- **Geotechnician**
- **Geospatial Habitat Assessment**
- **Geospatial Intelligence**

**Total Hours**

26-34

**Courses to total 30 credits for this degree**

**A. Remote Sensing**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 524</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FOR/NRS 472</td>
<td>Remote Sensing of the Environment</td>
<td>4</td>
</tr>
<tr>
<td>FOR 535</td>
<td>Remote Sensing of Fire</td>
<td>3</td>
</tr>
<tr>
<td>REM 476</td>
<td>Unmanned Aerial Systems (UAS) Operations</td>
<td>1</td>
</tr>
<tr>
<td>REM 475</td>
<td>Remote Sensing Application with Unmanned Aerial Systems (UAS)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 516</td>
<td>Image Sensors and Systems</td>
<td>3</td>
</tr>
<tr>
<td>NRS 552</td>
<td>Current Lit in Remote Sensing</td>
<td>1</td>
</tr>
</tbody>
</table>

**B. GIS Programming**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 479</td>
<td>GIS Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 419</td>
<td>Introduction to SAS/R Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 426</td>
<td>SAS Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 427</td>
<td>R Programming</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 511</td>
<td>Data Wizardry in Environmental Sciences</td>
<td>3</td>
</tr>
<tr>
<td>CS 479</td>
<td>Data Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**C. Natural Hazards and Emergency Planning**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 411</td>
<td>Natural Hazards and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414</td>
<td>Socioeconomic Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 567</td>
<td>Volcanology</td>
<td>3</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Hours</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>FOR 554</td>
<td>Air Quality, Pollution, and Smoke</td>
<td>3</td>
</tr>
<tr>
<td>NRS 576</td>
<td>Environmental Project Management and Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>NRS 588</td>
<td>NEPA in Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CE 535</td>
<td>Fluvial Geomorphology and River Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 535</td>
<td>Seepage and Slope Stability</td>
<td>3</td>
</tr>
<tr>
<td>TM 517</td>
<td>Critical Infrastructure Security and Resilience Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>TM 525</td>
<td>Emergency Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>INDT 470</td>
<td>Homeland Security</td>
<td>3</td>
</tr>
</tbody>
</table>

**D. Geospatial Aspects of Sustainable Planning**

Select 8 credits for thesis, 12 credits for non-thesis from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 535</td>
<td>Climate Change Mitigation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414</td>
<td>Socioeconomic Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 536</td>
<td>Principles of Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 544</td>
<td>Water Quality in the Pacific Northwest</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 548</td>
<td>Drinking Water and Human Health</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 520</td>
<td>Introduction to Bioregional Planning</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 523</td>
<td>Planning Sustainable Places</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 530</td>
<td>Planning Theory and Process</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 511</td>
<td>Data Wizardry in Environmental Sciences</td>
<td>3</td>
</tr>
<tr>
<td>TM 517</td>
<td>Critical Infrastructure Security and Resilience Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>TM 525</td>
<td>Emergency Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 558</td>
<td>Urban Design and Planning Studio</td>
<td>3</td>
</tr>
</tbody>
</table>

**E. Geotechnician**

Select 8 credits for thesis, 12 credits for non-thesis from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 471</td>
<td>Ore Deposits and Exploration</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 531</td>
<td>Chemical Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 419</td>
<td>Introduction to SAS/R Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 431</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 579</td>
<td>Introduction to Environmental Regulations</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 544</td>
<td>Water Quality in the Pacific Northwest</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 548</td>
<td>Drinking Water and Human Health</td>
<td>3</td>
</tr>
</tbody>
</table>

**F. Geospatial Habitat Assessment**

Select 8 credits for thesis, 12 credits for non-thesis from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>REM 429</td>
<td>Landscape Ecology</td>
<td>3</td>
</tr>
<tr>
<td>REM 507</td>
<td>Landscape and Habitat Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>REM 520</td>
<td>Advanced Vegetation Measurement and Monitoring</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NRS 588</td>
<td>NEPA in Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRS 552</td>
<td>Current Lit in Remote Sensing</td>
<td>1</td>
</tr>
<tr>
<td>FOR 514</td>
<td>Forest Biometrics</td>
<td>3</td>
</tr>
<tr>
<td>WLF 511</td>
<td>Wildland Habitat Ecology and Assessment</td>
<td>2</td>
</tr>
</tbody>
</table>

**G. Geospatial Intelligence**

Select 8 credits for thesis, 12 credits for non-thesis from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 414</td>
<td>Socioeconomic Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 550</td>
<td>Sustainability of Global Development</td>
<td>3-4</td>
</tr>
<tr>
<td>GEOG 565</td>
<td>Geopolitics and Conflict</td>
<td>3</td>
</tr>
<tr>
<td>ECON 446</td>
<td>International Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 447</td>
<td>International Development Economics</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INDT 470</td>
<td>Homeland Security</td>
<td>3</td>
</tr>
</tbody>
</table>
Distance Education Availability

To comply with the requirements of the Idaho State Board of Education (SBOE) and the Northwest Commission on Colleges and Universities (NWCCU) the University of Idaho must declare whether 50% or more of the curricular requirements of a program which may be completed via distance education.

Can 50% or more of the curricular requirements of this program be completed via distance education?
Yes

If Yes, can 100% of the curricular requirements of this program be completed via distance education?
Yes

Note: Existing programs transitioning from less than 50% of its curricular requirements to 50% or more of its requirements being available via distance education is considered a Group C change and must complete the program proposal formwork before these changes will be processed.

Geographical Area Availability

In which of the following geographical areas can this program be completed in person?
Moscow
Online Only

Student Learning Outcomes

List the intended learning outcomes for program component. Use learner centered statements that indicate what will students know, be able to do, and value or appreciate as a result of completing the program.

1. Demonstrate a depth of knowledge of spatial analysis and mapping techniques.
2. Demonstrate the ability to gather and analyze appropriate data and write results in context of existing literature and significance of the analysis.
3. Demonstrate advanced skills to conduct either disciplinary or interdisciplinary analyses using geographical information systems methods and datasets for Earth system science problems.
4. Apply mastery of key principals and core concepts in geographical information systems with a depth of knowledge in one of seven application areas cover critical land resource management and industrial workforce needs.
5. Demonstrate the ability to synthesize ideas and information to identify, analyze and problem-solve Earth system science and land resource management issues; demonstrate an application of this synthesis.
6. Collaborate with a faculty advisor and graduate committee to conduct independent research.
7. Communicate effectively, professionally, and within group settings.

Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program component.

1. Cohort performance in indicator courses: Each of the five non-seminar/non research courses in the degree will serve as an indicator course to act as an indicator of the overall quality of the program. This indirect measure of program performance will allow the program faculty to evaluate whether each cohort is maintaining a high degree of rigor in the degree. The program faculty will additionally identify at least two courses per option area to also act as indicator courses to evaluate the rigor in each option. The benchmark metric will be initialized by measuring the percentage of the first cohort to achieve at least a B within each indicator course.
2. Completion of integrative project: Each of the thesis or non-thesis options required the completion of an integrative project. Prior to the completion of each project the student will complete a self-reflective survey to assess the degree to which key concepts related to geographical information systems methods and theory were understood and applied.
3. End of degree survey: Prior to signing off on the completed integrative project, each student's graduate advisory committee will complete a survey to assess the degree to which they felt the student demonstrated key concepts related to geographical information systems methods and theory were understood and applied. The survey will also collect additional information including the number of internal and external presentations conducted by the student, the number of publications submitted, and whether the student applied or received funding to support their program.
4. Employer survey: A year following employment of a completed student, the graduates' employers will be asked to complete a brief survey to assess the degree to which they felt the student demonstrated key concepts related to geographical information. The survey will also collect additional information on what expertise areas the employers felt were meeting expectations or not meeting expectations. We will also solicit advice on potential new application areas given current and future needs.
How will you ensure that the assessment findings will be used to improve the program?

The assessment findings will be discussed at dedicated bi-annual faculty meetings, with the vice provosts for academic initiatives and online learning in attendance. The program director and departmental chair will conduct monthly meetings with the Director of the UI's Center for Excellence in Teaching and Learning to ensure that courses meet institutional standards of online instruction. Trainings will be mandated with the UI's Center for Excellence in Teaching and Learning for faculty members seeking to deliver courses in this program to ensure they meet institutional standards of online instruction. The program director and departmental chair will meet each semester with the UI assessment and accreditation officials to ensure there is a constant dialog on expectations, including a timeline to meet expectations to meet and retain compliance.

What direct and indirect measures will be used to assess student learning?

Indirect measures will include grades and performance in indicator courses and the completion of the integrative project - this data will help guide how effective the courses are at enabling students to expand and apply their knowledge. Direct measures will be derived through the interaction with the employers conducted one year after employment, as this will allow us to refine the curricula to directly meet employer's needs.

When will assessment activities occur and at what frequency?

Most assessment activities will occur annually. In addition, the program director and departmental chair will conduct monthly meetings with the Director of the UI's Center for Excellence in Teaching and each semester with representatives from the UI offices of the vice provosts for academic initiatives and digital learning initiatives to ensure that there is a constant dialog on expectations, including a timeline to meet expectations to meet and retain compliance.

Student Learning Outcomes

Learning Objectives
1. Demonstrate a depth of knowledge of spatial analysis and mapping techniques.
2. Demonstrate the ability to gather and analyze appropriate data and write results in context of existing literature and significance of the analysis.
3. Demonstrate advanced skills to conduct either disciplinary or interdisciplinary analyses using geographical information systems methods and datasets for Earth system science problems.
4. Apply mastery of key principals and core concepts in geographical information systems with a depth of knowledge in one of seven application areas cover critical land resource management and industrial workforce needs.
5. Demonstrate the ability to synthesize ideas and information to identify, analyze and problem-solve Earth system science and land resource management issues; demonstrate an application of this synthesis.
6. Collaborate with a faculty advisor and graduate committee to conduct independent research.
7. Communicate effectively, professionally, and within group settings.

Rationale for the proposed change. Include an explanation of how the department will manage the added workload, if any.

There is considerable state-wide and national demand for skilled workers that can analyze spatial datasets, maps, and use that information to help people make decisions. This is highlighted by the Department of Labor Statistics projection that jobs in this area will increase by 30% over the next decade. Across the State of Idaho, demand has considerably increased for advanced workforce skills in not only the spatial analysis of decision support data, but the acquisition and processing of new forms of sensors and data from drones and other sensor data. These stakeholders include representatives from multiple industry sectors including land resource management such as forestry, fisheries, wildlife science, rangeland management; broader resource exploration such as mining; water resources; hydrology; environmental management; geospatial analytics; climate change modeling; risk and emergency planning; fires, floods, landslides and other natural hazards; landscape remediation and restoration; among others. As such, this represents a clear need that is aligned and critical to the land grant mission of the University of Idaho.

At the University of Idaho, this department has led the education of these workforce skills most notably through the Geographic Information Science (GIS) undergraduate academic certificate. In this proposal, we take the next logical step to meet the demands of the State's employers and propose the establishment of an Master of Science Degree in Geographical Information Systems. This proposed degree builds on the existing departmental graduate curriculum and faculty expertise, while also leveraging faculty expertise and courses offered across multiple colleges at the University of Idaho to over seven different application areas.

The proposed degree wins synergy with an existing Professional Science Master (PSM) degree that has a Geographical Information Systems option that is currently offered at the University of Idaho. In the case of the PSM, a smaller subset of the same core courses already taught by the department are taken by the students. The remaining PSM courses taken by the students are focused on scientific communication, ethics, leadership, and economics. In contrast, students in the proposed M.S. in Geographical Information Systems undertake a full 30 credits of depth in Geographical Information Systems, with options that provide additional depth in key application areas. The 12 credits of overlapping core courses provide a high level of efficiency in offering the new major alongside the PSM, while providing students with two clear pathways: i.e., the M.S. degree that represents core Geographical Information Systems knowledge plus depth of applied skills for students that already have expertise and knowledge in the transferable skill areas, versus the PSM degree that represents the majority of the core Geographical Information Systems knowledge plus training in transferable skills.

To further meet the demands of a dynamic and mobile State of Idaho workforce we propose that this degree be offered as both 1) an online M.S. non-thesis degree targeted at existing employees of state agencies and industries, where they can learn addition skills while continuing at their employment locations, and 2) as an on-campus M.S. thesis degree targeted at not-yet employed persons that are seeking competitive advantages prior to entering the workforce or are seeking retraining to change careers.
The department is currently hiring a new faculty member with GIS expertise and is planning the hire of a new clinical faculty member to provide leadership in both quality online development, graduate advising, and further curricula development.

Supporting Documents
474_MS Geographic Information Science.pdf
Geographic Information Science_10-5-22.docx

Reviewer Comments
Ken Udas (kudas) (Tue, 26 Apr 2022 18:30:42 GMT): Updated Fee designation from Self Support to Online Fee.
Ken Udas (kudas) (Tue, 26 Apr 2022 18:37:50 GMT): Attached Budget
Ken Udas (kudas) (Tue, 26 Apr 2022 18:40:06 GMT): Removed "GEOG 524 Hydro Applications of GIS/Remote Sensing (3cr)" from option #3
Rebecca Frost (rfrost) (Wed, 05 Oct 2022 19:12:27 GMT): FOR 272 should be removed as an elective option in the Remote Sensing area as it cannot be used towards a graduate degree.
Rebecca Frost (rfrost) (Wed, 05 Oct 2022 19:20:01 GMT): Text entry for curriculum requirements was reformatted for catalog. Original entry attached as word document.
Stephanie Thomas (slthomas) (Thu, 13 Oct 2022 20:16:27 GMT): corrected issues to match the original requirements requested and approved before catalog formatting--some notes remain until require courses pass UCC

Key: 474
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<th>March 18th 2022</th>
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<tr>
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<td>University of Idaho</td>
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<tr>
<td>Name of College, School, or Division:</td>
<td>College of Science</td>
</tr>
<tr>
<td>Name of Department(s) or Area(s):</td>
<td>Department of Earth and Spatial Science</td>
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<tr>
<td>Official Name of the Program:</td>
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<td>Implementation Date:</td>
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<td>CIP code (consult IR /Registrar):</td>
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<td>Regional Program Responsibility</td>
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<td>Indicate (X) if the program is:</td>
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<td>(Consistent with Board Policy III.Z.)</td>
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**Proposed Action**

- [x] New program offering
- [x] Graduate program
- Undergraduate program
- Undergraduate certificate (30 credits or more)
- Graduate certificate (30 credits or more)
- New branch campus or change in location
- [x] Modification of Existing Academic Programs
- Undergraduate program
- Converting one program option to a stand-alone program
- Consolidating two or more undergraduate programs into one
- Consolidating two or more graduate programs into one
- Splitting an existing program into two or more programs
- Program expansion outside an institution’s Designated Service Region as defined in Board Policy III.Z.
- [x] Adding certificate or degrees to existing programs

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**Institutional Tracking No.**

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**FULL PROPOSAL FORM**

Academic Degree and Certificate Program

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<tr>
<td>Graduate Dean/other (as applicable)</td>
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<td>Provost/VP for Instruction</td>
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<td>Chief Academic Officer, OSBE</td>
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<td>President</td>
<td>Date</td>
</tr>
<tr>
<td>SBOE/Executive Director or Designee Approval Date</td>
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**Page 1**

**November 24, 2021**
Before completing this form, refer to Board Policy Section III.G., Postsecondary Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

Rationale for Creation or Modification of the Program

1. Describe the request and give an overview of the changes that will result. What type of substantive change are you requesting? Will this program be related or tied to other programs on campus? Identify any existing program that this program will replace. If this is an Associate degree, please describe transferability.

Historically, the Department of Geography and the Department of Geological Sciences merged into a combined unit called the Department of Geography and Geological Sciences. This year, the Department proposed to change its name to the Department of Earth and Spatial Sciences to better reflect the modern understanding of these disciplines and to be more aligned with courses and topics taught in State and regional high schools.

This year, the Department proposed to merge its traditional undergraduate degrees in Geology (B.S.) and Geography (B.S.) into a combined degree with the same name as the new department: B.S. Earth and Spatial Sciences. In making this change the faculty gained efficiencies in course offerings while also increasing options to expand workforce development to meet stakeholder needs. As part of the department merger the traditional MS and PhD degrees in Geography and Geology have been retained. However, the efforts to improve the undergraduate curricula identified opportunities for improved integration of graduate courses that are more responsive to the needs of employers for a skilled workforce in the State of Idaho, and regionally. Specifically, there is considerable state-wide and national demand for skilled workers that can analyze spatial datasets, maps, and use that information to help people make decisions (see Section 2 for more details). At the University of Idaho, this department has led the education of these workforce skills most notably through the Geographic Information Science (GIS) undergraduate academic certificate. In this proposal, we take the next logical step to meet the demands of the State’s employers and propose the establishment of a Master of Science Degree in Geographical Information Systems. This proposed degree builds on the existing departmental graduate curriculum and faculty expertise, while also leveraging faculty expertise and courses offered across the University of Idaho.

To further meet the demands of a dynamic and mobile State workforce we propose that this degree be offered as both 1) an online M.S. non-thesis degree targeted at existing employees of state agencies and industries, where they can learn addition skills while continuing at their employment locations, and 2) as an on-campus M.S. thesis degree targeted at not-yet employed persons that are seeking competitive advantages prior to entering the workforce or are seeking retraining to change careers. To meet the demands of a diverse workforce we propose that this degree would 1) provide students with a key set of skills common to the analysis of spatial data across multiple application areas and 2) be relevant to a wide array of land management and industry sectors through proposing a series of application areas where students would gain depth in those areas. To deliver the application areas, we propose to collaborate with departments across the University of Idaho that have existing courses in those areas. Many of these individual courses are already available online as electives within the College of Natural Resources Master of Natural Resources degree program and the University-wide online M.S. in Environmental Science.

The proposed degree works in synergy with an existing Professional Science Master (PSM) degree that has a Geographical Information Systems option that is currently offered at the University of Idaho. In the case of the PSM, a smaller subset of the same core courses already taught by the department are taken by the students. The remaining PSM courses taken by the students are focused on scientific communication, ethics, leadership, and economics. In contrast, students in the
proposed M.S. in Geographical Information Systems undertake a full 30 credits of depth in Geographical Information Systems, with options that provide additional depth in key application areas. The 12 credits of overlapping core courses provide a high level of efficiency in offering the new major alongside the PSM, while providing students with two clear pathways: i.e., the M.S. degree that represents core Geographical Information Systems knowledge plus depth of applied skills for students that already have expertise and knowledge in the transferable skill areas, versus the PSM degree that represents the majority of the core Geographical Information Systems knowledge plus training in transferable skills.

2. **Need for the Program.** Describe evidence of the student, regional, and statewide needs that will be addressed by this proposal to include student clientele to be served and address the ways in which the proposed program will meet those needs.

   a. **Workforce and economic need:** Provide verification of state workforce needs that will be met by this program. Include job titles and cite the data source. Describe how the proposed program will stimulate the state economy by advancing the field, providing research results, etc.

   The Idaho State Board of Education recognized that Idaho needs a STEM education-career pipeline and created the Idaho STEM Action Center in 2015 to support a competitive Idaho workforce and economy through STEM. In 2019, the Idaho STEM Action Center found that over 7000 STEM jobs went unfilled in Idaho due to lack of skills and education for appropriate job placement. The second most common job category that remained unfilled were jobs involving computer skills. Our department already provides training and undergraduate certifications in Geographic Information Science, a specialized computer analysis tool, which is valuable to the workforce’s needs in Idaho and nationally. The proposed M.S. degree expands on this legacy of leading and will further help train and transform the Idaho workforce enabling it to keep pace and remain nationally competitive with a rapidly changing set of spatial skills and tools.


   Across the State of Idaho, demand has considerably increased for advanced workforce skills in not only the spatial analysis of decision support data, but the acquisition and processing of new forms of sensors and data from drones and other sensor data. These stakeholders include representatives from multiple industry sectors including land resource management such as forestry, fisheries, wildlife science, rangeland management; broader resource exploration such as mining; water resources; hydrology; environmental management; geospatial analytics; climate change modeling; risk and emergency planning: fires, floods, landslides and other natural hazards; landscape remediation and restoration; among others. As such, this represents a clear need that is aligned and critical to the land grant mission of the University of Idaho.

   In terms of National demand, the proposed degree prepares graduates for multiple careers that the U.S. Bureau of Labor Statistics projects as exhibiting moderate to strong growth for 2020-2030:
b. **Student demand.** What is the most likely source of students who will be expected to enroll (full-time, part-time, outreach, etc.). Provide evidence of student demand/interest from inside and outside of the institution.

The primary market for students in the online non-thesis M.S. in Geographic Information Science are existing employees of State and Federal agencies and national industries that only have received a B.S. level of education but require additional skills to keep pace with technological advances, retraining, or to seek an advanced degree to qualify for additional compensation. A significant group of potential students include existing federal agency employees that were hired at the GS-5 classification standard as this group of employees only requires the completion of a full 4-year course of study in a field leading to a bachelor’s degree. Agency employees seeking an increase to a GS-7 level in these disciplines usually require a M.S. degree and generally prefer online degrees to maintain continual employment. Example positions relevant to the proposed degree include persons employed in the Outdoor Recreation Planning Series, GS-23; Intelligence Series, GS-132; Natural Resources Management and Biological Sciences Series, GS-401; Soil Conservation Series, GS-457; Forestry Series, GS-460; Range Conservationist, GS-454; Soil Scientist, GS-470; Wildlife Biologist, GS-486; Landscape Architect, GS-807; Hydrologist, GS-1315; Geologist, GS-1350; Cartography Series, GS-1370; Cartography Technician Series, GS-1371; among others.,


A further significant group of potential students for the online non-thesis M.S. option are current employees of State agencies and regional industries focused on land resource management (mining, forestry, water, agriculture, rangelands, energy, etc.), risk management (fires, floods, earthquakes, etc.). This includes the county Soil Conservation Districts, Idaho Department of Lands, Idaho Fish and Game, Idaho Department of Environmental Quality, as well as the equivalent state agencies in other states across the United States.

A further significant group of potential students are from within the University of Idaho. Namely, most majors in the College of Agriculture and Life Sciences, College of Natural Resources, and College Science at the University of Idaho rely on the foundational theory behind the spatial connection of organisms, humans, the environment; and the processes that connect them. As with other data analysis and spatial information science degree programs (e.g., Statistics), there is often a demand for existing students to explore additional certifications and degrees in complimentary disciplines to their primary field of study.
A further potential group of students for the online non-thesis M.S. option include persons interested in either cooperate or geospatial intelligence. The demand for geospatial intelligence expertise is broad, including State and National Homeland Security agencies, the National Geospatial-Intelligence Agency, and the various intelligence agencies, active serving U.S. Military personnel, and a diverse array of non-governmental and humanitarian organizations that focus on response to natural disasters.

Supporting information: Future U.S. Workforce for Geospatial Intelligence
https://www.nap.edu/catalog/18265/future-us-workforce-for-geospatial-intelligence
From Maps to Models: Augmenting the Nation’s Geospatial Intelligence Capabilities:
https://www.nap.edu/catalog/23650/from-maps-to-models-augmenting-the-nations-geospatial-intelligence-capabilities

A further potential market for students in this program include existing employees within sectors such as the entertainment industry (e.g., Sony, Amazon Studios, Disney, Netflix), virtual reality and immersive platforms (e.g., Unity, Unreal), and Game Developers (e.g., Bungie, Activision, Microsoft). In each case, there is an increasing demand for immersive scientific visualizations that not only look realistic, but also incorporate models and spatial data from a diverse set of sources.

In terms of the on-campus M.S. thesis option, we anticipate considerable interest from research-orientated undergraduates seeking advanced skills prior to a doctorate program or agency-based analysis position.

c. Societal Need: Describe additional societal benefits and cultural benefits of the program.

Graduates of this proposed program will be able to provide leadership on the mapping and analysis of western natural hazards (fires, droughts, floods, landslides, earthquakes), western water challenges (snowpack, availability), and western challenges to rural communities (transportation, property values, cultural values) through gaining expertise in recent technological advances such as the analysis of data from lidar, drones, and other sensors. The rise of predictive modeling, big data, drones, and user-ready spatial information platforms like Google Earth and the IPhone Maps feature are key examples of the ongoing need to educate geographic principals.

3. Program Prioritization
Is the proposed new program a result of program prioritization?

Yes__X___ No_____

If yes, how does the proposed program fit within the recommended actions of the most recent program prioritization findings.

During the 2020 program prioritization process mandated by the Idaho State Board of Education, one recommendation was the merger of two former University of Idaho Departments (Department of Geography & Department of Geological Sciences) and the rethinking of the associated majors. Earlier this year, the departmental faculty proposed to change the departmental name to the Department of Earth and Spatial Sciences. The Department faculty further proposed to merge the former B.S. in Geography and B.S. in Geological Sciences into a combined degree of a B.S. in Earth and Spatial Sciences where these traditional disciplinary areas would continue in the form of options within this new degree. The departmental faculty also used this process to identify new options within this new B.S. that meet current workforce
demands in the State of Idaho and the region more broadly.

Concurrent with these conversations regarding the undergraduate majors were conversations regarding the future of the department’s associated graduate majors. Although the existing departmental majors of a M.S./PhD in Geography and a M.S./PhD in Geology both continue to meet the needs of State of Idaho and regional employers, the conversations associated with the changes in the undergraduate majors identified key areas where employer demand for geospatial skills would be better served through the creation of a new M.S in Geographical Information Systems. The degree program will provide the State of Idaho with a critical workforce trained to support land resource management, emergency planning, state and national intelligence, conservation, and restoration that is crucial to the economic health of the State.

The proposed program is the direct result of departmental integration as recommended through the 2020 program prioritization process and the creation of an innovative approach to integrated study in the earth sciences and spatial analysis to inform the management of land resources (e.g., forestry, mining, water, wildlife) and the planning associated with the hazards that impact them (e.g., fires, floods, landslides). Such programs have been developed at our peer and aspirational peer universities and many have met with substantial success. The new program proposal for a M.S. in Geographical Information Systems is designed to enhance graduate student knowledge and understanding of the earth sciences and spatial processes and patterns through greater integration of the two disciplines within the former department (geography and geology) with disciplines from across the University of Idaho (forestry, range management, water resources, computer science, data analysis, sensor technologies, etc.,)

4. **Credit for Prior Learning**
   Indicate from the various cross walks where credit for prior learning will be available. If no PLA has been identified for this program, enter 'Not Applicable'.

   Not Applicable

5. **Affordability Opportunities**
   Describe any program-specific steps taken to maximize affordability, such as: textbook options (e.g., Open Educational Resources), online delivery methods, reduced fees, compressed course scheduling, etc. This question applies to certificates, undergraduate, graduate programs alike.

   The program will be offered through both an online non-thesis option and as an on-campus thesis option. We will use open educational resources as available. For the on-campus students, the department has existing Geographical Information Systems teaching laboratories for student use, and the labs are equipped with a broad spectrum of geospatial and geoinformatics software (e.g., ERDAS and ArcGIS Pro).

**Enrollments and Graduates**

6. **Existing similar programs at Idaho Public Institutions**. Using the chart below, provide enrollments and numbers of graduates for similar existing programs at your institution and other Idaho public institutions for the most past four years.
7. **Justification for Duplication** (if applicable). If the proposed program is similar to another program offered by an Idaho public higher education institution, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. Describe why it is not feasible for existing programs at other institutions to fulfill the need for the proposed program.

The existing ISU degree only requires a single graduate course focused on Geographic Information Systems, with the other required courses focusing on remote sensing and GPS technologies. The remainder of the ISU degree involves the selection of a diverse array of electives. In contrast, the proposed M.S. in Geographic Information Systems at the University of Idaho provides both (a) specialized depth in 5 advanced Geographic Information Systems courses and (b) specialized depth in one of 7 application areas relevant to the land grant mission of the University of Idaho (e.g., precision agriculture, forestry, natural hazards, geology, rangeland and wildlife management), as well as development of new focus areas relevant to geospatial intelligence and GIS programming.

8. **Projections for proposed program**: Using the chart below, provide projected enrollments and number of graduates for the proposed program:

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<th>Program Name</th>
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<td></td>
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<tr>
<th>ISU</th>
<th>M.S. Geographic Information Science (thesis and non-thesis option)</th>
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9. **Describe the methodology for determining enrollment and graduation projections.** Refer to information provided in Question #2 “Need for the Program” above. What is the capacity for the program? Describe your recruitment efforts? How did you determine the projected numbers above?

The broad expectation is that 10 students per year will seek to complete the degree in an.
accelerated manner (i.e., within one year), but that most students will complete the program over two years. The expectation is that most students will take approximately 6 credits per semester, including the summer session. This level of enrollment is consistent with other non-thesis master’s degrees at the University of Idaho.

We propose to build off the same marketing and recruitment strategy previously used to achieve the recent increase in the University of Idaho’s Master in Natural Resources enrollment (2019-2021 enrollment change of +136 majors). Namely, we are building off an existing database of over 3000+ contact emails for land resource management, risk management, industry and state/federal agencies across all 50 states. In addition to this direct outreach, we will also work in partnership with the State of Idaho’s agencies and industry representatives to directly market the degree to current employees.

We also anticipate strong growth through immediately offering 7 specialization areas, while continuing to work with our stakeholders and regional employers to develop and propose additional application areas. Examples of future areas under being considered include Health Informatics & Virtual Worlds and Scientific Visualizations. The University of Idaho’s Master in Natural Resources program has achieved sustained enrollment increases through a stepwise expansion of specialization areas from 1-5 over the last decade. In terms of similar programs at both peer institutions (University of Maine) and aspiration peer institutions (e.g., Oregon State University, Penn State University), each of these organizations offers similar graduate programs but with only 1-2 specialized option areas. Given this lack of competition in many of the proposed specialized option areas and the diverse expertise in Geographical Information Systems and existing breadth of courses already available at the University of Idaho, we anticipate being able to quickly establish a nationally competitive graduate program.

10. **Minimum Enrollments and Graduates.**
   a. What are the minimums that the program will need to meet in order to be continued, and what is the logical basis for those minimums?

   Following establishment, the minimum number to sustain this program is ~40 new students per year to justify the expenditure associated with delivering the degree.

   b. If those minimums are not met, what is the sunset clause by which the program will be considered for discontinuance?

   If, after five academic years following establishment, we fail to meet this minimum enrollment, while the State need for experts in Geographical Information Systems and Geospatial intelligence continues, then we will re-evaluate the structure and organization of our program to better appeal to the State’s workforce and the national workforce more broadly. This reassessment will incorporate a new round of conversations and panels with existing University students and more extensive outreach to potential employers of our students as well as faculty peers at similar institutions.

11. **Assurance of Quality.** Describe how the institution will ensure the quality of the program. Describe the institutional process of program review. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation.

   Quality assurance will take place at multiple levels.

   **Online Course Quality Review.** Each course within the proposed M.S. in Geographical Information Systems will be evaluated by the Center for Excellence in Teaching and Learning (CETL) for instructional design, content, and delivery. This review will ensure that each course achieves a consistent level of quality and that the student experience in taking each course in the
program in consistent and excellent. The CETL review will include both existing online courses, courses being converted into online modalities, and new courses that are being proposed as part of the program. The result of the review may include the need to redesign existing online courses to ensure overall program quality.

**Annual Program Review and Assessment (APRA).** The APRA process relies on annual self-studies in which the program outcomes and performance evaluation criteria are assessed, allowing timely modification to program practices to ensure continued quality of the program. As the objective of the proposed degree is to prepare students for professional positions; the success of the program will also be assessed based on enrollment trends and the ability of graduates to obtain suitable employment or placement in graduate programs.

**External Program Review (EPR).** A regular EPR will be achieved through the identification of an external advisory board comprised of representative of key stakeholders that will meet at least annually will be formed and used to maintain ties with industry and state/federal agencies for student placement, as well as solicit quality feedback to maintain program relevance and meet the needs of stakeholders (i.e., employers). Internally, we will seek input from potential and matriculating students on student needs, and feedback on program effectiveness will be integral to all course offerings in the program.

12. **In accordance with Board Policy III.G., an external peer review is required for any new doctoral program.** Attach the peer review report as Appendix A.

Not applicable.

13. **Teacher Education/Certification Programs** All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission (PSC) and approval from the State Board of Education.

Will this program lead to certification?

Yes_____ No_X____

If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission?

14. **Three-Year Plan:** If this is a new proposed program, is it on your institution’s approved 3-year plan?

Yes ___ No ___

If yes, proceed to question 15. If no:

a. **Which of the following statements address the reason for adding this program outside of the regular three-year planning process.**

Indicate (X) by each applicable statement:

<table>
<thead>
<tr>
<th>X</th>
<th>Program is important for meeting your institution’s regional or statewide program responsibilities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>The program is in response to a specific industry need or workforce opportunity.</td>
</tr>
<tr>
<td></td>
<td>The program is reliant on external funding (grants, donations) with a deadline for</td>
</tr>
</tbody>
</table>
b. **Provide an explanation for all statements you selected.**

The proposed degree arose through opportunities that were identified through the merging of the original Department Geography and the Department of Geological Sciences in response to the SBOE mandate for program review and the University’s 2020 Program Prioritization process. The potential for this degree was identified during the discussions that followed this important SBOE process.

The proposed degree is directly relevant to the land grant mission of the University of Idaho and its state-wide responsibility to provide advanced trainings for Idaho’s workforce in topics such as land and Earth resource management, precision agriculture, architecture (e.g., landscape planning, scientific visualizations), military science (e.g., geospatial intelligence), and engineering (e.g., programming and technical expertise on drones and sensors).

The proposed degree realigns department goals to address industry (e.g., mining, environment, water resources, geospatial analysis) and State agency (IDWR, IDEQ, IWRRI, IDHS) workforce needs. The proposed curriculum will better serve students and stakeholders as such, it does not rely on external funding and will be self-sustaining within three years.

---

**Educational Offerings: Curriculum, Intended Learning Outcomes, and Assessment Plan**

15. **Curriculum.** Provide descriptive information of the educational offering.

a. **Summary of requirements.** Provide a summary of program requirements using the following table.

<table>
<thead>
<tr>
<th>Credit hours in required courses offered by the department (s) offering the program.</th>
<th>20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit hours in required courses offered by other departments:</td>
<td>6-10</td>
</tr>
<tr>
<td>Credit hours in institutional general education curriculum</td>
<td>n/a</td>
</tr>
<tr>
<td>Credit hours in free electives</td>
<td>n/a</td>
</tr>
<tr>
<td>Total credit hours required for degree program:</td>
<td>30</td>
</tr>
</tbody>
</table>

b. **Curriculum.** Provide the curriculum for the program, including credits to completion, courses by title and assigned academic credit granted.
The degree includes both an online non-thesis option and an on-campus thesis option. Each option includes the same number of core courses. However, the non-thesis option includes 2 credits of non-thesis research, while the thesis version includes 6 credits of thesis research.

Students must then complete a minimum of 8 credits (thesis option) or 15 (non-thesis option) in one of the seven application areas. A minimum of 18 credits must be at the 500 level or above.

The following courses are already available online if denoted by a * . Courses denoted by ^ will be the focus of online conversion in the year prior to the start of the degree in Fall 2023.

### Core Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 58X ^</td>
<td>GIS Primer</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 590 ^</td>
<td>Geovisualization</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 475 *</td>
<td>Intermediate GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 583 *</td>
<td>Remote Sensing and GIS Integration</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 507 ^</td>
<td>Spatial Analysis and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 596 *</td>
<td>Department Seminar</td>
<td>1</td>
</tr>
<tr>
<td>GEOG/GEOL 599 *</td>
<td>Non-Thesis Research</td>
<td>2</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>GEOG/GEOL 500 *</td>
<td>Research</td>
<td></td>
</tr>
</tbody>
</table>

|                                       | 18 (non-thesis) 22 (Thesis)                   |

Select one of the Following Application Areas:

### 1. Remote Sensing (12+ credits non thesis, 8+ credits thesis)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 524 *</td>
<td>Hydrological Applications of GIS and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>FOR/NRS 472</td>
<td>Remote Sensing of Environment</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578 *</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FOR 535</td>
<td>Remote Sensing of Fire</td>
<td>3</td>
</tr>
<tr>
<td>REM 476 *</td>
<td>Unmanned Aerial Systems (UAS) Operations</td>
<td>1</td>
</tr>
<tr>
<td>REM 475 *</td>
<td>Remote Sensing Application with Unmanned Aerial Systems (UAS)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 587 *</td>
<td>Advanced Topics in Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>ECE 516 *</td>
<td>Image Sensors and Systems</td>
<td>3</td>
</tr>
<tr>
<td>FOR 522 / NRS 552</td>
<td>Current Literature in Environmental Remote Sensing</td>
<td>1</td>
</tr>
</tbody>
</table>
### 2. GIS Programming (12+ credits non thesis, 8+ credits thesis)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 479 ^</td>
<td>GIS Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 419 *</td>
<td>Intro to SAS/R Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 426 *</td>
<td>SAS Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 427 *</td>
<td>R Programming</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 511 *</td>
<td>Data Wizardry in Envs</td>
<td>3</td>
</tr>
<tr>
<td>CS 524</td>
<td>Advanced Computer Graphics (CS 324 or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>CS 479 *</td>
<td>Data Science</td>
<td>3</td>
</tr>
</tbody>
</table>

### 3. Natural Hazards and Emergency Planning (12+ credits non thesis, 8+ credits thesis)

#### Required:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 411 ^</td>
<td>Natural Hazards and Society</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Choose 9+ Credits of the Following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 548 ^</td>
<td>Tectonics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 524 *</td>
<td>Hydro Applications of GIS/Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414 *</td>
<td>Socioeconomic Applications in GIS</td>
<td>3</td>
</tr>
<tr>
<td>REM 510 *</td>
<td>GIS Application in Fire Ecology and Management</td>
<td>2</td>
</tr>
<tr>
<td>GEOL 567 ^</td>
<td>Volcanology</td>
<td>3</td>
</tr>
<tr>
<td>FOR 554 *</td>
<td>Air Quality, Pollution, and Smoke</td>
<td>3</td>
</tr>
<tr>
<td>NRS 576 *</td>
<td>Environmental Project Management and Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>CE 535 *</td>
<td>Fluvial Geomorph/River Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 535 *</td>
<td>Seepage and Slope Stability</td>
<td>3</td>
</tr>
<tr>
<td>NRS 588 *</td>
<td>NEPA in Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>TM 517 *</td>
<td>Critical Infrastructure Security and Resilience Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>TM 525 *</td>
<td>Emergency Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>NRS 576 *</td>
<td>Environmental Project Management and Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>INDT 470</td>
<td>Homeland Security</td>
<td>3</td>
</tr>
</tbody>
</table>

### 4. Geospatial Aspects of Sustainable Planning (12+ credits non thesis, 8+ credits thesis)
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 535 *</td>
<td>Climate Change Mitigation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414 *</td>
<td>Socioeconomic Applications in GIS</td>
<td>3</td>
</tr>
<tr>
<td>SOIL/ENVS 536 *</td>
<td>Principles of Sustainability</td>
<td>2</td>
</tr>
<tr>
<td>ENVS 520 *</td>
<td>Intro to Bioregional Planning</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 523 *</td>
<td>Planning Sustainable Places</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 530 *</td>
<td>Planning Theory and Process</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 544 *</td>
<td>Water Quality in the Pacific Northwest or</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 548 *</td>
<td>Drinking Water and Human Health</td>
<td>3</td>
</tr>
<tr>
<td>NRS 588 *</td>
<td>NEPA Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 511 *</td>
<td>Data Wizardry in Envs (programming prereq)</td>
<td>3</td>
</tr>
<tr>
<td>TM 517 *</td>
<td>Critical Infrastructure Security and Resilience Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 558</td>
<td>Urban design and planning</td>
<td>3</td>
</tr>
<tr>
<td>TM 525 *</td>
<td>Emergency Management and Planning</td>
<td>3</td>
</tr>
</tbody>
</table>

5. Geotechnician (12+ credits non thesis, 8+ credits thesis)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 590 ^</td>
<td>Cartographic Design and Geo-visualization</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 562 ^</td>
<td>Petroleum Systems and Stratigraphic Concepts</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 471</td>
<td>Ore Deposits</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 512/GEOL 531</td>
<td>Environmental/Chemical Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 419 *</td>
<td>Intro to SAS/R Programming</td>
<td>3</td>
</tr>
<tr>
<td>STAT 431 *</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578 *</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 579 *</td>
<td>Introduction to Environmental Regulations</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 544 *</td>
<td>Water Quality in the Pacific Northwest</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 548 *</td>
<td>Drinking Water and Human Health</td>
<td>3</td>
</tr>
<tr>
<td>ENVS 579 *</td>
<td>Introduction to Environmental Regulations</td>
<td>3</td>
</tr>
</tbody>
</table>
### 6. Geospatial Habitat Assessment (12+ credits non thesis, 8+ credits thesis)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>REM 520 *</td>
<td>Advanced Vegetation Measurement and Monitoring</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578 *</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>REM 507 *</td>
<td>Landscape and Habitat Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>FOR 514 ^</td>
<td>Forest Biometrics</td>
<td>3</td>
</tr>
<tr>
<td>WLF 511 *</td>
<td>Wildlife Habitat Ecology and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NRS 588 *</td>
<td>NEPA in Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>FOR 552/NRS 552 *</td>
<td>Current Literature in Environmental Remote Sensing</td>
<td>1</td>
</tr>
<tr>
<td>REM 429 *</td>
<td>Landscape Ecology</td>
<td>3</td>
</tr>
</tbody>
</table>

### 7. Geospatial Intelligence (12+ credits non thesis, 8+ credits thesis)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 414</td>
<td>Socioeconomic Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>ECON 446</td>
<td>International Economics (prereq: ECON 201 and 202, or ECON 272)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 447</td>
<td>International Development Economics (same prereq)</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 565 ^</td>
<td>Geopolitics and Conflict</td>
<td>3</td>
</tr>
<tr>
<td>NRS 578 *</td>
<td>LIDAR and Optical Remote Sensing Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 550 ^</td>
<td>Geography of Development</td>
<td>3</td>
</tr>
<tr>
<td>INDT 470 *</td>
<td>Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>CS 575 *</td>
<td>Machine Learning (Prereq: CS 210)</td>
<td>3</td>
</tr>
<tr>
<td>CS 577 *</td>
<td>Python for Machine Learning (Preq: CS 121 or MATH 330, and STAT 301)</td>
<td>3</td>
</tr>
<tr>
<td>CS 579 *</td>
<td>Data Science (Preq MATH 330 or permission)</td>
<td>3</td>
</tr>
<tr>
<td>POLS 410</td>
<td>Game Theory</td>
<td>3</td>
</tr>
<tr>
<td>POLS 562 / NRS 562</td>
<td>Natural Resource Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**c. Additional requirements.** Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.

The non-thesis requirement includes the completion of a project paper (case study or review article). Projects may be aligned with internships or other work experiences. The non-thesis project consists of a substantial project in which the student demonstrates ability to do rigorous independent work.

The thesis requirement includes a written thesis, where the thesis may be comprised of a
manuscript in a form acceptable for publication in a refereed journal, while otherwise fulfilling the requirements of the Graduate College. The thesis consists of a substantial project in which the student demonstrates ability to do rigorous independent work.


a. Intended Learning Outcomes. List the Intended Learning Outcomes for the proposed program, using learner-centered statements that indicate what students will know, understand, and be able to do, and value or appreciate as a result of completing the program.

1. Demonstrate a depth of knowledge of spatial analysis and mapping techniques.
2. Demonstrate the ability to gather and analyze appropriate data and write results in context of existing literature and significance of the analysis.
3. Demonstrate advanced skills to conduct either disciplinary or interdisciplinary analyses using geographical information systems methods and datasets for Earth system science problems.
4. Apply mastery of key principals and core concepts in geographical information systems with a depth of knowledge in one of seven application areas cover critical land resource management and industrial workforce needs.
5. Demonstrate the ability to synthesize ideas and information to identify, analyze and problem-solve Earth system science and land resource management issues; demonstrate an application of this synthesis.
6. Collaborate with a faculty advisor and graduate committee to conduct independent research.
7. Communicate effectively, professionally, and within group settings.

17. Assessment plans.

a. Assessment Process. Describe the assessment plan for student learning outcomes that will be used to evaluate student achievement and how the results will be used to improve the program.

Program assessment will occur through five principal mechanisms.

1. Cohort performance in indicator courses: Each of the five non-seminar/non research courses in the degree will serve as an indicator course to act as an indicator of the overall quality of the program. This indirect measure of program performance will allow the program faculty to evaluate whether each cohort is maintaining a high degree of rigor in the degree. The program faculty will additionally identify at least two courses per option area to also act as indicator courses to evaluate the rigor in each option. The benchmark metric will be initialized by measuring the percentage of the first cohort to achieve at least a B within each indicator course.

2. Completion of integrative project: Each of the thesis or non-thesis options required the completion of an integrative project. Prior to the completion of each project the student will complete a self-reflective survey to assess the degree to which key concepts related to geographical information systems methods and theory were understood and applied.

3. End of degree survey: Prior to signing off on the completed integrative project, each student’s graduate advisory committee will complete a survey to assess the degree to which they felt the student demonstrated key concepts related to geographical information systems methods and theory. The survey will also collect
additional information including the number of internal and external presentations conducted by the student, the number of publications submitted, and whether the student applied or received funding to support their program.

4. **Employer survey:** A year following employment of a completed student, the graduates’ employers will be asked to complete a brief survey to assess the degree to which they felt the student demonstrated key concepts related to geographical information. The survey will also collect additional information on what expertise areas the employers felt were meeting expectations or not meeting expectations. We will also solicit advice on potential new application areas given current and future needs.

**Resources Required for Implementation – fiscal impact and budget.**

Organizational arrangements required within the institution to accommodate the change including administrative, staff, and faculty hires, facilities, student services, library; etc.

18. **Physical Facilities and Equipment:** Describe the provision for physical facilities and equipment.

   a. **Existing resources.** Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

   The Department has existing Geographical Information System Teaching Laboratories that will be used by the students in the on-campus thesis option. The online non-thesis students will not use these departmental laboratory resources.

   b. **Impact of new program.** What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated?

   The increase of use to the existing facilities by the on-campus thesis students can be accommodated into the current level of use.

   c. **Needed resources.** List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

   We will purchase permanent licenses of Articulate Storyline 3 given this is the industry standard for the authoring of online training modules. We will also purchase high-definition webcams, headsets (microphones), and licenses of Adobe Acrobat Pro and Adobe Illustrator.

19. **Library and Information Resources:** Describe adequacy and availability of library and information resources.

   a. **Existing resources and impact of new program.** Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? Will there be an impact on existing programs of increased library usage caused by the proposed program? For off-campus programs, clearly indicate how the library resources are to be provided.
The proposed program does not require extensive use of library resources. The students as part of their final projects will make use of the library existing access to online journals, which will have minimal impact on library staff. The proposed program will work collaboratively with Bruce Godfrey, who provides Geographic Information Systems resources for students, faculty, and staff.

b. **Needed resources.** What new library resources will be required to ensure successful implementation of the program? Enter the costs of those library resources into the budget sheet.

None.

20. **Faculty/Personnel resources**

a. **Needed resources.** Give an overview of the personnel resources that will be needed to implement the program. How many additional sections of existing courses will be needed? Referring to the list of new courses to be created, what instructional capacity will be needed to offer the necessary number of sections?

The proposed program will include the hiring of a new clinical faculty member to provide curricula leadership including working with the Department Chair on recruiting, marketing, and advising of non-thesis masters students. This clinical faculty member will also develop and teach online courses in the program and liaise with existing University of Idaho instructional resources (e.g., the Center for Excellence in teaching and Learning) to lead a team to develop and deliver high quality online courses. The proposed program will also support a team of doctoral students to help design, convert, and teach online courses during the summer months. This enables the Department to not only increase capacity to deliver the curricula but also provides these students with critical experience in instructional design and delivery, increasing their competitiveness in the workforce.

b. **Existing resources.** Describe the existing instructional, support, and administrative resources that can be brought to bear to support the successful implementation of the program.

14 faculty, 1 support staff, 1 instructional staff.

c. **Impact on existing programs.** What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained?

We do not expect any impact on existing programs within the department. Further by adopting a distributed curricula model to offer the application areas, we anticipate minimum impact on specific collaborative departments. We do anticipate increased opportunities for teaching and research collaboration across campus by achieving improved integration between the department and other Geographic Information Systems relevant programs across campus. These include the Ui Drone Laboratory, the Northwest Knowledge Network, and the Idaho Geological Survey.

d. **Needed resources.** List the new personnel that must be hired to support the proposed program. Enter the costs of those personnel resources into the budget sheet.

Clinical Assistant Professor and Program Director.

21. **Revenue Sources**
a) **Reallocation of funds:** If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

n/a

b) **New appropriation.** If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

None.

c) **Non-ongoing sources:**
   i. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution’s plans for sustaining the program when that funding ends?

   Enrollment and tuition (academic year and summer revenue).

   ii. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds?

   n/a.

d) **Student Fees:**
   i. If the proposed program is intended to levy any institutional local fees, explain how doing so meets the requirements of Board Policy V.R., 3.b.

   Student fees will be in line with board policies and will remain consistent with fees associated with the previous programs.

   ii. Provide estimated cost to students and total revenue for self-support programs and for professional fees and other fees anticipated to be requested under Board Policy V.R., if applicable.

   n/a.

22. Using the excel [budget template](#) provided by the Office of the State Board of Education, provide the following information:

   - Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first four fiscal years of the program.

   - Include reallocation of existing personnel and resources and anticipated or requested new resources.

   - Second and third year estimates should be in constant dollars.

   - Amounts should reconcile subsequent pages where budget explanations are provided.

   - If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
• Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).
Program Resource Requirements.
- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first four fiscal years of the program.
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second and third year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

### I. PLANNED STUDENT ENROLLMENT

<table>
<thead>
<tr>
<th></th>
<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTE</td>
<td>Headcount</td>
<td>FTE</td>
<td>Headcount</td>
</tr>
<tr>
<td>A. New enrollments</td>
<td>0</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>B. Shifting enrollments</td>
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<tr>
<td>Total Enrollment</td>
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### II. REVENUE

<table>
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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On-going</td>
<td>One-time</td>
<td>On-going</td>
<td>One-time</td>
</tr>
<tr>
<td>1. New Appropriated Funding Request</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Institution Funds</td>
<td></td>
<td>$137,676</td>
<td>$119,231</td>
<td>$97,133</td>
</tr>
<tr>
<td>3. Federal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. New Tuition Revenues from Increased Enrollments</td>
<td></td>
<td>$280,320</td>
<td>$420,480</td>
<td>$560,640</td>
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<tr>
<td>5. Student Fees</td>
<td></td>
<td></td>
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<tr>
<td>6. Other (i.e., Gifts)</td>
<td></td>
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<tr>
<td>Total Revenue</td>
<td>$0</td>
<td>$137,676</td>
<td>$280,320</td>
<td>$420,480</td>
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</table>

*Ongoing is defined as ongoing operating budget for the program which will become part of the base.*

*One-time is defined as one-time funding in a fiscal year and not part of the base.*
### III. EXPENDITURES

<table>
<thead>
<tr>
<th></th>
<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On-going</td>
<td>One-time</td>
<td>On-going</td>
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</tr>
<tr>
<td>2. Faculty</td>
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<td>$73,440</td>
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<tr>
<td>3. Adjunct Faculty</td>
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<td></td>
<td>26520</td>
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<tr>
<td>4. Graduate/Undergrad Assistants</td>
<td>10592</td>
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<td>10804</td>
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<tr>
<td>8. Fringe Benefits</td>
<td>22054</td>
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<td>22487</td>
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<tr>
<td>9. Other:</td>
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<tr>
<td><strong>Total Personnel and Costs</strong></td>
<td>$104,646</td>
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<td>$106,731</td>
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<tr>
<td>FY 22</td>
<td>FY 23</td>
<td>FY 24</td>
<td>FY 25</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>B. Operating Expenditures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Travel</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
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<tr>
<td>2. Professional Services</td>
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</tr>
<tr>
<td>3. Other Services</td>
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<tr>
<td>4. Communications</td>
<td></td>
<td></td>
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<tr>
<td>5. Materials and Supplies</td>
<td>$30,530</td>
<td>$10,000</td>
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<tr>
<td>6. Rentals</td>
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<td>7. Materials &amp; Goods for Manufacture &amp; Resale</td>
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<tr>
<td>8. Miscellaneous</td>
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<td>Total Operating Expenditures</td>
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<table>
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<th>FY 24</th>
<th>FY 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Capital Outlay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Library Resources</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Equipment</td>
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<td></td>
<td></td>
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<tr>
<td>Total Capital Outlay</td>
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### D. Capital Facilities

**Construction or Major Renovation**

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<thead>
<tr>
<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-going</td>
<td>One-time</td>
<td>On-going</td>
<td>One-time</td>
</tr>
<tr>
<td>On-going</td>
<td>One-time</td>
<td>On-going</td>
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<tr>
<td>On-going</td>
<td>One-time</td>
<td>On-going</td>
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### E. Other Costs

<table>
<thead>
<tr>
<th>Utilities</th>
<th>Maintenance &amp; Repairs</th>
<th>Other</th>
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<tbody>
<tr>
<td>$0</td>
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<tr>
<td>$0</td>
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**Total Other Costs**

<table>
<thead>
<tr>
<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
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</thead>
<tbody>
<tr>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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</tbody>
</table>

**TOTAL EXPENDITURES:**

<table>
<thead>
<tr>
<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
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</tr>
<tr>
<td>$97,132</td>
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**Net Income (Deficit):**

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<th>FY 22</th>
<th>FY 23</th>
<th>FY 24</th>
<th>FY 25</th>
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<td>-$137,676</td>
<td>$137,676</td>
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<td>$323,348</td>
<td>$97,133</td>
<td>$473,246</td>
<td>$87,395</td>
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</table>

**Budget Notes (specify row and add explanation where needed; e.g., “I.A., B. FTE is calculated using…”):**

<table>
<thead>
<tr>
<th>I.A.B.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Date of Proposal Submission: January 31st, 2022
Institution Submitting Proposal: University of Idaho
Name of College, School, or Division: College of Science
Name of Department(s) or Area(s): Department of Geography and Geological Sciences
Official Name of the Program: Earth and Spatial Sciences
Implementation Date: 2022-2023
Degree Information: Degree Level: Undergraduate, Degree Type: Bachelor of Sciences
CIP code (consult IR/Registrar):
Method of Delivery: Indicate percentage of face-to-face, hybrid, distance delivery, etc.
Geographical Delivery: Location(s) Moscow campus Region(s)
Indicate (X) if the program is/has: (Consistent with Board Policy V.R.) X Self-Support fee Professional Fee Online Program Fee
Indicate (X) if the program is: (Consistent with Board Policy III.Z.) Regional Program Responsibility X Statewide Program Responsibility

**Proposed Action**
- New program offering:
  - Undergraduate program
  - Graduate program
  - Undergraduate certificate (30 credits or more)
  - Graduate certificate (30 credits or more)
- **Modification of Existing Academic Programs**
  - Converting one program option to a stand-alone program
  - Consolidating two or more undergraduate programs into one
  - Consolidating two or more graduate programs into one
  - Splitting an existing program into two or more programs
  - Program expansion outside an institution’s Designated Service Region as defined in Board Policy III.Z.
- Adding certificate or degrees to existing programs

Page 1
November 4, 2021
<table>
<thead>
<tr>
<th>Role</th>
<th>Date</th>
<th>Role</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Dean</td>
<td></td>
<td>Vice President for Research (as applicable)</td>
<td></td>
</tr>
<tr>
<td>Graduate Dean/other (as applicable)</td>
<td></td>
<td>Academic Affairs Program Manager, OSBE</td>
<td></td>
</tr>
<tr>
<td>FVP/Chief Fiscal Officer</td>
<td></td>
<td>Chief Financial Officer, OSBE</td>
<td></td>
</tr>
<tr>
<td>Provost/VP for Instruction</td>
<td></td>
<td>Chief Academic Officer, OSBE</td>
<td></td>
</tr>
<tr>
<td>President</td>
<td></td>
<td>SBOE/Executive Director or Designee Approval</td>
<td></td>
</tr>
</tbody>
</table>
Before completing this form, refer to Board Policy Section III.G., Postsecondary Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

Rationale for Creation or Modification of the Program

1. **Describe the request and give an overview of the changes that will result.** What type of substantive change are you requesting? Will this program be related or tied to other programs on campus? Identify any existing program that this program will replace. If this is an Associate degree, please describe transferability.

The departments of Geography and Geological Sciences have merged due to program prioritization at the University of Idaho. An initial combination of the department names was deemed cumbersome and outdated. Therefore, the faculty of the merged department voted to adopt “Earth and Spatial Sciences” as the name of the merged department, which reflects a modern interpretation of the curriculum and breadth of job classifications likely to be filled by our graduates. As part of the merger, the curriculum was updated, efficiencies in class offerings were increased, and class offerings were expanded to reflect new curriculum goals. The department is requesting the adoption of the Earth and Spatial Sciences (ESS) degree program that will reflect the goals of the merged department and help fulfill the workforce needs of the State of Idaho and the greater region. This new degree will offer emphasis tracks in Geological Sciences, Global Sustainability and Geography, and Hydrology and Climate. This new Bachelor of Science degree is intended for students who have interests in geology and geography but also those students who wish to pursue an education and training in the disciplines of climate, hydrology, and sustainability. This proposed degree builds on the prior Geography and Geological Sciences curriculums, highlights the expertise of current faculty, and will not require additional resources to deliver the degree option.

The Geography and Geological Sciences degree programs will be taught to completion with existing students, and new students will enter the Earth and Spatial Sciences (ESS) degree program. Emphases under the prior and proposed degree programs can be taught simultaneously and each will continue to address the needs of students to work as geologists and geographers upon graduation. The ESS emphases also will enhance the knowledge and marketability of our graduates for careers as hydrologists, GIS specialists, data analysts, climate specialists, sustainability analysts, and other Earth science career tracks. Such workforce needs have been indicated by our stakeholders across Idaho and the region, including industry sectors such as resource exploration, mining, water resources, environmental management, geospatial analytics, climate change modeling, and landscape remediation and restoration. The new degree program also will continue the robustness of coursework that trains future Earth scientists as researchers and licensed professionals. Existing certifications of geographic information systems and climate change, and geography and geology minors are included in the proposed ESS program. We anticipate that the ESS program will broaden our marketability to students across the State and expand our ability to produce the Earth science workforce needed to sustain and grow the Idaho economy.

Targeted audience: 20-50 undergraduate majors per year.

2. **Need for the Program.** Describe evidence of the student, regional, and statewide needs that will be addressed by this proposal to include student clientele to be served and address the ways in
which the proposed program will meet those needs.

**a. Workforce and economic need:** Provide verification of state workforce needs that will be met by this program. Include job titles and cite the data source. Describe how the proposed program will stimulate the state economy by advancing the field, providing research results, etc.

The proposed new Earth and Spatial Sciences BS degree represents the consolidation of two existing degrees into a single degree with options. This consolidation provides for a common set of core classes and more broadly educated earth scientists. The new degree prepares students for careers in three Bureau of Labor Statistic occupations: Geographers (SOC 19-3092), Hydrologists (SOC 19-2043), and Geoscientists (SOC 19-2042). Collectively in 2020 these occupations employed 37,100 people nationally (400 in Idaho) with projected growth of 7% over the next 10 years.

The Idaho State Board of Education recognized that Idaho needs a STEM education-career pipeline and created the Idaho STEM Action Center in 2015 to support a competitive Idaho workforce and economy through STEM. In 2019, the Idaho STEM Action Center found that over 7000 STEM jobs went unfilled in Idaho due to lack of skills and education for appropriate job placement. The second most common job category that remained unfilled were jobs involving computer skills. Our department provides training and certifications in Geographic Information Science (GIS), a specialized computer analysis tool, which is valuable to the workforce's needs in Idaho and nationally.

Idaho has some of the lowest go-on rates (high school students continuing to college) in the nation at 45% each year; this creates a substantial barrier for connecting students to college geoscience programs, and subsequently STEM careers, in Idaho. This new program offers an opportunity for students to gain pertinent experience to work in a broad range of careers such as in industry positions in mining, petroleum, hydrology, geophysics, agriculture, and environmental consulting, as well as in education and at federal, state, and local governmental agencies in the state. In addition to these traditional occupations, the degree provided students with the fundamental knowledge and skill base for alternative careers such as, for example, surveyors, cartographers and photogrammetrists, or urban and regional planners. These occupations will advance the state economy by providing qualified students to perform the jobs that went unfilled due to lack of expertise.


**b. Student demand.** What is the most likely source of students who will be expected to enroll (full-time, part-time, outreach, etc.). Provide evidence of student demand/ interest from inside and outside of the institution.

There are currently 42 undergraduate students enrolled in the two degree programs that are being
consolidated into the new Earth and Spatial Sciences degree program (excluding graduate enrollments). Enrollment is expected to grow as the new program provides a more robust avenue for students to prepare for careers in Idaho and across the region in industry sectors such as resource exploration, mining, water resources, environmental management, geospatial analytics, climate change modeling and landscape remediation and restoration. Other institutions including The Ohio State University, Boston College, University of Michigan, University of Oregon, and Oregon State University have already re-envisioned former Geography and Geology departments around the ‘Earth System Science’ concept proposed here and have over the past five years experienced sizeable enrollment growth; 70% and 40% for University of Oregon and Oregon State University, respectively. We expect this increased enrollment to come from full-time students inside and outside the university.

c. **Societal Need:** Describe additional societal benefits and cultural benefits of the program.

Graduates of the Earth and Spatial Science program will be prepared for careers addressing some of the most challenging issues of our times. These challenges including i) mitigating the impacts of climate and its societal responses, ii) transitioning to sustainable strategies for resource and energy development, and iii) assessing and predicting geologic hazards that occur at the intersection of the physical world with human communities. Graduates of the Earth and Spatial Science program will be leaders to identify equitable solutions to these challenges.

3. **Program Prioritization**

Is the proposed new program a result of program prioritization?

Yes  X  No

If yes, how does the proposed program fit within the recommended actions of the most recent program prioritization findings?

The proposed degree plan supports the University’s land grant mission by providing a workforce educated in the professional practice of Earth and Spatial Sciences. The degree program will provide the State of Idaho with a critical workforce trained to support resource extraction, conservation, and restoration that is crucial to the economic health of the State. The proposed Earth and Spatial Sciences program meets specific needs at the state and national level through education and research in the development and conservation of critical mineral and energy resources, the development and conservation of regional surface and groundwater systems, and the economic and physical effects of climate change. The merging of the two departments, Geography and Geological Sciences, into a single Department of Earth and Spatial Sciences opens up exciting avenues of interdisciplinary scholarship and maximizes the efficient use of institutional resources. This merger and curriculum update aligns the new program with the essential mission of the University, furthers the contribution of the program facility to the University’s strategic plan and supports the strategic allocation of university funding and resources.

The newly proposed program is the result of departmental integration as recommended through the 2020 program prioritization process and the creation of an innovative approach to integrated study in the earth sciences. Such programs have been developed at other universities and many have met with substantial success. The new program proposal for Geography and Geological Sciences is designed to enhance undergraduate student knowledge and understanding of the
earth sciences through greater integration of the two disciplines (geography and geology).

4. **Credit for Prior Learning**

   Indicate from the various cross walks where credit for prior learning will be available. If no PLA has been identified for this program, enter ‘Not Applicable’.

   Not Applicable

5. **Affordability Opportunities**

   Describe any program-specific steps taken to maximize affordability, such as: textbook options (e.g., Open Educational Resources), online delivery methods, reduced fees, compressed course scheduling, etc. This question applies to certificates, undergraduate, graduate programs alike.

   A portion of the courses in the new program will be offered using online delivery options and open educational resources. The department has 2 computer labs for instruction and student use, and the labs are equipped with a broad spectrum of geospatial and geoinformatics software (e.g., ERDAS and ArcGIS Pro).
Enrollments and Graduates

6. **Existing similar programs at Idaho Public Institutions.** Using the chart below, provide enrollments and numbers of graduates for similar existing programs at your institution and other Idaho public institutions for the most past four years.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Program Name</th>
<th>Fall Headcount Enrollment in Program</th>
<th>Number of Graduates From Program (Summer, Fall, Spring)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FY18</td>
<td>FY19</td>
</tr>
<tr>
<td>Boise State University</td>
<td>B.S. Geosciences</td>
<td>97</td>
<td>89</td>
</tr>
<tr>
<td>Idaho State University</td>
<td>B.S. Geosciences</td>
<td>49</td>
<td>52</td>
</tr>
</tbody>
</table>

7. **Justification for Duplication** (if applicable). If the proposed program is similar to another program offered by an Idaho public higher education institution, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. Describe why it is not feasible for existing programs at other institutions to fulfill the need for the proposed program.

The proposed degree program does have some overlap with the Geography and Geological programs currently offered at UI, due to the teaching out of the degrees and the hopes of the new program being approved. Those two programs will be discontinued once this new program is in place. No other Idaho universities have the same faculty expertise, reputation, and existing framework of classes to provide an educational experience specifically designed to meet the needs of those professionals garnering this degree.

8. **Projections for proposed program:** Using the chart below, provide projected enrollments and number of graduates for the proposed program:

**Proposed Program: Projected Enrollments and Graduates First Five Years**

<table>
<thead>
<tr>
<th>Program Name: BS in Earth and Spatial Sciences</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Projected Fall Term Headcount Enrollment in Program</th>
<th>Projected Annual Number of Graduates From Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY23 (current enroll) FY24 (first year of) FY25</td>
<td>FY23 (current) FY24 (first year of) FY25 FY26 FY27</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*FY23 and FY24 are 0 are a result of getting this new proposed program started. We will continue to teach out the two previous BS programs in Geology and Geography during those years. There will be minimal impact on student course offerings during these years.

9. **Describe the methodology for determining enrollment and graduation projections.** Refer to information provided in Question #2 “Need for the Program” above. What is the capacity for the program? Describe your recruitment efforts? How did you determine the projected numbers above?

While students recognize that a great many of our society’s most pressing needs involve skills pertinent to the Earth and Spatial Sciences, many of these students may not recognize that the path to developing expertise in these areas lies within the fields of Geological Sciences or Geography. Through changing the name of our program, we seek to connect with these students through a re-focused program that meets the needs of training professional Geographers, Geologists, Hydrologists, and Geographic Information Scientists, while appealing to the expectations and associations of students interested more broadly in Earth and Spatial Sciences.

Other peer institutions, such as Oregon State University and the University of Oregon, that have followed a similar path in their messaging, have seen immediate and early growth in enrollments after changing their program names followed by more gradual growth in subsequent years (approximately 20% growth for two years and 5% annual growth thereafter). Beginning with our current enrollment of 42 majors per year, in section 8 above, we impose this same projection. To estimate annual graduates, we lean on the patterns of recent years. We have found that a large proportion of our majors do not initially declare as our majors when they enter the University of Idaho. Many switch to our programs as sophomores or juniors or enter the University as transfer students. Thus, we estimate that one third of each year’s majors will graduate annually.

10. **Minimum Enrollments and Graduates.**
   a. What are the minimums that the program will need to meet in order to be continued, and what is the logical basis for those minimums?

   Graduates of this program are critical to State employment needs. The need for professionals trained in a range of fields in Earth and Spatial Science justifies maintaining these degree programs even at low enrollments, and a minimum enrollment for viability is difficult to define. However, if enrollment drops below 50% of enrollment in the department's current degree program, then the faculty will change its approach to meeting the State's needs.

   b. If those minimums are not met, what is the sunset clause by which the program will be considered for discontinuance?

   If, after three academic years, we fail to improve on our current enrollment levels, while the State need for experts in the Earth and Spatial Sciences continues (see Answer to Question
#2), then we will re-evaluate the structure and organization of our program to better appeal to the State’s students. This reassessment will incorporate a new round of conversations and panels with existing University students and more extensive outreach to potential employers of our students as well as faculty peers at similar institutions.

11. **Assurance of Quality.** Describe how the institution will ensure the quality of the program. Describe the institutional process of program review. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation.

The proposed Earth and Spatial Sciences program will conduct an annual Academic Program Review (APR) as is required for all UI academic programs. The APR process relies on annual self-studies in which the program outcomes and performance evaluation criteria are assessed, allowing timely modification to program practices to ensure continued quality of the program. As the objective of the proposed degree is to prepare students for professional positions; the success of the program will also be assessed on the basis of enrollment trends and the ability of graduates to obtain suitable employment or placement in graduate programs. Where appropriate students will be prepared and encouraged to sit for professional licensure. An external advisory board comprised of representative of key stakeholders and meeting at least annually will be formed and used to maintain ties with industry and state/federal agencies for student placement, as well as solicit quality feedback in order to maintain program relevance and meet the needs of stakeholders (i.e., employers). Internally, we will seek input from potential and matriculating students on student needs, and feedback on program effectiveness will be integral to all course offerings in the program.

12. **In accordance with Board Policy III.G., an external peer review is required for any new doctoral program.** Attach the peer review report as Appendix A.

13. **Teacher Education/Certification Programs** All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission (PSC) and approval from the State Board of Education.

Will this program lead to certification?

Yes_____ No__X___

If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission?

14. **Three-Year Plan:** If this is a new proposed program, is it on your institution’s approved 3-year plan?

Yee _____ No _____ X___________

If yes, proceed to question 15. If no:

a. Which of the following statements address the reason for adding this program
outside of the regular three-year planning process.

Indicate (X) by each applicable statement:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Program is important for meeting your institution's regional or statewide program responsibilities.</td>
</tr>
<tr>
<td>X</td>
<td>The program is in response to a specific industry need or workforce opportunity.</td>
</tr>
<tr>
<td></td>
<td>The program is reliant on external funding (grants, donations) with a deadline for acceptance of funding.</td>
</tr>
<tr>
<td></td>
<td>There is a contractual obligation or partnership opportunity related to this program.</td>
</tr>
<tr>
<td></td>
<td>The program is in response to accreditation requirements or recommendations.</td>
</tr>
<tr>
<td></td>
<td>The program is in response to recent changes to teacher certification/endorsement requirements.</td>
</tr>
</tbody>
</table>

b. Provide an explanation for all statements you selected.

The proposed degree program is a result of the merging of the Geography and Geological Sciences departments in response to the SBOE mandate for program review and the University’s Program Prioritization process. Merging of the departments requires a new vision of the curriculum and learning outcomes, which were derived from faculty, student, and stakeholder input to meet the University’s land grant mission of serving the State and strengthen our teaching, scholarly, and creative capacities. The proposed degree realigns department goals to address industry (e.g., mining, environment, water resources, geospatial analysis) and State agency (IDWR, IDEQ, IWRRI) workforce needs. The program curriculum was updated to increase efficiencies in class offerings and expand class offerings to reflect new curriculum goals aligned with workforce opportunities. The proposed curriculum will better serve students and stakeholders; as such, it does not rely on external funding, nor does it require additional internal funds. Although there is no contractual obligation to offer the program, the Earth and Spatial Sciences program is a response to the needs of both students and stakeholders in the private and public sectors. The proposal is not a response to accreditation or teacher certification requirements. The program is offered solely to be responsive to the needs of the citizens of Idaho and the students at the University of Idaho.

Educational Offerings: Curriculum, Intended Learning Outcomes, and Assessment Plan

15. Curriculum. Provide descriptive information of the educational offering.

a. Summary of requirements. Provide a summary of program requirements using the following table.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit hours in required courses offered by the department (s) offering the program.</td>
<td>41 (A), 37-40 (B), 40 (C)</td>
</tr>
<tr>
<td>Credit hours in required courses offered by other departments:</td>
<td>21 (A), 21-24 (B), 18-20(C)</td>
</tr>
<tr>
<td>Credit hours in institutional general education curriculum</td>
<td>36</td>
</tr>
</tbody>
</table>
b. **Curriculum.** Provide the curriculum for the program, including credits to completion, courses by title and assigned academic credit granted.

Required coursework includes:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 317</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 143</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 385</td>
<td>GIS Primer</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following sequences:</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 101</td>
<td>Physical Geology</td>
<td></td>
</tr>
<tr>
<td>&amp; 101L</td>
<td>and Physical Geology Lab</td>
<td></td>
</tr>
<tr>
<td>GEOL 111</td>
<td>Physical Geology for Science Majors</td>
<td></td>
</tr>
<tr>
<td>&amp; 111L</td>
<td>and Physical Geology for Science Majors Lab</td>
<td></td>
</tr>
<tr>
<td>GEOL 102</td>
<td>Historical Geology</td>
<td></td>
</tr>
<tr>
<td>&amp; GEOL 102</td>
<td>Historical Geology Lab</td>
<td></td>
</tr>
<tr>
<td>GEOG 100</td>
<td>Physical Geography</td>
<td></td>
</tr>
<tr>
<td>&amp; 100L</td>
<td>and Physical Geography Lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 165</td>
<td>Human Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 200</td>
<td>World Regional Geography</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 19

Choose one from the following three options:

**A. Geological Sciences**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111L</td>
<td>General Chemistry I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 111 or 211</td>
<td>General Physics I or Engineering Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111L or 211L</td>
<td>General Physics I or Engineering Physics I Lab</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 249</td>
<td>Mineralogy and Optical Mineralogy</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 302</td>
<td>Field Geology Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 324</td>
<td>Principles of Stratigraphy and Sedimentation</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 326</td>
<td>Igneous and Metamorphic Petrology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 345</td>
<td>Structural Geology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 490</td>
<td>Geology Field Camp</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>MATH 160</td>
<td>Survey of Calculus</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 170</td>
<td>Calculus I</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 175</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 330</td>
<td>Linear Algebra</td>
<td></td>
</tr>
</tbody>
</table>

Choose at least 9 credits GEOL electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 313</td>
<td>Global Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Climatology</td>
<td>3</td>
</tr>
<tr>
<td>HYDR 409</td>
<td>Quantitative Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Groundwater Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 412</td>
<td>Environmental Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 490 or GEOG 493</td>
<td>Field Camp or Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two electives from the following: 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 361</td>
<td>Geology and the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Tree Rings and Environmental Change</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 435</td>
<td>Climate Change Mitigation</td>
<td></td>
</tr>
<tr>
<td>GEOL 431</td>
<td>Chemical Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOL 435</td>
<td>Glaciology</td>
<td></td>
</tr>
<tr>
<td>GEOL 474</td>
<td>Stable Isotopes in the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOL 476?</td>
<td>Fundamentals of Modeling</td>
<td></td>
</tr>
<tr>
<td>SOIL 450</td>
<td>Environmental Hydrology</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL 46**

### B. Hydrology and Climate

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 170</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 175</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>Engineering Physics 1</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 313</td>
<td>Global Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Climatology</td>
<td>3</td>
</tr>
<tr>
<td>HYDR 409</td>
<td>Quantitative Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Groundwater Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 412</td>
<td>Environmental Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 490 or GEOG 493</td>
<td>Field Camp or Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two electives from the following: 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 361</td>
<td>Geology and the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 417</td>
<td>Tree Rings and Environmental Change</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 435</td>
<td>Climate Change Mitigation</td>
<td></td>
</tr>
<tr>
<td>GEOL 431</td>
<td>Chemical Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOL 435</td>
<td>Glaciology</td>
<td></td>
</tr>
<tr>
<td>GEOL 474</td>
<td>Stable Isotopes in the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOL 476?</td>
<td>Fundamentals of Modeling</td>
<td></td>
</tr>
<tr>
<td>SOIL 450</td>
<td>Environmental Hydrology</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL 42**

### C. Geography and Global Sustainability

**Required:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 313</td>
<td>Global Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 420 or 330</td>
<td>Land, resources and the Env. or Urban Geog</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 436</td>
<td>Principles of Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 435</td>
<td>Climate Change Mitigation</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL**

November 4, 2021
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 390</td>
<td>Cartographic Design &amp; Geovisualization</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 493</td>
<td>Senior Capstone in Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 365 or GEOG 350</td>
<td>Political Geography or Geog of Development</td>
<td>3</td>
</tr>
<tr>
<td>Choose 5 of the following</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
<td></td>
</tr>
<tr>
<td>GEOG 317</td>
<td>Tree Rings and Environmental Change</td>
<td></td>
</tr>
<tr>
<td>GEOG 330</td>
<td>Urban Geography</td>
<td></td>
</tr>
<tr>
<td>GEOL 335</td>
<td>Geomorphology</td>
<td></td>
</tr>
<tr>
<td>GEOG 350</td>
<td>Geography of Development</td>
<td></td>
</tr>
<tr>
<td>GEOL 361</td>
<td>Geology and the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 410</td>
<td>Biogeography</td>
<td></td>
</tr>
<tr>
<td>HYDR 412</td>
<td>Environmental Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOG 420</td>
<td>Land, Resources, and Environment</td>
<td></td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
<td></td>
</tr>
<tr>
<td>GEOG 407</td>
<td>Spatial Analysis and Modeling</td>
<td></td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Intermediate GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td></td>
</tr>
<tr>
<td>GEOG 479</td>
<td>GIS Programming</td>
<td></td>
</tr>
<tr>
<td>GEOG 483</td>
<td>Remote Sensing/GIS Integration</td>
<td></td>
</tr>
<tr>
<td>GEOL 212</td>
<td>Principles of Paleontology</td>
<td></td>
</tr>
<tr>
<td>GEOG 260</td>
<td>Introduction to Geopolitics</td>
<td></td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Climatology</td>
<td></td>
</tr>
<tr>
<td>GEOL 375</td>
<td>Stable Isotopes in the Environment</td>
<td></td>
</tr>
<tr>
<td>GEOL 462</td>
<td>Petroleum Geology and Stratigraphic Concepts</td>
<td></td>
</tr>
<tr>
<td>GEOL 431</td>
<td>Chemical Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>Choose 2 supporting courses</td>
<td></td>
<td>6-8</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>PHYS 111 or 211</td>
<td>General Physics I or Engineering Physics I</td>
<td></td>
</tr>
<tr>
<td>MATH 160 or 170</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 175</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>STAT 431</td>
<td>Statistical Analysis</td>
<td></td>
</tr>
<tr>
<td>ECON 446 or 447</td>
<td>International economics or International Dev.</td>
<td></td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Macroeconomics</td>
<td></td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Microeconomics</td>
<td></td>
</tr>
<tr>
<td>ECON 272</td>
<td>Foundations of Economic Analysis</td>
<td></td>
</tr>
<tr>
<td>SOIL 450</td>
<td>Environmental Hydrology</td>
<td></td>
</tr>
<tr>
<td>SOIL 444</td>
<td>Water Quality of the Pacific Northwest</td>
<td></td>
</tr>
<tr>
<td>SOIL 448</td>
<td>Drinking Water and Human Health</td>
<td></td>
</tr>
<tr>
<td>BE 453</td>
<td>Northwest Climate and Water Resources</td>
<td></td>
</tr>
<tr>
<td>ENVS 415</td>
<td>Environmental Lifecycle Assessment</td>
<td></td>
</tr>
</tbody>
</table>
Credits to completion: 61-65, depending on the option

c. Additional requirements. Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.

A senior capstone experience is required for all options which includes a specific report and presentation. Capstone experiences require students to collect, integrate, and interpret data and observations and formally present results and interpretations. The capstone requirement is met by required courses in each of the options (either GEOG 493 Senior Capstone in the Geography and Global Sustainability option or GEOL 490 Geology Field Camp for the Geological Sciences and Hydrology and Climate options.

Internships may be recommended as a component of a student study program. Courses will require research papers and examinations to validate the knowledge acquired by the student during the course of study. Many of the courses that students might take to conform to a particular study plan agreed upon by advisor and student may require additional preparation in mathematics and statistics or an additional laboratory science course.


a. Intended Learning Outcomes. List the Intended Learning Outcomes for the proposed program, using learner-centered statements that indicate what students will know, understand, and be able to do, and value or appreciate as a result of completing the program.

New Learning Outcomes:
“Core” learning outcomes for ESS degree common to all three options
1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
2. Students will develop skills applicable to the collection, integration, analysis, and illustration of data for solving spatial and temporal problems
3. Students will develop skills for communicating fundamental concepts in their field and results from their own work, in both written and oral settings.

Option-specific learning outcomes:
**Geological Sciences option:**
1. Preparation for the National Association of State Boards of Geology (ASBOG) Fundamentals of Geology (FG) exam, the precursor to licensure as a Professional Geologist.
2. Ability to integrate and communicate understanding of the geologic sciences (e.g., mineralogy, petrology, stratigraphy, etc.) to develop testable hypotheses of the origin and evolution of geological terrains.

**Hydrology and Climate option:**
1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
2. Ability to explain the physical nature of global climate change and the role of society in influencing and mitigating effects of climate change.

**Global Sustainability and Geography option:**
1. Understanding of geographic and spatial perspectives in the interaction between and sustainability of human and natural systems
2. The ability to use geospatial data to map and analyze spatial patterns and relationships with a wide variety of data types, including both natural and human systems.

---

17. **Assessment plans.**

**Assessment Process.** Describe the assessment plan for student learning outcomes that will be used to evaluate student achievement and how the results will be used to improve the program.

i) **Assessment of specific learning outcomes**

“Core” learning outcomes common to all three option areas (assessment plan in italicized bullets):
1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
   - Success in introductory coursework that provides a foundation in the fundamental concepts in geological, physical and human systems, as evidenced by assignments, exams and final grades in 100-200 level courses (GEOG 100, GEOL 101, GEOL 102, GEOL 111, GEOG 165, GEOG 200)
   - Success in upper division coursework required in each option area as assessed by assignments, projects, exams and final grades
   - Ability to synthesize materials from lower and upper division courses and apply them to projects in senior capstone experiences, as assessed by student projects, assignments and final grades in GEOG 493 and GEOL 490

2. Students will develop skills applicable to the collection, integration, analysis, and illustration of data for solving spatial and temporal problems
   - Success in required courses in mathematics, statistics and geographic information science as evidenced by assignments and grades in MATH 143 (or higher), STAT 251 (or higher), GEOG 385
   - Success in applying and demonstrating these skills in the capstone experiences (GEOG 493 or GEOL 490) and other upper-division courses

3. Students will develop skills for communicating fundamental concepts in their field and results
from their own work, in both written and oral settings.

- Success in required coursework in written and oral communication (ENGL 317; Gen Ed Comm requirements)
- Assessment of oral and written communication skills via writing assignments and project presentations in upper division courses and the senior capstone courses

**Option-specific learning outcomes:**

**Geological Sciences option:**

1. Program graduates understand the importance of sitting for and successfully passing the National Association of State Boards of Geology (ASBOG) Fundamentals of Geology (FG) exam, the precursor to licensure as a Professional Geologist.
   - 31 states, including Idaho, and Puerto Rico require licensing of professional geologists
   - 60% of students pass their first attempt of the FG exam with declining rates for subsequent attempts as exam takers are further removed from their university training

2. Ability to integrate and communicate understanding of the geologic sciences (e.g., mineralogy, petrology, stratigraphy, etc.) to develop testable hypotheses of the origin and evolution of geological terrains.
   - Successful completion of concept-based and field-based projects in upper division courses and in the GEOL 490 Field Methods senior experience course.

**Hydrology and Climate option:**

1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
   - Ability to successfully acquire, analyze, synthesize, and present hydrologic information in lab and field exercises in upper division courses such as GEOL 410, GEOG 412, GEOG 424, HYDR 409, and the capstone course (GEOG 493 or GEOL 490), as assessed by classroom and field-based projects and assignments.

2. An understanding of the physical nature of global climate change, its impacts, and the role of society in influencing and mitigating effects of climate change.
   - Success in upper division courses such as GEOG 313, GEOG 401, GEOG 435, GEOG 317, GEOG 430, as assessed by performance on assignments, projects and exams

**Global Sustainability and Geography option:**

1. Understanding of geographic and spatial perspectives in the interaction between and sustainability of human and natural systems
   - Success in upper division courses in spatial perspectives in both human and natural systems (e.g., GEOG 313, GEOG 330, GEOG 420, GEOG 435, GEOG 350, GEOG 365), as assessed by assignments, projects and exams.
   - Scope, depth and quality of independent project carried out in the senior capstone experience (GEOG 493)

2. The ability to use geospatial data and technology to map and analyze spatial patterns and relationships with a wide variety of data types, including environmental and human systems.
   - Success in coursework focused on geospatial analysis, such as GEOG 385, GEOG 390, GEOG 407, GEOG 424, GEOG 483, as assessed by performance on lab assignments, exams, independent projects and final grades.
   - # of students earning GIS Certificate (requires grades of “C” or better in 15 credits of
ii) Overarching assessment activities.

Our assessment process will also consist of 4 overarching activities that will contribute to both the assessment of specific learning outcomes noted above, as well as the long-term evaluation and refinement of goals, objectives and learning outcomes for the ESS program.

1. Student Evaluations of Courses and Instructors

Course evaluations allow students to evaluate both the course and the instructor and provide the department with information regarding course utility in meeting the student's needs.

2. Survey of Graduating Seniors

An online exit survey of all graduating seniors will be implemented to provide information on general student satisfaction with the degree program, courses, faculty and facilities. This information will be collected anonymously.

3. Internal and External Review

The Department of Earth and Spatial Sciences will conduct a biennial review of course offerings and course goals for alignment with department learning outcomes. This self-review will allow the faculty to reassess the program and its direction as well as its goals and objectives. An external review will be conducted every 5-7 years to provide the department with guidance for future decisions on how to support, maintain, and advance the department according to its vision and to fulfill the university's goals.

4. Advisory Board

An advisory board will be implemented to provide input and advice on the department's objectives and evolution. The advisory board will consist of industry and government members primarily consisting of department alumni. Annual meetings with the advisory board will allow for the presentation of accomplishments and ongoing activities in research and academic progress for which the board can synthesize and present recommendations for improvement.

**Resources Required for Implementation – fiscal impact and budget.**

Organizational arrangements required within the institution to accommodate the change including administrative, staff, and faculty hires, facilities, student services, library; etc.

18. Physical Facilities and Equipment: Describe the provision for physical facilities and equipment.

   a. Existing resources. Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

   Existing laboratory facilities (GIS lab, Paleontology lab, Dendrochronology lab, Geochemistry lab, **) within the Geography and Geological Sciences will be utilized to provide students with hands-on research. Existing classroom spaces currently housed by the Geography and Geological Sciences program will continue to be utilized.

   b. Impact of new program. What will be the impact on existing programs of increased use
of physical resources by the proposed program? How will the increased use be accommodated?

No change in the use of facilities or equipment.

c. **Needed resources.** List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

No physical resources.

19. **Library and Information Resources:** Describe adequacy and availability of library and information resources.

   a. **Existing resources and impact of new program.** Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? Will there be an impact on existing programs of increased library usage caused by the proposed program? For off-campus programs, clearly indicate how the library resources are to be provided.

   b. **Needed resources.** What new library resources will be required to ensure successful implementation of the program? Enter the costs of those library resources into the budget sheet.

20. **Faculty/Personnel resources**

   a. **Needed resources.** Give an overview of the personnel resources that will be needed to implement the program. How many additional sections of existing courses will be needed? Referring to the list of new courses to be created, what instructional capacity will be needed to offer the necessary number of sections?

      No new resources needed.

   b. **Existing resources.** Describe the existing instructional, support, and administrative resources that can be brought to bear to support the successful implementation of the program.

      15 of faculty, 1 support staff, 1 instructional staff, and 1 laboratory coordinator.

   c. **Impact on existing programs.** What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will the quality and productivity of existing programs be maintained?

      We are repackaging the Geology and Geography bachelors into a merged degree so there will be no impact on existing programs.

   d. **Needed resources.** List the new personnel that must be hired to support the proposed program. Enter the costs of those personnel resources into the budget sheet.
No additional resources are needed for this change.

Revenue Sources

a) **Reallocation of funds:** If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

All existing funds were merged for FY22.

b) **New appropriation.** If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

None.

c) **Non-ongoing sources:**
   i. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution’s plans for sustaining the program when that funding ends?

   There are no non-ongoing sources of funding.

   ii. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds?

   All grants from both departments have been merged into this new program already.

d) **Student Fees:**
   i. If the proposed program is intended to levy any institutional local fees, explain how doing so meets the requirements of Board Policy V.R., 3.b.

   Student fees will be in line with board policies and will remain consistent with fees associated with the previous programs.

   ii. Provide estimated cost to students and total revenue for self-support programs and for professional fees and other fees anticipated to be requested under Board Policy V.R., if applicable.

   No change in cost to the students.

21. Using the excel **budget template** provided by the Office of the State Board of Education, provide the following information:

   - Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of the program.

   - Include reallocation of existing personnel and resources and anticipated or requested new
resources.

• Second and third year estimates should be in constant dollars.

• Amounts should reconcile subsequent pages where budget explanations are provided.

• If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).

• Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

*Please see attached for budget.
**475: EARTH AND SPATIAL SCIENCES (BS)**

**In Workflow**
1. Geol/Geog Review (renee@uidaho.edu)
2. 225 Chair (alistair@uidaho.edu)
3. 19 Curriculum Committee Chair (markn@uidaho.edu)
4. 19 Dean (gingercarney@uidaho.edu)
5. Provost's Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
6. Curriculum Review (sstubbs@uidaho.edu)
7. Degree Audit Review (rfrost@uidaho.edu)
8. Registrar's Office (none)
9. Ready for UCC (disable)
10. UCC (none)
11. Faculty Senate Chair (mstout@uidaho.edu; jvalkovic@uidaho.edu; cari@uidaho.edu)
12. State Approval (mstout@uidaho.edu; jvalkovic@uidaho.edu; lindalundgren@uidaho.edu)
13. NWCCU (sara@uidaho.edu; mstout@uidaho.edu)
14. Theodore Unzicker (tunzicker@uidaho.edu)

**Approval Path**
1. Tue, 05 Apr 2022 22:38:09 GMT
   Renee Jensen-Hasfurther (renee): Rollback to Initiator
2. Wed, 06 Apr 2022 18:26:06 GMT
   Renee Jensen-Hasfurther (renee): Approved for Geol/Geog Review
3. Mon, 11 Apr 2022 19:07:00 GMT
   Alistair Smith (alistair): Approved for 225 Chair
4. Mon, 09 May 2022 07:53:15 GMT
   Mark Nielsen (markn): Approved for 19 Curriculum Committee Chair
5. Mon, 09 May 2022 15:21:27 GMT
   Ginger Carney (gingercarney): Approved for 19 Dean
6. Tue, 10 May 2022 16:15:50 GMT
   Dean Panttaja (panttaja): Approved for Provost's Office
7. Tue, 10 May 2022 20:14:57 GMT
   David Barnes (dabarnes): Rollback to 225 Chair for Curriculum Review
8. Tue, 10 May 2022 21:10:51 GMT
   David Barnes (dabarnes): Approved for 225 Chair
9. Tue, 10 May 2022 22:09:38 GMT
   Mark Nielsen (markn): Approved for 19 Curriculum Committee Chair
10. Tue, 10 May 2022 22:22:07 GMT
    Ginger Carney (gingercarney): Approved for 19 Dean
    Dean Panttaja (panttaja): Approved for Provost's Office
    Steve Stubbs (sstubbs): Approved for Curriculum Review
    Rebecca Frost (rfrost): Approved for Degree Audit Review
    Steve Stubbs (sstubbs): Approved for Registrar's Office
15. Wed, 26 Oct 2022 17:02:35 GMT
    Theodore Unzicker (tunzicker): Approved for Ready for UCC
    Theodore Unzicker (tunzicker): Approved for UCC

**New Program Proposal**

Date Submitted: Wed, 06 Apr 2022 18:20:26 GMT

**Viewing:** 475 : Earth and Spatial Sciences (BS)

**Last edit:** Mon, 10 Oct 2022 19:42:04 GMT

Changes proposed by: Renee Love
Faculty Contact

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Faculty Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renee Love</td>
<td><a href="mailto:rlove@uidaho.edu">rlove@uidaho.edu</a></td>
</tr>
</tbody>
</table>

Will this request have a fiscal impact of $250K or greater?
Yes

Academic Level
Undergraduate

College
Science

Department/Unit:
Earth & Spatial Sciences

Effective Catalog Year
2023-2024

Program Title
Earth and Spatial Sciences (BS)

Degree Type
Major

Please note: Majors and Certificates over 30 credits need to have a state form approved before the program can be created in Curriculum.

Program Credits
120

Attach Program Change
Full Proposal_Form-Academic_Certificate_FINAL.docx

CIP Code
40.0601 - Geology/Earth Science, General.

Emphasis/Option CIP Code(s)

<table>
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<th>Code(s)</th>
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Will the program be Self-Support?
No

Will the program have a Professional Fee?
No

Will the program have an Online Program Fee?
No

Will this program lead to licensure in any state?
No

Will the program be a statewide responsibility?
Yes

Financial Information

What is the financial impact of the request?
Greater than $250,000 per FY

Note: If financial impact is greater than $250,000, you must complete a Program Proposal Form
Describe the financial impact

Physical Facilities and Equipment: Describe the provision for physical facilities and equipment.

a. Existing resources. Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

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b. Impact of new program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated?

No change in the use of facilities or equipment.

c. Needed resources. List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

No physical resources.

Curriculum:

Required course work includes the university requirements (see regulation J-3 (https://catalog.uidaho.edu/general-requirements-academic-procedures/j-general-requirements-baccalaureate-degrees/)) and:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
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<tr>
<td>ENGL 317</td>
<td>Technical Writing</td>
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<tr>
<td>MATH 143</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>STAT 251</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 385</td>
<td>Foundations of GIS</td>
<td>3</td>
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Select one of the following:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>GEOL 101 &amp; 101L</td>
<td>Physical Geology and Physical Geology Lab</td>
<td>4</td>
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<tr>
<td>GEOL 102 &amp; 102L</td>
<td>Historical Geology and Historical Geology Lab</td>
<td></td>
</tr>
<tr>
<td>GEOL 111 &amp; 111L</td>
<td>Physical Geology for Science Majors and Physical Geology for Science Majors Lab</td>
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</tr>
<tr>
<td>PHYS 111 &amp; 111L</td>
<td>General Physics I and General Physics I Lab</td>
<td></td>
</tr>
<tr>
<td>GEOG 100 &amp; 100L</td>
<td>Introduction to Planet Earth and Introduction to Planet Earth Lab</td>
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</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>GEOG 165</td>
<td>Human Geography</td>
<td>4</td>
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<tr>
<td>GEOG 200</td>
<td>World Cultures and Globalization</td>
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</table>

Options

Select one of the following options: 41-47


Hydrology and Climate (https://catalog.uidaho.edu/colleges-related-units/science/geography-geological-sciences/earth-spatial-sciences-bs/#HydrologyandClimate)

Geography and Global Sustainability (https://catalog.uidaho.edu/colleges-related-units/science/geography-geological-sciences/earth-spatial-sciences-bs/#GeographyandGlobalSustainability)

Total Hours 61-67

A. Geological Sciences Option

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<tr>
<th>Code</th>
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<tr>
<td>CHEM 111</td>
<td>General Chemistry I</td>
<td>3</td>
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<td>CHEM 111L</td>
<td>General Chemistry I Laboratory</td>
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<td>PHYS 111</td>
<td>General Physics I</td>
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<tr>
<td>or PHYS 211</td>
<td>Engineering Physics I</td>
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<tr>
<td>PHYS 111L</td>
<td>General Physics I Lab</td>
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</tr>
<tr>
<td>or PHYS 211L</td>
<td>Laboratory Physics I</td>
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</tr>
<tr>
<td>GEOL 249</td>
<td>Mineralogy and Optical Mineralogy</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 302</td>
<td>Field Geology Methods</td>
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<tr>
<td>GEOL 324</td>
<td>Principles of Stratigraphy and Sedimentation</td>
<td>4</td>
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<tr>
<td>Code</td>
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<td>Hours</td>
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<tr>
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<tr>
<td>GEOL 326</td>
<td>Igneous and Metamorphic Petrology</td>
<td>4</td>
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<tr>
<td>GEOL 345</td>
<td>Structural Geology</td>
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<tr>
<td>GEOL 490</td>
<td>Geology Field Camp (OR)</td>
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<tr>
<td>or GEOL 489</td>
<td>Virtual Field Camp</td>
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<tr>
<td>MATH 160</td>
<td>Survey of Calculus</td>
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<tr>
<td>or MATH 170</td>
<td>Calculus I</td>
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<td>MATH 175</td>
<td>Calculus II</td>
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<tr>
<td>or MATH 330</td>
<td>Linear Algebra</td>
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<tr>
<td>Advisor Approved Electives in Geology</td>
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<tr>
<td><strong>46-47</strong></td>
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Courses to total 120 credits for this degree

### B. Hydrology and Climate Option

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>GEOG 313</td>
<td>Global Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Groundwater Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 490</td>
<td>Geology Field Camp OR</td>
<td></td>
</tr>
<tr>
<td>or GEOG 493</td>
<td>Senior Capstone in Geography</td>
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<tr>
<td>HYDR 409</td>
<td>Quantitative Hydrogeology</td>
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<td>HYDR 412</td>
<td>Environmental Hydrogeology</td>
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<td>MATH 175</td>
<td>Calculus II</td>
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<td>PHYS 211</td>
<td>Engineering Physics I</td>
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<td>Select two electives from the following:</td>
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<tr>
<td>GEOL 361</td>
<td>Geology and the Environment</td>
<td>3</td>
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<tr>
<td>GEOG 317</td>
<td>Tree Rings and Environmental Change</td>
<td>3</td>
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<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
<td>3</td>
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<td>GEOG 435</td>
<td>Climate Change Mitigation</td>
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<tr>
<td>GEOG 431</td>
<td>Chemical Hydrogeology</td>
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</tr>
<tr>
<td>GEOG 435</td>
<td>Glaciology and the Dynamic Frozen Earth</td>
<td>3</td>
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<tr>
<td>GEOG 474</td>
<td>Stable Isotopes in the Environment</td>
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<tr>
<td>SOIL 450</td>
<td>Environmental Hydrology</td>
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<td><strong>Total Hours</strong></td>
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</tr>
<tr>
<td><strong>41-43</strong></td>
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</table>

Courses to total 120 credits for this degree

### C. Geography and Global Sustainability Option

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>GEOG 313</td>
<td>Global Climate Change</td>
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<td>GEOG 420</td>
<td>Land, Resources, and Environment</td>
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<td>or GEOG 330</td>
<td>Urban Geography</td>
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<td>SOIL 436</td>
<td>Principles of Sustainability</td>
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<td>GEOG 435</td>
<td>Climate Change Mitigation</td>
<td>3</td>
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<tr>
<td>GEOG 390</td>
<td>Cartographic Design &amp; Geovisualization</td>
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<td>GEOG 493</td>
<td>Senior Capstone in Geography</td>
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</tr>
<tr>
<td>GEOG 365</td>
<td>Geopolitics and Conflict</td>
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<td>or GEOG 350</td>
<td>Sustainability of Global Development</td>
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<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
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<td>GEOG 317</td>
<td>Tree Rings and Environmental Change</td>
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<td>GEOL 350</td>
<td>Geomorphology</td>
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<td>GEOG 350</td>
<td>Sustainability of Global Development</td>
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<td>GEOL 361</td>
<td>Geology and the Environment</td>
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<td>GEOG 410</td>
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<td>HYDR 412</td>
<td>Environmental Hydrogeology</td>
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<tr>
<td>GEOG 430</td>
<td>Climate Change Ecology</td>
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<tr>
<td>GEOG 407</td>
<td>Spatial Analysis and Modeling</td>
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<tr>
<td>GEOG 475</td>
<td>Intermediate GIS</td>
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<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
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<td>GEOG 479</td>
<td>GIS Programming</td>
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<td>GEOG 483</td>
<td>Remote Sensing IMAGE ANALYSIS/GIS Integration</td>
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<td>GEOL 212</td>
<td>Dinosaurs and Prehistoric Life</td>
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<td>GEOG 260</td>
<td>Introduction to Geopolitics</td>
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<tr>
<td>GEOG 401</td>
<td>Climatology</td>
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<tr>
<td>GEOG 474</td>
<td>Stable Isotopes in the Environment</td>
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<tr>
<td>GEOL 462</td>
<td>Petroleum Systems and Stratigraphic Concepts</td>
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<tr>
<td>GEOL 431</td>
<td>Chemical Hydrogeology</td>
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</table>

Choose 2 supporting courses: 6-8

- CHEM 111 General Chemistry I
  & 111L General Chemistry I Laboratory
- PHYS 111 General Physics I
  & 111L General Physics I Lab
  or PHYS 211 Engineering Physics I
- MATH 160 Survey of Calculus
  or MATH 170 Calculus I
- MATH 175 Calculus II
- STAT 431 Statistical Analysis
- ECON 446 International Economics
  or ECON 447 International Development Economics
- ECON 201 Principles of Macroeconomics
  or ECON 447 International Development Economics
- ECON 202 Principles of Microeconomics
- ECON 272 Foundations of Economic Analysis
- SOIL 450 Environmental Hydrology
- SOIL 444 Water Quality in the Pacific Northwest
- SOIL 448 Drinking Water and Human Health
- BE 453 Northwest Climate and Water Resources Change
- ENVS 415 Environmental Lifecycle Assessment

Total Hours 42-44

Courses to total 120 credits for this degree

Degree Maps:

**Geological Sciences Option**

**Fall Term 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENGL 101</td>
<td>Writing and Rhetoric I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 143</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>(GEOL 101 AND GEOL 101L) OR (GEOL 111 AND GEOL 111L) OR (GEOL 102 AND 102L) OR (GEOG 100 AND 100L)</td>
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<tr>
<td>Social and Behavioral Ways of Knowing Course</td>
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<tr>
<td>Oral Communication Course</td>
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<tr>
<td><strong>Hours</strong></td>
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**Spring Term 1**

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<thead>
<tr>
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<tr>
<td>ENGL 102</td>
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<td>CHEM 111</td>
<td>General Chemistry I</td>
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<tr>
<td>CHEM 111L</td>
<td>General Chemistry I Laboratory</td>
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<tr>
<td>GEOL 249</td>
<td>Mineralogy and Optical Mineralogy</td>
<td>4</td>
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<tr>
<td>MATH 160 OR MATH 170</td>
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<td>4</td>
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<tr>
<td><strong>Hours</strong></td>
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</table>

**Fall Term 2**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>GEOL 324</td>
<td>Principles of Stratigraphy and Sedimentation</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 165</td>
<td>Human Geography</td>
<td>3</td>
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<tr>
<td>or GEOG 200</td>
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</tr>
<tr>
<td>(PHYS 111 AND PHYS 111L) OR (PHYS 211 AND PHYS 211L)</td>
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<tr>
<td>Geology, Major Elective Course</td>
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<tr>
<td><strong>Hours</strong></td>
<td><strong>14</strong></td>
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</tbody>
</table>
### Spring Term 2
- **GEOL 345** Structural Geology 4
- **GEOG 385** Foundations of GIS 3
- **MATH 175** Calculus II 4
- **or MATH 330** Linear Algebra 3
- Humanistic and Artistic Ways of Knowing Course 3

**Hours** 14

### Summer Term 2
- **GEOL 302** Field Geology Methods 3

**Hours** 3

### Fall Term 3
- **GEOL 326** Igneous and Metamorphic Petrology 4
- **ENGL 317** Technical Writing 3
- American Diversity Course 3
- Elective Course 3

**Hours** 13

### Spring Term 3
- **STAT 251** Statistical Methods 3
- International Course 3
- Elective Course 3
- Elective Course 3
- Elective Course 3

**Hours** 15

### Summer Term 3
- **GEOL 490** Geology Field Camp 3

**Hours** 3

### Fall Term 4
- Geology, Major Elective Course 3
- Geology, Major Elective Course 3
- Humanistic and Artistic Ways of Knowing Course 3
- Elective Course 3
- Elective Course 3

**Hours** 15

### Spring Term 4
- Geology, Major Elective Course 3
- Elective Course 3
- Elective Course 3
- Elective Course 3

**Hours** 12

**Total Hours** 120

### Global Sustainability and Geography Option

#### Fall Term 1
- **ENGL 101** Writing and Rhetoric I 3
- **MATH 143** College Algebra 3
- (GEOL 101 AND GEOL 101L) OR (GEOL 111 AND GEOL 111L) OR (GEOL 102 AND 102L) OR (GEOG 100 OR 100L) 4
- Social and Behavioral Ways of Knowing Course 3
- Oral Communication Course 3

**Hours** 16

#### Spring Term 1
- **ENGL 102** Writing and Rhetoric II 3
- **CHEM 111** General Chemistry I 3
- **CHEM 111L** General Chemistry I Laboratory 1
- **STAT 251** Statistical Methods 3
- **GEOG 165** or GEOG 200 Human Geography or World Cultures and Globalization 3
- Geography, Major Elective Course 3

**Hours** 16

#### Fall Term 2
- **MATH 170** Calculus I (Suggested Supporting Course) 4
- **GEOG 385** Foundations of GIS 3
- (PHYS 111 AND PHYS 111L) OR (PHYS 211 AND PHYS 211L) 4
- Humanistic and Artistic Ways of Knowing Course 3

**Hours** 14

#### Spring Term 2
- **GEOG 365** Geopolitics and Conflict 3
- or GEOG 350 or Sustainability of Global Development 3
- Geography, Major Elective Course 3
<table>
<thead>
<tr>
<th>Elective Course</th>
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<tbody>
<tr>
<td>Elective Course</td>
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<td>Elective Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

### Fall Term 3
- **ENGL 317** Technical Writing 3
- **GEOG 313** Global Climate Change 3
- **GEOG 435** Climate Change Mitigation 3
- Geography, Major Elective Course 3
- Elective Course 3

| Hours | 15 |

### Spring Term 3
- **GEOG 390** Cartographic Design & Geovisualization 3
- **SOIL 436** Principles of Sustainability 3
- Geography, Major Elective Course 3
- Geography, Major Elective Course 3
- International Course 3

| Hours | 15 |

### Fall Term 4
- **GEOG 420** Land, Resources, and Environment 3
  - or **GEOG 330** Urban Geography 3
- American Diversity Course 3
- Supporting Class, Major Elective Course 3
- Geography, Major Elective Course 3
- Elective Course 3

| Hours | 14 |

### Spring Term 4
- **GEOG 493** Senior Capstone in Geography 3
- Humanistic and Artistic Ways of Knowing Course 3
- Elective Course 3
- Elective Course 3
- Elective Course 3

| Hours | 15 |

### Total Hours
- **120**

### Hydrology and Climate Option

#### Fall Term 1
- **ENGL 101** Writing and Rhetoric I 3
- **MATH 143** College Algebra 3
- **GEOL 101 AND GEOL 101L** OR **GEOL 111 AND GEOL 111L** OR **GEOL 102 AND 102L** OR **GEOG 100 AND 100L** 4
- Social and Behavioral Ways of Knowing Course 3
- Oral Communication Course 3

| Hours | 16 |

#### Spring Term 1
- **ENGL 102** Writing and Rhetoric II 3
- **CHEM 111 & 111L** General Chemistry I and General Chemistry I Laboratory 4
- **GEOG 165** Human Geography 3
  - or **GEOG 200** World Cultures and Globalization 3
- **MATH 170** Calculus I 4

| Hours | 14 |

#### Fall Term 2
- **GEOL 309** Ground Water Hydrology 3
- **GEOG 313** Global Climate Change 3
- **MATH 175** Calculus II 4
- **PHYS 211 & 211L** Engineering Physics I and Laboratory Physics I 4

| Hours | 14 |

#### Spring Term 2
- **STAT 251** Statistical Methods 3
- **GEOG 385** Foundations of GIS 3
- **GEOL/GEOG Course, Major Elective Course** 3
- Elective Course 3
- Elective Course 3

| Hours | 15 |

#### Summer Term 2
- **GEOL 302** Field Geology Methods 3

| Hours | 3 |
### Fall Term 3
- **ENGL 317** Technical Writing 3
- **GEOL 410** Groundwater Field Methods 3
- **HYDR 409** Quantitative Hydrogeology 3
- **GEOG 424** Hydrologic Applications of GIS and Remote Sensing 3
- Elective Course 3

**Hours** 15

### Spring Term 3
- International Course 3
- Humanistic and Artistic Ways of Knowing Course 3
- Elective Course 3
- Elective Course 4

**Hours** 13

### Summer Term 3
- **GEOL 490** Geology Field Camp 3

**Hours** 3

### Fall Term 4
- **GEOL/GEOG, Major Elective Course** 3
- American Diversity Course 3
- Elective Course 3
- Elective Course 3
- Elective Course 1

**Hours** 13

### Spring Term 4
- **GEOG 493** Senior Capstone in Geography 3
- **GEOG 401** Climatology 3
- **HYDR 412** Environmental Hydrogeology 3
- Humanistic and Artistic Ways of Knowing Course 3
- Elective Course 2

**Hours** 14

**Total Hours** 120

The degree map is a guide for the timely completion of your curricular requirements. Your academic advisor or department may be contacted for assistance in interpreting this map. This map is not reflective of your academic history or transcript and it is not official notification of completion of degree or certificate requirements. Please contact the Registrar’s Office regarding your official degree/certificate completion status.

### Distance Education Availability
To comply with the requirements of the Idaho State Board of Education (SBOE) and the Northwest Commission on Colleges and Universities (NWCCU) the University of Idaho must declare whether 50% or more of the curricular requirements of a program which may be completed via distance education.

**Can 50% or more of the curricular requirements of this program be completed via distance education?**
Yes

**If Yes, can 100% of the curricular requirements of this program be completed via distance education?**
No

Note: Existing programs transitioning from less than 50% of its curricular requirements to 50% or more of its requirements being available via distance education is considered a Group C change and must complete the program proposal formwork before these changes will be processed.

### Geographical Area Availability
In which of the following geographical areas can this program be completed in person?
- Coeur d’Alene
- Moscow

### Student Learning Outcomes
List the intended learning outcomes for program component. Use learner centered statements that indicate what will students know, be able to do, and value or appreciate as a result of completing the program.

New Learning Outcomes:
"Core" learning outcomes for ESS degree common to all three options
1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
2. Students will develop skills applicable to the collection, integration, analysis, and illustration of data for solving spatial and temporal problems.
3. Students will develop skills for communicating fundamental concepts in their field and results from their own work, in both written and oral settings.

Option-specific learning outcomes:
Geological Sciences option:
1. Preparation for the National Association of State Boards of Geology (ASBOG) Fundamentals of Geology (FG) exam, the precursor to licensure as a Professional Geologist.
2. Ability to integrate and communicate understanding of the geologic sciences (e.g., mineralogy, petrology, stratigraphy, etc.) to develop testable hypotheses of the origin and evolution of geological terrains.

Hydrology and Climate option:
1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
2. Ability to explain the physical nature of global climate change and the role of society in influencing and mitigating effects of climate change.

Global Sustainability and Geography option:
1. Understanding of geographic and spatial perspectives in the interaction between and sustainability of human and natural systems.
2. The ability to use geospatial data to map and analyze spatial patterns and relationships with a wide variety of data types, including both natural and human systems.

Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program component.

“Core” learning outcomes common to all three option areas (assessment plan in italicized bullets):
1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
   - Success in introductory coursework that provides a foundation in the fundamental concepts in geological, physical and human systems, as evidenced by assignments, exams and final grades in 100-200 level courses (GEOG 100, GEOL 101, GEOL 102, GEOL 111, GEOG 165, GEOG 200)
   - Success in upper division coursework required in each option area as assessed by assignments, projects, exams and final grades
   - Ability to synthesize materials from lower and upper division courses and apply them to projects in senior capstone experiences, as assessed by student projects, assignments and final grades in GEOG 493 and GEOL 490

2. Students will develop skills applicable to the collection, integration, analysis, and illustration of data for solving spatial and temporal problems.
   - Success in required courses in mathematics, statistics and geographic information science as evidenced by assignments and grades in MATH 143 (or higher), STAT 251 (or higher), GEOG 385
   - Success in applying and demonstrating these skills in the capstone experiences (GEOG 493 or GEOL 490) and other upper-division courses

3. Students will develop skills for communicating fundamental concepts in their field and results from their own work, in both written and oral settings.
   - Success in required coursework in written and oral communication (ENGL 317; Gen Ed Comm requirements)
   - Assessment of oral and written communication skills via writing assignments and project presentations in upper division courses and the senior capstone courses

Option-specific learning outcomes:
Geological Sciences option:
1. Program graduates understand the importance of sitting for and successfully passing the National Association of State Boards of Geology (ASBOG) Fundamentals of Geology (FG) exam, the precursor to licensure as a Professional Geologist.
   - 31 states, including Idaho, and Puerto Rico require licensing of professional geologists
   - 60% of students pass their first attempt of the FG exam with declining rates for subsequent attempts as exam takers are further removed from their university training

2. Ability to integrate and communicate understanding of the geologic sciences (e.g., mineralogy, petrology, stratigraphy, etc.) to develop testable hypotheses of the origin and evolution of geological terrains.
   - Successful completion of concept-based and field-based projects in upper division courses and in the GEOL 490 Field Methods senior experience course.

Hydrology and Climate option:
1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
   - Ability to successfully acquire, analyze, synthesize, and present hydrologic information in lab and field exercises in upper division courses such as GEOL 410, GEOG 412, GEOG 424, HYDR 409, and the capstone course (GEOG 493 or GEOL 490), as assessed by classroom and field-based projects and assignments.

2. An understanding of the physical nature of global climate change, its impacts, and the role of society in influencing and mitigating effects of climate change.
   - Success in upper division courses such as GEOG 313, GEOG 401, GEOG 435, GEOG 317, GEOG 430, as assessed by performance on assignments, projects and exams

Global Sustainability and Geography option:
1. Understanding of geographic and spatial perspectives in the interaction between and sustainability of human and natural systems
   • Success in upper division courses in spatial perspectives in both human and natural systems (e.g., GEOG 313, GEOG 330, GEOG 420, GEOG 435, GEOG 350, GEOG 365), as assessed by assignments, projects and exams.
   • Scope, depth and quality of independent project carried out in the senior capstone experience (GEOG 493)

2. The ability to use geospatial data and technology to map and analyze spatial patterns and relationships with a wide variety of data types, including environmental and human systems.
   • Success in coursework focused on geospatial analysis, such as GEOG 385, GEOG 390, GEOG 407, GEOG 424, GEOG 483, as assessed by performance on lab assignments, exams, independent projects and final grades.
   • # of students earning GIS Certificate (requires grades of “C” or better in 15 credits of coursework in geospatial analysis)

How will you ensure that the assessment findings will be used to improve the program?

Our assessment process will also consist of 4 overarching activities that will contribute to both the assessment of specific learning outcomes noted above, as well as the long-term evaluation and refinement of goals, objectives and learning outcomes for the ESS program.

1. Student Evaluations of Courses and Instructors
   Course evaluations allow students to evaluate both the course and the instructor and provide the department with information regarding course utility in meeting the student's needs.

2. Survey of Graduating Seniors
   An online exit survey of all graduating seniors will be implemented to provide information on general student satisfaction with the degree program, courses, faculty and facilities. This information will be collected anonymously.

3. Internal and External Review
   The Department of Earth and Spatial Sciences will conduct a biennial review of course offerings and course goals for alignment with department learning outcomes. This self-review will allow the faculty to reassess the program and its direction as well as its goals and objectives. An external review will be conducted every 5-7 years to provide the department with guidance for future decisions on how to support, maintain, and advance the department according to its vision and to fulfill the university's goals.

4. Advisory Board
   An advisory board will be implemented to provide input and advice on the department’s objectives and evolution. The advisory board will consist of industry and government members primarily consisting of department alumni. Annual meetings with the advisory board will allow for the presentation of accomplishments and ongoing activities in research and academic progress for which the board can synthesize and present recommendations for improvement.

What direct and indirect measures will be used to assess student learning?

See above

When will assessment activities occur and at what frequency?

Annually

Student Learning Outcomes

Learning Objectives

New Learning Outcomes:

“Core” learning outcomes for ESS degree common to all three options
1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
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3. Students will develop skills for communicating fundamental concepts in their field and results from their own work, in both written and oral settings.

Option-specific learning outcomes:

Geological Sciences option:
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Global Sustainability and Geography option:
1. Understanding of geographic and spatial perspectives in the interaction between and sustainability of human and natural systems
2. The ability to use geospatial data to map and analyze spatial patterns and relationships with a wide variety of data types, including both natural and human systems.

Rationale for the proposed change. Include an explanation of how the department will manage the added workload, if any.

The departments of Geography and Geological Sciences have merged due to program prioritization at the University of Idaho. An initial combination of the department names was deemed cumbersome and outdated. Therefore, the faculty of the merged department voted to adopt “Earth and Spatial Sciences” as the name of the merged department, which reflects a modern interpretation of the curriculum and breadth of job classifications likely to be filled by our graduates. As part of the merger, the curriculum was updated, efficiencies in class offerings were increased, and class offerings were expanded to reflect new curriculum goals. The department is requesting the adoption of the Earth and Spatial Sciences (ESS) degree program that will reflect the goals of the merged department and help fulfill the workforce needs of the State of Idaho and the greater region. This new degree will offer emphasis tracks in Geological Sciences, Global Sustainability and Geography, and Hydrology and Climate. This new Bachelor of Science degree is intended for students who have interests in geology and geography but also those students who wish to pursue an education and training in the disciplines of climate, hydrology, and sustainability. This proposed degree builds on the prior Geography and Geosciences curriculums, highlights the expertise of current faculty, and will not require additional resources to deliver the degree option.

The Geography and Geosciences degree programs will be taught to completion with existing students, and new students will enter the Earth and Spatial Sciences (ESS) degree program. Emphases under the prior and proposed degree programs can be taught simultaneously and each will continue to address the needs of students to work as geologists and geographers upon graduation. The ESS emphases also will enhance the knowledge and marketability of our graduates for careers as hydrologists, GIS specialists, data analysts, climate specialists, sustainability analysts, and other Earth science career tracks. Such workforce needs have been indicated by our stakeholders across Idaho and the region, including industry sectors such as resource exploration, mining, water resources, environmental management, geospatial analytics, climate change modeling, and landscape remediation and restoration. The new degree program also will continue the robustness of coursework that trains future Earth scientists as researchers and licensed professionals. Existing certifications of geographic information systems and climate change, and geography and geology minors are included in the proposed ESS program. We anticipate that the ESS program will broaden our marketability to students across the state and expand our ability to produce the Earth science workforce needed to sustain and grow the Idaho economy.

Targeted audience: 20-50 undergraduate majors per year.

The proposed new Earth and Spatial Sciences BS degree represents the consolidation of two existing degrees into a single degree with options. This consolidation provides for a common set of core classes and more broadly educated earth scientists. The new degree prepares students for careers in three Bureau of Labor Statistic occupations: Geographers (SOC 19-3092), Hydrologists (SOC 19-2043), and Geoscientists (SOC 19-2042). Collectively in 2020 these occupations employed 37,100 people nationally (400 in Idaho) with projected growth of 7% over the next 10 years.

The Idaho State Board of Education recognized that Idaho needs a STEM education-career pipeline and created the Idaho STEM Action Center in 2015 to support a competitive Idaho workforce and economy through STEM. In 2019, the Idaho STEM Action Center found that over 7000 STEM jobs went unfilled in Idaho due to lack of skills and education for appropriate job placement. The second most common job category that remained unfilled were jobs involving computer skills. Our department provides training and certifications in Geographic Information Science (GIS), a specialized computer analysis tool, which is valuable to the workforce’s needs in Idaho and nationally.

Idaho has some of the lowest go-on rates (high school students continuing to college) in the nation at 45% each year; this creates a substantial barrier for connecting students to college geoscience programs, and subsequently STEM careers, in Idaho. This new program offers an opportunity for students to gain pertinent experience to work in a broad range of careers such as in industry positions in mining, petroleum, hydrology, geophysics, agriculture, and environmental consulting, as well as in education and at federal, state, and local governmental agencies in the state. In addition to these traditional occupations, the degree provided students with the fundamental knowledge and skill base for alternative careers such as, for example, surveyors, cartographers and photogrammetrists, or urban and regional planners. These occupations will advance the state economy by providing qualified students to perform the jobs that went unfilled due to lack of expertise.

Reviewer Comments


Ken Udas (kudas) (Mon, 09 May 2022 16:33:26 GMT): Changed “Self Support” from YES to NO following consultation with the department head.

David Barnes (dabarnes) (Tue, 10 May 2022 20:14:57 GMT): Rollback: Rollback for edits at the request of the department.

David Barnes (dabarnes) (Tue, 10 May 2022 21:12:02 GMT): Approved for 225 Chair at the request of Alistair Smith.

Rebecca Frost (rfrost) (Mon, 10 Oct 2022 19:39:20 GMT): Updated degree maps to take into account typically offered and to ensure all required courses are included. Maps are also requiring upper-division coursework starting in the second year which is not recommended for students. There is enough room within electives to move this work further down in the plan if the department would be so inclined.

Key: 475
476: ENVIRONMENTAL HYDROGEOLOGY ACADEMIC CERTIFICATE

In Workflow
1. Geol/Geog Review (renee@uidaho.edu)
2. 225 Chair (alistair@uidaho.edu)
3. 19 Curriculum Committee Chair (markn@uidaho.edu)
4. 19 Dean (gingercarney@uidaho.edu)
5. Provost’s Office (kudas@uidaho.edu; mstout@uidaho.edu; jvalkovic@uidaho.edu; gwen@uidaho.edu)
6. Curriculum Review (sstubbs@uidaho.edu)
7. Degree Audit Review (rfrost@uidaho.edu)
8. Registrar’s Office (none)
9. Ready for UCC (disable)
10. UCC (none)
11. Faculty Senate Chair (mstout@uidaho.edu; jvalkovic@uidaho.edu; cari@uidaho.edu)
12. State Approval (mstout@uidaho.edu; jvalkovic@uidaho.edu; lindalundgren@uidaho.edu)
13. NWCCU (sara@uidaho.edu; mstout@uidaho.edu)
14. Theodore Unzicker (tunzicker@uidaho.edu)

Approval Path
1. Tue, 05 Apr 2022 22:46:42 GMT
   Renee Jensen-Hasfurther (renee): Approved for Geol/Geog Review
2. Tue, 05 Apr 2022 22:51:26 GMT
   Alistair Smith (alistair): Approved for 225 Chair
3. Mon, 09 May 2022 07:52:55 GMT
   Mark Nielsen (markn): Approved for 19 Curriculum Committee Chair
   Ginger Carney (gingercarney): Approved for 19 Dean
5. Tue, 10 May 2022 16:16:32 GMT
   Dean Panttaja (panttaja): Approved for Provost’s Office
   Steve Stubbs (sstubbs): Approved for Curriculum Review
   Rebecca Frost (rfrost): Approved for Degree Audit Review
8. Wed, 05 Oct 2022 20:08:23 GMT
   Steve Stubbs (sstubbs): Approved for Registrar’s Office
9. Wed, 26 Oct 2022 17:03:34 GMT
   Theodore Unzicker (tunzicker): Approved for Ready for UCC
10. Wed, 02 Nov 2022 16:22:54 GMT
    Theodore Unzicker (tunzicker): Approved for UCC

New Program Proposal
Date Submitted: Fri, 25 Mar 2022 22:03:44 GMT

Viewing: 476 : Environmental Hydrogeology Academic Certificate
Last edit: Wed, 05 Oct 2022 19:24:28 GMT
Changes proposed by: Renee Love

Faculty Contact

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Faculty Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renee Love</td>
<td><a href="mailto:rlove@uidaho.edu">rlove@uidaho.edu</a></td>
</tr>
</tbody>
</table>

Will this request have a fiscal impact of $250K or greater?
No

Academic Level
Undergraduate
College
Science

Department/Unit:
Earth & Spatial Sciences

Effective Catalog Year
2023-2024

Program Title
Environmental Hydrogeology Academic Certificate

Degree Type
Certificate

Please note: Majors and Certificates over 30 credits need to have a state form approved before the program can be created in Curriculum.

Program Credits
15

CIP Code
40.0601 - Geology/Earth Science, General.

Will the program be Self-Support?
No

Will the program have a Professional Fee?
No

Will the program have an Online Program Fee?
No

Will this program lead to licensure in any state?
No

Will the program be a statewide responsibility?
Yes

Financial Information

What is the financial impact of the request?
Less than $250,000 per FY

Note: If financial impact is greater than $250,000, you must complete a Program Proposal Form

Curriculum:

All required coursework must be completed with a grade of 'C' or better (O-10-a (https://catalog.uidaho.edu/general-requirements-academic-procedures/o-miscellaneous/)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>GEOL 309</td>
<td>Ground Water Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Groundwater Field Methods</td>
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<tr>
<td>HYDR 409</td>
<td>Quantitative Hydrogeology</td>
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<td>HYDR 412</td>
<td>Environmental Hydrogeology</td>
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<td>Choose one of the following:</td>
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<td>GEOL 428</td>
<td>Geostatistics</td>
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</tr>
<tr>
<td>GEOG 424</td>
<td>Hydrologic Applications of GIS and Remote Sensing</td>
<td></td>
</tr>
<tr>
<td>GEOL 431</td>
<td>Chemical Hydrogeology</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours
15

Courses to total 15 credits for this certificate
Distance Education Availability

To comply with the requirements of the Idaho State Board of Education (SBOE) and the Northwest Commission on Colleges and Universities (NWCCU) the University of Idaho must declare whether 50% or more of the curricular requirements of a program which may be completed via distance education.

Can 50% or more of the curricular requirements of this program be completed via distance education?
Yes

If Yes, can 100% of the curricular requirements of this program be completed via distance education?
No

Note: Existing programs transitioning from less than 50% of its curricular requirements to 50% or more of its requirements being available via distance education is considered a Group C change and must complete the program proposal formwork before these changes will be processed.

Geographical Area Availability

In which of the following geographical areas can this program be completed in person?
Coeur d'Alene
Moscow

Student Learning Outcomes

List the intended learning outcomes for program component. Use learner centered statements that indicate what will students know, be able to do, and value or appreciate as a result of completing the program.

1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
2. Ability to explain the physical nature of global climate change and the role of society in influencing and mitigating effects of climate change.

Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program component.

1. Students will develop an understanding of geologic and human systems through the study of Earth and human processes that interact across a wide range of spatial and temporal scales.
   · Success in introductory coursework that provides a foundation in the fundamental concepts in geological, physical and human systems, as evidenced by assignments, exams and final grades in 100-200 level courses (GEOG 100, GEOL 101, GEOL 102, GEOL 111, GEOG 165, GEOG 200)
   · Success in upper division coursework required in each option area as assessed by assignments, projects, exams and final grades
   · Ability to synthesize materials from lower and upper division courses and apply them to projects in senior capstone experiences, as assessed by student projects, assignments and final grades in GEOG 493 and GEOL 490
2. Students will develop skills applicable to the collection, integration, analysis, and illustration of data for solving spatial and temporal problems
   • Success in required courses in mathematics, statistics and geographic information science as evidenced by assignments and grades in MATH 143 (or higher), STAT 251 (or higher), GEOG 385
   • Success in applying and demonstrating these skills in the capstone experiences (GEOG 493 or GEOL 490) and other upper-division courses
3. Students will develop skills for communicating fundamental concepts in their field and results from their own work, in both written and oral settings.
   • Success in required coursework in written and oral communication (ENGL 317; Gen Ed Comm requirements)
   • Assessment of oral and written communication skills via writing assignments and project presentations in upper division courses and the senior capstone courses
1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
   • Ability to successfully acquire, analyze, synthesize, and present hydrologic information in lab and field exercises in upper division courses such as GEOL 410, GEOG 412, GEOG 424, HYDR 409, and the capstone course (GEOG 493 or GEOL 490), as assessed by classroom and field-based projects and assignments.
2. An understanding of the physical nature of global climate change, its impacts, and the role of society in influencing and mitigating effects of climate change.
   • Success in upper division courses such as GEOG 313, GEOG 401, GEOG 435, GEOG 317, GEOG 430, as assessed by performance on assignments, projects and exams
How will you ensure that the assessment findings will be used to improve the program?
Our assessment process will also consist of 4 overarching activities that will contribute to both the assessment of specific learning outcomes noted above, as well as the long-term evaluation and refinement of goals, objectives and learning outcomes for the ESS program.

1. **Student Evaluations of Courses and Instructors**
   Course evaluations allow students to evaluate both the course and the instructor and provide the department with information regarding course utility in meeting the student's needs.

2. **Survey of Graduating Seniors**
   An online exit survey of all graduating seniors will be implemented to provide information on general student satisfaction with the degree program, courses, faculty and facilities. This information will be collected anonymously.

3. **Internal and External Review**
   The Department of Earth and Spatial Sciences will conduct a biennial review of course offerings and course goals for alignment with department learning outcomes. This self-review will allow the faculty to reassess the program and its direction as well as its goals and objectives. An external review will be conducted every 5-7 years to provide the department with guidance for future decisions on how to support, maintain, and advance the department according to its vision and to fulfill the university's goals.

4. **Advisory Board**
   An advisory board will be implemented to provide input and advice on the department's objectives and evolution. The advisory board will consist of industry and government members primarily consisting of department alumni. Annual meetings with the advisory board will allow for the presentation of accomplishments and ongoing activities in research and academic progress for which the board can synthesize and present recommendations for improvement.

**What direct and indirect measures will be used to assess student learning?**
See above

**When will assessment activities occur and at what frequency?**
Annually

**Student Learning Outcomes**

**Learning Objectives**
1. Comprehension of the hydrologic cycle and the ability to measure and interpret basic physical and biochemical aspects of water associated with hydrologic processes.
2. Ability to explain the physical nature of global climate change and the role of society in influencing and mitigating effects of climate change.

**Rationale for the proposed change. Include an explanation of how the department will manage the added workload, if any.**
This was an option for Geological Sciences degree. Due to merging departments with the Department of Geography, we have combined our undergraduate majors and have decided that this would be best offered as a certificate, instead of an option.

**Reviewer Comments**

Ken Udas (kudas) (Mon, 09 May 2022 16:33:48 GMT): Changed "Self Support" from YES to NO following consultation with the department head.

Rebecca Frost (rfrost) (Wed, 05 Oct 2022 19:24:28 GMT): Added 'Academic Certificate' to program name to remain consistent with naming conventions. Adjusted curriculum to meet catalog layout requirements. Added Regulation O-10-a statement.

Key: 476
All policies must be reviewed, approved, and returned by the policy sponsor, with a cover sheet attached, to ui-policy@uidaho.edu.

**Faculty Staff Handbook (FSH)**
- ☐ Addition X Revision* ☐ Deletion* ☐ Minor Amendment

Policy Number & Title: **FSH 3065 AFFIRMATIVE ACTION AND EQUAL EMPLOYMENT OPPORTUNITY HIRING**

**Administrative Procedures Manual (APM)**
- ☐ Addition Revision* ☐ Deletion* ☐ Interim ☐ Minor Amendment

Policy Number & Title: **None.**

*Note: If revision or deletion, request original document from ui-policy@uidaho.edu. All changes must be made using “track changes.”

Originator: Elissa Keim, Director Employee Development & Workforce Diversity

Policy Sponsor, if different from Originator:

Reviewed by General Counsel ☐ Yes X No ☐ Name & Date:

1. **Policy/Procedure Statement:** Briefly explain the reason for the proposed addition, revision, and/or deletion.

   Update to policy to reflect correct names of responsible offices and update processes.

2. **Fiscal Impact:** What fiscal impact, if any, will this addition, revision, or deletion have?

   None.

3. **Related Policies/Procedures:** Describe other UI policies or procedures related or similar to this proposed change, or that will be impacted by it.

   None.

4. **Effective Date:** This policy shall be effective on July 1, or January 1, whichever arrives first after final approval (see FSH 1460 H) unless otherwise specified.
AFFIRMATIVE ACTION AND EQUAL EMPLOYMENT OPPORTUNITY HIRING

LAST REVISION: July 2020 (editorial) January 2023

CONTENTS:
A. Policy
B. Definitions
C. Affirmative Action Process

A. POLICY. The University of Idaho is an equal opportunity and affirmative action employer. It is the policy of the regents that equal opportunity be afforded in education and employment to qualified persons regardless of race, color, national origin, religion, sex, age, disability, or status as a disabled veteran or Vietnam-era veteran. See RGP II.P.1. and RGP II.P.2. It is also the policy of the University of Idaho to not discriminate based on sexual orientation.

A-1. Scope of this policy. This policy specifically applies to faculty, classified, and exempt positions. However, a good faith effort to follow and document affirmative action and equal opportunity procedures for all positions should be made, including student and temporary hires. With the exception of students applying for the work-study program, postdoctoral fellows, or teaching/research assistants, anyone who is seeking UI employment should be directed to Human Resources website https://www.uidaho.edu/human-resources/forms, to view all available openings. (Applications for work-study are taken at the Student Financial Aid Office. Teaching and research assistant appointments are made in the academic units.) For more information on postdoctoral fellowships or exceptions to this policy, contact the Director of the Office of Civil Rights and Investigations Employment Equity and Compliance at (208) 885-4285. The Director of Employment Equity and Compliance the Office of Civil Rights and Investigations approves all job descriptions for postdoctoral fellows, as well as the recruitment, selection, and offer of all postdoctoral positions.

B. DEFINITIONS.

B-1. Open Search. An open search is defined as a search that is open to all applicants and is publicly advertised for an appropriate time period to allow applicants equal opportunity to apply. Classified searches are posted for a minimum of two weeks and faculty and exempt positions are posted for a minimum of four weeks. The UI has limited criteria for exceptions to open searches or reducing the recruitment period. Hiring departments must contact the Director of Employment Equity and Compliance the Office of Civil Rights and Investigations at (208) 885-4285 to determine if there may be exceptions to the open competitive search process, including UI-only searches. Waivers or exceptions to the open competitive process must be in writing from the Director of Employment Equity and Compliance the Office of Civil Rights and Investigations and kept in the search file in the event of an audit.


B-3. Minorities and Persons of Color. The terms “minorities” and “persons of color” refer to members of certain racial and ethnic groups. Persons who are nonresident aliens of Black, Hispanic, or Asian descent are not included in this definition and are not included among the protected-group applicants listed on forms required by this policy. For the purposes of this policy, minorities and persons of color are further defined as follows:

Commented [KE(1)]: Post Doc job descriptions are run through Human Resources, and since 2016, following a formal recruitment process has been optional.
UI FACULTY-STAFF HANDBOOK
Chapter III: EMPLOYMENT INFORMATION CONCERNING FACULTY AND STAFF
Section 3065: Affirmative Action and Equal Employment Opportunity Hiring

a. “American Indian or Alaskan native or Native American”—all persons having origins in any of the original peoples of North America and who maintain cultural identification through tribal affiliation or community recognition.

b. “Black (not of Hispanic origin)” — all persons having origins in any of the black racial groups of Africa.

c. “Hispanic”—all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

d. “Asian”—all persons having origins in any of the original peoples of the Far East (including the Indian subcontinent and Southeast Asia, but not the Middle East).

e. “Hawaiian Native or other Pacific Islander”—all persons having origins in any of the original peoples of the Pacific Islands.

B-4. Persons with Disabilities. The term “disability” refers to the condition of a person who (a) has a physical or mental impairment that substantially limits one or more major life activities, (b) has a record of such an impairment, or (c) is regarded as having such an impairment. Federal law may further modify this definition.

B-5. “Status as a Vietnam-era veteran” refers to a person who served on active duty in the armed forces during the period from August 5, 1964, through May 7, 1975.

B-6. Affirmative Action Coordinators. Each college or administrative unit has an affirmative action coordinator. The coordinators provide knowledge and expertise to (a) explain affirmative action requirements to members of search committees and others who express interest or concern, (b) help search committees develop the required documentation for recruitment and screening procedures, and (c) brief the Director of Employment Equity and Compliance on issues that arise during the search process related to affirmative action and equal opportunity employment. The Director of Employment Equity and Compliance may delegate selected responsibilities to affirmative action coordinators.

B-7. Search Committee. The search committee should consist of at least three people, but five to six people are recommended. It is not necessary that all members of the committee be faculty or staff from within the hiring department or unit, but it is important that the search committee be as diverse as possible. Gender balance and racial/ethnic representation are to be attempted if at all possible. The committee composition must be reviewed and approved by the unit department head and the Director of Employment Equity and Compliance. Further definition of the scope and responsibility of the committee may be determined by the hiring dean or unit administrator.

B-8. Forms. Forms related to the affirmative action hiring procedure and those suggested for use in selection are available electronically from Employment Equity and Compliance. (See https://www.uidaho.edu/human-resources/forms).

C. AFFIRMATIVE ACTION PROCESS.

C-1. Recruitment. Recruitment for all positions at the UI must be conducted in full compliance with UI’s affirmative action and equal employment opportunity procedures (below) and with the requirements of all applicable immigration and naturalization laws (see FSH 3070). To ensure compliance with applicable laws and reporting requirements, all searches must be entered into the applicant tracking system. The chair of every search committee should be familiar with the affirmative action and equal employment opportunity requirements of the UI. The chair should also consult with the Director of Employment Equity and Compliance for assistance in conducting a search that maximizes the potential for attracting a diverse pool of applicants. A signed Position Authorization Form, must be obtained from the President, Provost, or Vice President, as applicable, prior to initiating recruitment. The Director of Employment Equity and Compliance will review and approve all recruitment materials before announcement is made of any position vacancy, including any to be filled on a part-
time or temporary basis, e.g., a sabbatical replacement. Failure to secure necessary approvals from the Director of Employment Equity and Compliance or Employment Services will result in nullification of the process and attempted hire. Employment Equity and Compliance will assist with the development of results-oriented job descriptions, recruiting, advertising, and collection of applications. Recruitment materials must include:

a. **Search Firms.** When used, search firms are required to comply with all state and federal laws, as well as UI and Regents policies regarding affirmative action and equal employment opportunity. The chair of the search is responsible for disseminating the internal policies to the search firm and ensuring they are followed. The positions are recruited in the same manner as similar positions and are subject to the same approvals and documentation.

b. **Salary Range.** An appropriate salary range is defined initially, but need not be advertised to potential applicants.

c. **Text of Announcement and Advertisement.** Vacancy announcements appear in the Idaho Register and/or on the Human Resources’ (HR) website in the applicant tracking system, as well as in other media and websites. The announcement is made available to each applicant. It documents that UI has communicated to applicants the qualifications on which they will be judged. It is also the basis for the screening forms. The form of the announcement may vary, but it must include the basic components that are noted on the vacancy announcement outline (See https://www.uidaho.edu/human-resources/forms) and shall be consistent with the job description. The “minimum” or “essential” qualifications must be the absolute minimum that would be acceptable in an applicant; once defined, they are inflexible. An applicant who does not possess these qualifications cannot be interviewed or hired. “Preferred” or “desirable” (or “marginal”) qualifications include any and all attributes believed to be desirable for the position. A candidate may not possess all of the “preferred” characteristics; nevertheless, any specific attribute that might be a reason for preferring one candidate over another should be included as a basis for ranking. When applicants self-identify as disabled under the definition of ADA and indicate they can, with reasonable accommodation, perform the essential functions of the position, UI has a duty to attempt reasonable accommodation under the ADA. The announcement must include the statement, “To enrich education through diversity the University of Idaho is an equal opportunity/affirmative action employer.” If a background check, education verification or post offer medical screen is required for the position, it must be stated in the announcement. The advertisement is an abbreviation of the vacancy announcement and, at a minimum, must contain the job title, closing date, contact information, and the tagline “AA/EOE.”

d. **Statement of Distribution of Announcement and Advertisement.** Departments may place paid advertisements in newspapers and journals, and/or mailing announcements to institutions that grant degrees to potential applicants or post on professional society websites or listservs. The hiring department shall send announcements to any known organizations representing the interests of minorities and women within the discipline or field, e.g., Women in Science. Employment Equity and Compliance can assist with the identification of such groups and can assist with the placement of advertisements. Due to the quantity of advertisements placed by the University of Idaho, a centralized placement of many times savings can be realized by centralizing the placement of advertisements has been established by Employment Equity and Compliance. Employment Equity and Compliance will provide a standard description of the university and its setting to ensure consistency in advertising.

e. **Dates of Recruitment.** The period of recruitment should be discussed with the Director Employment Equity and Compliance to ensure that reasonable time is allowed to recruit a diverse pool of candidates. The recruitment period may be shortened, provided that the departmental administrator furnishes the reasons for doing so and assurance that any extra efforts necessary to recruit thoroughly in the time available will be made.

f. **Job Description.** All positions require an up-to-date job description. Standard electronic forms are available for this purpose.
1. The position job description for non-faculty positions must be created using the Results Oriented Job Description (ROJD) and University of Idaho Job Description (UIJD) form available for downloading at the Human Resources Website at https://www.uidaho.edu/hr/policies/forms in the applicant tracking system. If a description of and the qualifications for the position have not been established, the departmental administrator in consultation with Employment Services will define these and the salary range. An Employment Services approved ROJD/UIJD is required prior to the initiation of search proceedings. Faculty positions must have a position description using the format set forth in FSH 3050.

2. The Americans with Disabilities Act of 1990 (ADA) requires job descriptions to identify “essential or non-marginal functions” and “non-essential or marginal functions” of positions. When positions are established or vacant, departmental administrators shall consult with Employment Services to ensure that job descriptions are in full compliance with ADA provisions. This HR review precedes the beginning of the recruitment process.

g. Application Form. The standard UI application form for classified positions is available through the applicant tracking system on the referenced HR website. Those not completing their application materials electronically may submit the equivalent information to the contact listed on the announcement via hard copy, by the closing date. The Required Applicant Disclosure Form and Affirmative Action Form are available from the Affirmative Action Coordinators for those not completing their application materials on-line.

h. Affirmative Action Form. The chair of the search committee must ensure that all applicants have access to complete on-line or are given or sent the Affirmative Action form inviting applicants to identify themselves as members of protected groups. Applicants may choose not to provide such information, but UI has a responsibility to request it.

C-2. Selection. Screening forms are used to document the comparison of candidates. They are based on the qualifications specified in the announcement. As a result of preliminary screening, the pool of candidates who meet minimum qualifications is established. Forms used for this purpose should show the basis for numerical values assigned to weighting and judgment factors. Both the required and the preferred qualifications should be evaluated, but the weights assigned to various criteria may vary. Selection forms document the date of the evaluation, the signature of the evaluator, and comments that supplement or explain numerical scores and should be completed in ink. The hiring unit may conduct other job-related evaluations, after consultation with Employment Equity and Compliance or designee. The Director for Employment Services or Employment Equity and Compliance or designee is responsible for reviewing any supplemental application evaluation material the hiring department wants to use in the screening process.

a. Preliminary Screening. Employment Services conducts preliminary screening for classified positions. All other searches, The search committee chair or the hiring manager may designate a member of the committee, or other person designated by the committee, to conduct a preliminary screening based on minimum/required qualifications that can be readily and unquestionably assessed on a yes-or-no basis. The disqualified applications should be made available for review by members of the search committee. In addition, the applications of known protected-group members that are disqualified in the preliminary stage will be reviewed electronically by the Director of the Office of Civil Rights and Investigations. of Employment Equity and Compliance or designee.

b. Intermediate Screening. Intermediate screening is conducted to make distinctions among the qualified candidates in this applicant pool in an adequate manner. Each committee member should complete a screening form for each applicant retained in the pool so that meaningful comparisons can be made. Comments explaining the ratings should be entered on the form. Committee members should work independently without access to the evaluations completed by others and should be cautioned to refrain from making any written comments on the applicants’ resumes, reference letters, or other application materials. Following the independent evaluations, it is appropriate that the selection committee meet as a group to compare and discuss the candidates. The final recommendation should reflect committee consensus rather than a mere collection of individual opinions. If new interpretation or insight has resulted from committee discussions, a committee member may change a candidate’s rating forms and such changes should be entered in ink, initialed, and dated on the same form with the
original ratings. It is important to record and keep minutes of the committee discussion of applicants.

c. Review of Preliminary and Intermediate Screening Procedures. The Director of the Office of Civil Rights and Investigations—Employment Equity and Compliance or designee will review and approve electronically all screening procedures (see C-1. h) prior to the interview phase. In the case of faculty hiring, the Director of the Office of Civil Rights and Investigations—Employment Equity and Compliance or designee cannot approve proceeding to interviews until the Office of the Provost has had an opportunity to review the credentials of all finalists. Completion of these procedures will constitute a record of the applicants considered and reasons for having eliminated protected-group members. Reasons given for the rank ordering or elimination of applicants should be directly related to the qualifications listed on the announcement. Though numerical scores or numerically based rank-order are a part of the explanation, they should be supported by additional narrative. Reasons should be stated in comparative terms so that differences between candidates are readily apparent. Comments in the applicant tracking system should be complete and detailed so that they will stand alone as an explanation for the results in selection, apart from applicants’ folders, which are retained in the hiring department. The completed comments shall be submitted via the online applicant tracking system electronically to the Director of the Office of Civil Rights and Investigations and Employment Services through the Affirmative Action Coordinator—Employment Equity and Compliance or designee. It is recommended that the files, including preliminary and intermediate selection forms, for all finalists and protected-group members be available for reference for five years.

d. Interviews. Questions and discussions during interviews must be confined to clearly job-related topics; consistency in interviews is important and there must be a procedure for documenting the re-evaluation of candidates on the basis of the interview. Members of the search or screening committee should document their evaluation of each candidate interviewed. Telephone interviews may be conducted provided that they follow a structured outline that provides for rating of the applicant’s responses; conference calls should be arranged so that more than one person can take part in evaluating the applicant; also, some of the same evaluators should be involved in all of the interviews. For a list of acceptable and unacceptable interview inquiries visit www.uidaho.edu/diversityandhumanrights.

e. Reference and Background Checks. The committee is responsible for checking references and contacting the potential employee regarding conducting criminal history background checks, education verification and post-offer medical screens, when appropriate. See APM 50.16 and 50.19. Employment Services will work with the appropriate resources to conduct the criminal history background checks and education verifications and provide the information necessary for the potential employee to complete a post-offer medical screen. If a criminal history background check and/or education verification and/or a post-offer medical screen is necessary for the position, the potential employee may not begin the job until Human Resources has received satisfactory results.

f. Final Selection. Completion and on-line submission of the final selection to the Director of the Office of Civil Rights and Investigations and Employment Services—Employment Equity and Compliance or designee precedes receipt of approval to offer the position.

g. Offer of Position. The Affirmative Action approval by the Director of Employment Equity and Compliance or designee the Office of Civil Rights and Investigations indicates affirmative action procedures have been completed. After receiving approval to offer from Employment Services, the offer is approved by the hiring college or unit administrator following established procedures in the college or unit.

C-3. Retention of Files. Hiring records, including job advertisements, applications and resumes, selection forms, minutes of meetings in which applicant qualifications are discussed, letters of reference, and interview notes, are to be retained by the hiring department for five years from the effective date of hire or close of the search when no hire is made.
Amended July 2020. Made references concordant with Board Policies, and updated office names.

Amended July 2009. Editorial changes to sections A-1, B-1, B-6, B-7, C-1, and C-2.

Amended January 2008. Substantial revises made to sections A, B-1, B-2, B-3, B-6, B-7, B-8, C-1, C-2, and C-3. Added section A-1, C-1. a, and C-1. f. 1 and 2. Made minor editorial changes to B-3.

Amended January 2006. Revised C-1. e and B-8, and made editorial changes.


Amended July 1997. Revised C-1. c and d, and C-2. d.

Adopted 1979.
POLICY COVER SHEET
For instructions on policy creation and change, please see https://www.uidaho.edu/governance/policy

All policies must be reviewed, approved, and returned by the policy sponsor, with a cover sheet attached, to ui-policy@uidaho.edu.

Faculty Staff Handbook (FSH)
☐ Addition ☐ Revision* ☐ Deletion* ☐ Emergency ☐ Minor Amendment
Policy Number & Title:

Administrative Procedures Manual (APM)
XAddition ☐ Revision* ☐ Deletion* ☐ Emergency ☐ Minor Amendment
Policy Number & Title: APM 01.01 Office of General Counsel

*Note: If revision or deletion, request original document from ui-policy@uidaho.edu. All changes must be made using “track changes.”

Originator: Diane Whitney, University Policy and Compliance Coordinator
Policy Sponsor, if different from Originator: Kent Nelson, Acting General Counsel

Reviewed by General Counsel X Yes ___No Name & Date: Kent Nelson, 11/11/22

1. Policy/Procedure Statement: Briefly explain the reason for the proposed addition, revision, and/or deletion.

   The purpose of this policy is to outline the function and authority of the Office of General Counsel, including retention of outside counsel, acceptance of service of process, and responding to subpoenas, public record requests, and similar requests for information.

2. Fiscal Impact: What fiscal impact, if any, will this addition, revision, or deletion have?

   None.

3. Related Policies/Procedures: Describe other UI policies or procedures related or similar to this proposed change, or that will be impacted by it.

   None.

4. Effective Date: This policy shall be effective on July 1, or January 1, whichever arrives first after final approval (see FSH 1460 D) unless otherwise specified in the policy.
APM 01.01
Office of General Counsel

A. Purpose. The purpose of this policy is to outline the function and authority of the University of Idaho Office of General Counsel (OGC).

B. Scope. This policy applies to all employees and students at the University of Idaho.

C. Policy

C-1. Responsibility. The OGC provides advice and legal services to the University of Idaho and all of its colleges, divisions, units, and related entities, on the broad range of legal matters affecting the University. The OGC represents the University of Idaho and may not represent individual employees or students except when these individuals are named as defendants in litigation as a result of actions or omissions within the course and scope of their employment or institutional representation. For personal legal advice, employees and students should consult a private attorney.

C-2. Retention of Outside Counsel. Due to the volume or to the specialized nature of legal services required by the University, it will sometimes be necessary to hire the services of attorneys outside of the OGC to represent the University. All outside legal counsel must be retained by the General Counsel, regardless of the source of funds that will pay for the outside legal counsel. Legal services to be rendered by any outside attorney shall be limited to the scope of services approved by the General Counsel, and the scope of services shall not be expanded without prior approval of the General Counsel.

C-3. Service of Process. Only the General Counsel or their designee shall accept service of legal process on behalf of the University. If an individual asks an employee or student to accept receipt of legal papers on the University’s behalf, the employee or student shall decline acceptance of the documents and direct the individual to the OGC.

C-4. Subpoenas and Other Requests for Information. The OGC manages the response to subpoenas and other requests for information, such as public record requests, to ensure compliance with privacy and other legal obligations. If an individual asks an employee or student to accept a subpoena or similar request for information, the employee or student shall decline acceptance of the documents and direct the individual to the OGC. Other requests for information, whether written or verbal, should be directed to the OGC.