ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE CERTIFICATE

The completed and signed proposal should be submitted by the Dean's Office to: curriculumplanning@asu.edu.

Before academic units can advertise undergraduate certificates or include them in their offerings as described in the university catalogs, they must be recommended for approval by the Senate Curriculum and Academic Programs Committee and the University Senate, and be approved by the Office of the University Provost.

Definition and minimum requirements:

These are the minimum requirements for approval. Individual undergraduate certificates may have additional requirements.

An undergraduate certificate is a programmatic or linked series of courses from a single field or one that crosses disciplinary boundaries and may be freestanding or affiliated with a degree program. The certificate provides a structured and focused set of courses that can be used to enhance a student's baccalaureate experience or professional development.

An undergraduate certificate program:

- Requires a minimum of 15 credit hours of which at least 12 credit hours must be upper division
- Requires a minimum grade of "C" or better for all upper-division courses
- Consists of courses that must directly relate in whole or large part to the purpose of the certificate. Example: Geographic area certificates must include only courses specific to the title of the certificate, other than a non-English language
- Is cross disciplinary; or,
    - Certified by a professional or accredited organization/governmental agency; or,
    - Clearly leads to advanced specialization in a field; or,
    - Is granted to a program that does not currently have a major

College/School/Institute:	College of Liberal Arts and Sciences
Department/Division/School:	School of Earth and Space Exploration
Proposed certificate name:	Field Geology
Requested effective date:	Spring 2019

Delivery method and campus or location options: select all locations that apply

☐ Downtown Phoenix ☐ Polytechnic ☒ Tempe ☐ Thunderbird ☐ West ☐ Other: _____

☐ **Both** on-campus **and** ☐ ASU Online* - (check applicable campus(es) from options listed above)

☐ ASU Online only (all courses online and managed by ASU Online)

Note: Once students elect a campus or online option, students will not be able to move between the on-campus and the ASU Online options. Approval from the Office of the University Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online. Please contact Ed Plus then complete the ASU Online Offering form in Curriculum ChangeMaker to begin this request.

Proposal Contact

Name:	Duane E. DeVecchio	**Title:**	Assistant Research Professor
Phone number:	480-727-2636	**Email:**	ddevecch@asu.edu

DEAN APPROVAL(S)

This proposal has been approved by all necessary unit and College/School levels of review. I recommend implementation of the proposed organizational change.

College/School/Division Dean name:

Signature _____ **Date:** 4/18/18 /20

College/School/Division Dean name:
(if more than one college involved)

Signature _____ **Date:** / /20

1. Overview

Provide a brief description of the new certificate.

The certificate in field geology prepares undergraduate students with the core knowledge-base and field experience to identify, describe, collect and interpret a variety of types of geological field data. A strong field-based background is required for many entry-level jobs in resource mining, geotechnical, and environmental consulting companies, as well as being strongly desired for many graduate research programs in the earth sciences.

A. This proposed certificate (check one):

- ☐ is cross disciplinary; or
- ☐ is certified by a professional or accredited organization/governmental agency; or,
- ☒ clearly leads to advanced specialization in a field; or,
- ☐ is granted to a program that does not currently have a major

B. Why should this be a certificate rather than a concentration or a minor?

The proposed plan of study is best offered as a certificate rather than a concentration or minor due to the nature of the coursework and the student population that will be interested in completing the program. The principal source of students for the program will be current and former degree-seeking Earth and Space Exploration (ESE) students with a concentration in geological sciences. Consequently, these students would be ineligible for the program if it were to be offered as a concentration because they are already participating(ed) in a concentration. These same students would also be ineligible to participate if the program were offered as a minor because two of the required program courses (Field Geology II (GLG452)) and Structural Geology (GLG310) are also required courses for the ESE degrees with a concentration in geological sciences. Therefore, the program is best offered as a certificate, designed to strengthen field-based observation, data collection, and reporting for students interested in pursuing graduate school or careers within the geological sciences where extensive field experience is often necessary.

C. Affiliation

If the certificate program is affiliated with a degree program, include a brief statement of how it will complement the program. If it is not affiliated with a degree program, incorporate a statement as to how it will provide an opportunity for a student to gain knowledge or skills not already available at ASU.

Although enrollment in the certificate in field geology program will not be limited to Earth and Space Exploration (ESE) students, prerequisites for the required and elective certificate courses will likely limit involvement in the program to either current or past ESE students concentrating in the geological sciences or non-degree seeking students with significant geologic experience. As such, the certificate in field geology has been designed to provide necessary training for a subset of individuals, either past or current students of geology, who wish to hone or develop their field-based geologic skills, which are necessary for many geoscience careers and/or acceptance into earth science graduate programs.

D. Demand

Explain the need for the new certificate (e.g., market demand, interdisciplinary considerations).

With a job outlook for geoscientists increasing at a rate faster than other job averages (>10% by 2024), the need for well-trained individuals with B.S Degrees in geology is clear. Fundamental to this training is the ability to understand, analyze and interpret field data, as well as the ability to conduct field work, which is exemplified by nearly all of the typical duties of geoscientists defined in the U.S. Bureau of Labor Statistic. In addition, graduating B.S students with strong field skills are more competitive at the more than 200 field-based geoscience graduate programs nationwide. Furthermore, broadening of undergraduate geologic curricula over the past 15 years (including ASU), has resulted in students who lack these fundamental skills, which the certificate in Field geology helps to address.

E. Projected enrollment
What are enrollment projections for the first three years?

	1st Year	2nd Year (Yr. 1 continuing + new entering)	3rd Year (Yr. 1 & 2 continuing + new entering)
Number of Students (Headcount)	20	35	75

2. Support and Impact

A. Faculty governance
Attach a supporting letter from the chair of the academic unit verifying that the proposed certificate has received faculty approval through appropriate governance procedures in the unit and that the unit has the resources to support the certificate as presented in the proposal, without impacting core program resources.

See attached letter from J. Ramon Arrowsmith, Professor of Geology and Deputy Director, School of Earth and Space Exploration.

B. Other related programs
Identify other related ASU programs and outline how the new certificate will complement these existing ASU programs. (If applicable, statements of support from potentially affected academic unit administrators need to be included with this proposal submission.)

N/A

C. Letter(s) of support
Provide a supporting letter from each college/school dean from which individual courses are taken.

3. Academic Curriculum and Requirements

A. Knowledge, competencies, and skills
List the knowledge, competencies, and skills (learning outcomes) students should have when they complete this proposed certificate. Examples of program learning outcomes can be found at (https://uoeee.asu.edu/assessment).

Outcome1.1: Recipients of the Certificate in Field Geology will demonstrate the ability to collect, synthesize, and present geologic field data.

-Measure1.1: Structural Geology (GLG310) lab section

--Performance Criterion1.1: 80% will earn an average grade of “B” or better on the lab rubrics.

-Measure1.2: Structural Geology (GLG310) final independent field-based project and presentation

--Performance Criterion1.2: 80% will earn a grade combined grade of “B” or better on the project and presentation.

-Measure1.3: Advanced Field (GLG464) final report.

--Performance Criterion1.3: 80% will earn a grade combined grade of “B” or better on the course final report.

Outcome2.1: Recipients of the Certificate in Field Geology will demonstrate the ability to create a geologic map from field observations and data collection, and present the map and its interpretations in a written and illustrated technical report.

-Measure2.1: Capstone project in Field Geology II (GLG452).

--Performance Criterion2.1: 80% will earn a grade of “B” or better on the capstone map project rubric.

-Measure2.2: Capstone project in Field Geology II (GLG452).

--Performance Criterion2.2: 80% will earn a grade of "B" or better on the capstone project written report and supporting illustrations.

Outcome3:1 Recipients of the Certificate in Field Geology will demonstrate and showcase overall mastery of field-based geologic techniques, across several subdisciplines, through high-performance academic success and creation of a learning portfolio.

-Measure3.1: Fifteen units of course work; three upper-division mandatory courses, and two upper-division elective course selected from a list of sub-disciplines (15 units required).

--Performance Criterion3.1: 80% will earn a course grade of "B" or better for all coursework applied to 15-unit certificate requirement.

-Measure3.2: Creation of an ASU Digital Portfolio that documents student learning across certificate requirements, that includes: a philosophy of field-based geologic investigations, and evidence, assessment, and reflections on learning for all courses fulfilling certificate requirements.

--Performance Criterion3.2: Recipients of the certificate will earn a grade of "Satisfactory" on all elements of the Portfolio rubric.

-Meausre3.3: Alumni and graduating student survey item related to 1) how closely related is the student's position to earth science and/or 2) current graduate school enrollment status

--Performance Criterion3.3 80% or more of the students indicate that they are employed in a "closely related" or "somewhat related" field, and/or are accepted into graduate school.

B. Enrollment criteria

Describe the procedures and any qualifications for enrollment in the proposed certificate. If they are identical to the admission criteria for the existing major and degree program under which this certificate will be established, please note that.

Students must be admitted to an undergraduate degree program or already have completed a bachelor's degree from ASU or another institution in order to enroll in this certificate. Additional enrollment requirements include completion of the following courses or their equivalencies with a C or better:

GLG 101 Introduction to Geology I (3 credits) and GLG103 Introduction to Geology I Lab (1 credit) or SES 121 Earth, Solar System and Universe (3 credits) and SES 123 Earth, Solar System and Universe Lab (1 credit), GLG 321 Mineralogy (3 credits), and GLG 451 Field Geology I (3 credits).

C. Program Map

Attach a copy of the "proposed" map for this certificate program. Instructions on how to create a "proposed certificate map" in BAMM can be found in the Build a Major Map Training Guide.

D. Curricular structure

Provide the curricular structure for this certificate. Be specific in listing required courses and specify the total minimum number of hours required for the certificate.

Required certificate courses				
Prefix	**Number**	**Title**	**Is this a new Course?**	**Credit Hours**
GLG	310	Structural Geology	No	3
GLG	452	Field Geology II	No	3
GLG	455	Advanced Field Geology	No	3
			Section sub-total:	9

Elective certificate courses				
Prefix	**Number**	**Title**	**Is this a new Course?**	**Credit Hours**
GLG	362	Geomorphology	No	3
GLG	420	Volcanology	No	3
GLG	424	Petrology	No	3
GLG	435	Sedimentology	No	3
GLG	489	Field Geochemistry	No	3
			Section sub-total:	6

Other certificate requirements **E.g. –** Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable	**Credit Hours**
N/A	
Section sub-total:	
Total minimum credit hours required for certificate	**15**

E. Minimum residency requirement
How many hours of the certificate must be ASU credit?

A minimum of 9 credit hours must be completed at ASU. Credit hours not completed at ASU must be approved for use with the certificate in field geology.

F. New courses
Provide a brief course description for each new course.

None.

Note: All new required courses should be submitted in Curriculum Changemaker and ready for Provost's Office approval before this certificate is put on Curriculum and Academic Programs Committee (CAPC) agenda.

4. Administration and Resources

A. Administration

How will the proposed certificate be administered (including admissions, student advisement, retention, etc.)?

Administration of the certificate, including, admissions, student advisement and retention, will be handled by existing administrative support staff and by faculty mentors in the School of Earth and Space Exploration.

B. Resources

What are the resource implications for the proposed certificate, including any projected budget needs? Will new books, library holdings, equipment, laboratory space and/or personnel be required now or in the future? If multiple units/programs will collaborate in offering this certificate please discuss the resource contribution of each participating program. Letters of support must be included from all academic units that will commit resources to this certificate.

No additional resources or budget needs will be necessary to support the Field Geology Certificate.

C. Primary faculty

List the primary faculty participants regarding this proposed certificate. For interdisciplinary certificates, please include the relevant names of faculty members from across the University.

Name	**Title**	**Area(s) of Specialization as they relate to proposed certificate**
Duane DeVecchio	Assistant Research Professor	Sedimentology, field geology
Steve Reynolds	Professor	Structural geology, field geology
Kelin Whipple	Professor	Geomorphology
Tom Sharp	Professor	Field geology
Hilairy Hartnett	Associate Professor	Field Geochemistry
Christy Till	Assistant Professor	Petrology

5. Additional Materials

A. Complete and attach the Appendix document.

B. Provide one or more model programs of study (if appropriate).

C. Attach other information that will be useful to the review committees and the Office of the Provost.

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APPENDIX

OPERATIONAL INFORMATION FOR UNDERGRADUATE CERTIFICATES

(This information is used to populate the Degree Search/catalog website.

Please consider the student audience in creating your text.)

1. **Proposed Certificate Name:** Field Geology

2. **Marketing Description**
   Optional. 50 words maximum. The marketing description should not repeat content found in the program description.

   Students interested in geology-related careers, internships or graduate school opportunities will enhance their prospects with this field-based program that emphasizes necessary field-based geologic skills.

3. **Program Description (150 words maximum)**

   The certificate program in field geology prepares undergraduate students with the core knowledge-base and field experience to identify, describe, collect and interpret a variety of types of geological field data. A strong field-based background is required for many entry-level jobs in resource mining, geotechnical, and environmental consulting companies and is a strong asset for acceptance into many graduate research programs in the earth sciences.

4. **Contact and Support Information**

Building code and room number: (*Search ASU map*)	ISTB4, 795
Program office telephone number: (*i.e. 480/965-2100*)	480/965-5081
Program Email Address:	sese-advising@asu.edu
Program Website Address:	https://sese.asu.edu

5. **Program Requirements**
   Remember to attach a copy of the "proposed" map for this certificate program. Instructions on how to create a "proposed certificate map" in BAMM can be found in the Build a Major Map Training Guide.

6. **Enrollment Requirements**
   If applicable, list any special enrollment requirements applicable to this certificate in addition to the standard text. Enrollment requirements for all undergraduate certificates include the following text:

   A student pursuing an undergraduate certificate must be enrolled as a degree-seeking student at ASU. Undergraduate certificates are not awarded prior to the award of an undergraduate degree. A student already holding an undergraduate degree may pursue an undergraduate certificate as a nondegree-seeking graduate student.

   Additional enrollment requirements include completion of the following courses or their equivalencies with a C or better: GLG 101 Introduction to Geology I (3 credits) and GLG103 Introduction to Geology I Lab (1 credit) or SES 121 Earth, Solar System and Universe (3 credits) and SES 123 Earth, Solar System and Universe Lab (1 credit) AND GLG 321 Mineralogy (3 credits), and GLG 451 Field Geology I (3 credits).

7. **Delivery/Campus Information Options:** On-campus only (ground courses and/or iCourses)

   Note: Once students elect a campus or online option, students will not be able to move between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.

8. **Campus/Locations:** indicate **all** locations where this program will be offered.

☐ Downtown Phoenix ☐ Polytechnic ☒ Tempe ☐ Thunderbird ☐ West ☐ Other: _____

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The certificate requires a minimum of 15 credit hours. At least 12 credit hours must be completed in upper-division course work and at least 9 credit hours must be completed at ASU. At least six upper-division hours in the certificate must be completed in courses offered by the College of Liberal Arts and Sciences. A grade of "C" (2.00 on a 4.00 scale) or higher is required for each course used to fulfill a certificate requirement.

Required Courses -- 9 credit hours

GLG 310: Structural Geology (3)
GLG 452: Field Geology II (L) (3)
GLG 455: Advanced Field Geology (3)

Electives (choose two) -- 6 credit hours

GLG 362: Geomorphology (3)
GLG 420: Volcanology (3)
GLG 424: Petrology (3)
GLG 435: Sedimentology (3)
GLG 489: Field Geochemistry (L) (3)

Depending on a student's undergraduate program of study, prerequisite courses may be needed in order to complete the requirements of this certificate.

Courses not completed at ASU must be approved for use in this certificate.

ASU School of Earth and Space Exploration
Arizona State University

Tempe, AZ, 85287 USA
ramon.arrowsmith@asu.edu
480-965-3541

To: ASU Curriculum Planning
From: J Ramón Arrowsmith, Professor of Geology & Deputy Director, School of Earth and Space Exploration
Date: March 8, 2018
RE: Unit support for Certificate in Field Geology

The School of Earth and Space Exploration was formed in part from the ASU Department of Geology. This foundation includes a long history of research and training in the field. Field observations, sampling, and interpretation of geological and geomorphic relationships, patterns, and phenomena are essential in fundamental Earth science research as well as in the application of the knowledge for hazards, resource development, and other societal needs. In addition, employers of our students expect good skills in field geology.

The School of Earth and Space Exploration strongly supports this request for the Certificate in Field Geology. This certificate has been under discussion for nearly a year among the SESE Faculty and has their approval. We can support this certificate with existing faculty and staff resources.

Sincerely,

J Ramón Arrowsmith, Professor of Geology & Deputy Director, School of Earth and Space Exploration