ASU ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW MINOR

The completed and signed proposal should be submitted by the Dean's Office to: curriculumplanning@asu.edu. Before academic units can advertise undergraduate minors 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 approved by the University Provost.

Definition and minimum requirements:
These are the minimum requirements for approval. Individual undergraduate minors may have additional requirements.

A minor is an approved, coherent focus of academic study in a single discipline, other than the student's major, involving substantially fewer hours of credit than a corresponding major. Certain major and minor combinations may be deemed inappropriate either by the college or department of the major or minor. Inappropriate combinations include (but would not be limited to) ones in which an excessive number of courses in the minor are simultaneously being used to fulfill requirements of the student's major.

A minor:

- Requires a minimum of 15 semester hours of which at least 9 semester hours must be upper division
- Is not intended for students pursuing a major in the department which offers the minor

College/School/Institute:	Ira A. Fulton Schools of Engineering
Department/Division/School:	Polytechnic School
Proposing Faculty Group (*if applicable*):	Environmental and Resource Management
Proposed Minor Name:	Environmental and Resource Management
Requested effective date:	2016-17
Delivery method:	On-campus only (ground courses and/or iCourses)

Note: Once students elect a campus or On-line option, students will not be able to move back and forth 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.

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

☐ Downtown Phoenix ☒ Polytechnic ☐ Tempe ☐ West Other:

Proposal Contact

Name:	Dr. Larry Olson	**Title:**	Program Chair, ERM, Associate Professor
Phone number:	480-727-1499	**Email:**	Larry.Olson@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:** 2/5 /20 16

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

Signature _____ **Date:** / /20

Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.

ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW MINOR

1. Overview

A. Description

Provide a brief description of the proposed minor.

The proposed minor provides students with a thorough introduction to environmental regulations and key environmental management issues such as the provision of clean potable water, wastewater treatment, solid and hazardous waste management, as well as remediation technologies for polluted soils, groundwater, and air. It provides a valuable option to other majors that focus on environmental issues such as engineering, agribusiness, applied biology, etc. The courses form a coherent whole and demonstrate the connection between science, engineering, public policy and the law.

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

The focus of the minor is on degree programs that touch on these key environmental management areas but do not have either the technical or legal emphasis to be found in the Environmental & Resource Management minor. The strong core of required classes is complemented by a variety of elective courses that allow a student to pursue additional areas of interest.

C. Affiliation

If the minor 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.

The environmental and resource management classes in the minor are part of the BS degree in Environmental and Resource Management. Environmental and resource management majors would not be eligible to take the minor. The focus of the minor will be students from other degree programs as described above. Having these students in classes with environmental and resource management majors will enhance the learning environment for all by bringing different, but important, perspectives to solving complicated and challenging societal problems.

D. Demand

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

This minor would be a strong interdisciplinary addition to the curriculum and could enhance the employment prospects for other majors by providing practical, real world exposure to the way in which government and private industries deal with environmental management issues. No new classes are required and all classes specified in the minor are taught on a regular basis so that the incremental costs of adding this minor are minimal.

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*)	10	50	100

2. Support and Impact

A. Faculty governance

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

letter attached

B. Other related programs

Identify other related ASU programs and outline how the new minor 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.)

Other related programs include Engineering, Applied Biology, Agribusiness, and Environmental Science

Engineering

Civil and Environmental Engineering students in the School of Sustainable Engineering and the Built Environment focus on engineering and scientific design for environmental infrastructure. This minor would add the additional elements of a strong regulatory emphasis and a focus on management and policy issues which are important to senior level officials in environmental management.

Agribusiness

Some students in the Morrison School of Agribusiness are very interested in the sustainability and environmental impacts of the agriculture/food/water nexus. This minor provides a solid scientific background and a background in environmental law to complement their studies in the financial and economic aspects of agribusiness.

Applied Biology

The B.S. in Applied Biology focuses on ecology, habitat, and resource conservation. This minor adds an additional perspective of industry focused environmental management and the regulatory structure in the U.S. to manage issues of water and air pollution, solid and hazardous waste, climate change, and alternative energy sources.

Environmental Science

The Environmental Science degree at ASU West and Lake Havasu City focuses on ecology and the natural environment. The ERM minor would add the additional perspective of industry focused environmental management and the regulatory structure in the U.S. to manage issues of water and air pollution, solid and hazardous waste, climate change, and alternative energy sources.

C. Letter(s) of support

Provide a supporting letter from each college/school dean from which individual courses are taken.

All courses for the minor will be offered through the environmental and resource management program in the Polytechnic School.

3. Student Learning Outcomes and Assessment Methods

A. Knowledge, competencies, and skills

List the knowledge, competencies, and skills students should have when they graduate from the proposed degree program. You can find examples of program Learning Outcomes at (https://uoeee.asu.edu/plan-outcomes).

Graduates of the Environmental and Resource Management (ERM) minor will be able to apply chemical and biological principles to solving important environmental challenges such as wastewater treatment, mitigation of air pollution, or remediation technologies for contaminated soil and groundwater. They will also demonstrate how environmental regulations can be used to implement policy objectives. Environmental and resource management minor students will be able to evaluate and interpret data, select appropriate technologies to treat air, water, and soil contamination, and describe and evaluate the threats to ecosystems and human health from a growing population and new technologies.

B. Assessment

Describe the plan and methods to assess whether students have achieved the knowledge, competencies and skills identified in the Learning Outcomes. You can find examples of assessment methods at (https://uoeee.asu.edu/creating-plan).

Competency in applying scientific principles to environmental problems will be demonstrated by a grade of C or better in ERM 302 Water and Wastewater Treatment Technology and ERM 402 Unit Treatment Technologies. Competency in understanding how to apply the law to achieve environmental policy objectives will be demonstrated by a grade of C or better in ERM 201 Environmental Management and ERM 203 Environmental Regulations.

4. Academic Curriculum and Requirements

A. Provide a description of the curricular requirements for the minor. Be specific in listing required courses as well as electives and specify the total minimum number of hours required for the minor. Please attach one or more model programs of study to illustrate the choices students might make, if appropriate.

Required Minor Courses*

Prefix	Number	Title	Is this a new course?	Credit Hours
ERM	201	Environmental Management	No	3
ERM	203	Environmental Regulations	No	3
ERM	302	Water and Wastewater Treatment Technology	No	3
ERM	402	Unit Treatment Technologies	No	3
			Section Sub-total	12

Elective Minor Courses

Prefix	Number	Title	Is this a new course?	Credit Hours
ERM	401	Hazardous Waste Mangement	No	3
ERM	406	Environmental Chemistry	No	3
ERM	407	Occupational Hygiene	No	3
ERM	428	International Environmental Management	No	3
ERM	432	Sustainable Solid Waste Management	No	3
ERM	494	Environmental Management Leadership	No	3
			Section Sub-total	3

Other Minor Requirements

E.g. – Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable	Credit Hours
Section Sub-total	0

*All required course work in the environmental and resource management minor must be completed with a "C" or better.

Total minimum credit hours required for the Minor **15**

B. Minimum residency requirement
How many hours of the minor must be ASU credit? 12

C. New Courses
Provide prefix, number and a brief course description for each new course. NA

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

5. Administration and Resources

A. Describe the procedures and any qualifications for enrollment in the minor.
Sophomore status, GPA of 2.00, and appropriate prerequisites for selected environmental and resource management courses.

B. Describe the advising procedures as well as measures for verification of completion of the minor.
Advisors within the Polytechnic School of the Ira A. Fulton Schools of Engineering will be responsible for advising students about this minor and verifying completion. Interested students should consult with a Polytechnic School advisor to verify eligibility and to review all courses required for the minor. To schedule an advising appointment, go to https://fultonapps.asu.edu/advising.

C. What are the resource implications for the proposed minor, 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 minor, 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 minor.
No new resources are anticipated for this minor. All classes are already taught to environmental and resource management majors on a regular basis and addition of the minor will enhance enrollment by adding students from other majors.

D. Primary Faculty
List the primary faculty participants regarding this proposed minors. For interdisciplinary minors, please include the relevant names of faculty members from across the University.

Name	Title	Area(s) of Specialization as they relate to proposed minor
Larry Olson	Associate Professor and ERM Program Chair	Environmental Chemistry; International Environmental Management
Kiril Hristovski	Associate Professor	Solid Waste; Hazardous Waste; Water/Wastewater Treatment; Unit Treatment
Albert Brown	Lecturer	Environmental Management; Environmental Regulations; Environmental Leadership

6. Additional Materials

A. Appendix
Complete and attach the Appendix document.

B. Program of study
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 University Provost.

APPENDIX
OPERATIONAL INFORMATION FOR MINORS

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

Please consider the student audience in creating your text.)

1. **Proposed Minor Name:** Environmental and Resource Management

2. **Description (150 words maximum)**
   The minor in environmental and resource management provides students with a thorough introduction to environmental regulations and key environmental management issues such as the provision of clean, potable water, wastewater treatment, solid and hazardous waste management, as well as remediation technologies for polluted soils, groundwater and air. It applies basic science and engineering principles to solving problems that significantly impact human health and ecosystems. The environmental and resource management minor provides a valuable option to other majors that focus on environmental issues whether from a technical or policy perspective. The courses form a coherent whole and demonstrate the connection between science, engineering, public policy and the law.

3. **Contact and Support Information**

Building Name, code and room number: *(Search ASU map)*	TECH 134
Program office telephone number: (*i.e. 480/965-2100*)	480/727-1499
Program Email Address:	technology@asu.edu
Program Website Address:	http://poly.engineering.asu.edu/ERM

4. **Program Requirements:** Provide applicable information regarding the program such as curricular restrictions or requirements, specific course lists, or academic retention requirements.

   The minor requires completion of four core courses (12 credit hours) and one elective course (3 credit hours) for a total of 15 credit hours. At least 12 credit hours must be completed in residency at ASU.

   The following are required courses that must be completed with a grade of "C" (2.00 on a 4.00 scale) or higher:

   ERM 201 Environmental Management (3)
   ERM 203 Environmental Regulations (3)
   ERM 302 Water and Wastewater Treatment Technology (3)
   ERM 402 Unit Treatment Technologies (3)

   An elective course must be selected from the following list:

   ERM 401 Hazardous Waste Management (3)
   ERM 406 Environmental Chemistry (3)
   ERM 407 Occupational Hygiene (3)
   ERM 428 International Environmental Management, G (3)
   ERM 432 Sustainable Solid Waste Management (3)
   ERM 494 Special Topics: Environmental Management Leadership (3)

   Depending upon the student's program of study, prerequisite courses may be needed in order to complete the requirements of this minor.

5. **Additional Enrollment Requirements** If applicable list any additional enrollment requirements students must complete

   Students currently enrolled in the Environmental and Resource Management BS degree are not eligible to pursue the Environmental and Resource Management minor. Students will need to have a minimum GPA of 2.0 and have at least sophomore status. Interested students should consult with a Polytechnic School advisor to verify eligibility and to review all courses required for the minor. To schedule an advising appointment, go to https://fultonapps.asu.edu/advising.

   Note: Certain major and minor combinations may be deemed inappropriate either by the college or department of the major or minor. Courses taken as part of a minor may not count toward both the major degree and the minor. Please contact the department for more information.

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

Note: Once students elect a campus or On-line option, students will not be able to move back and forth 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.

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

☐ Downtown Phoenix ☒ Polytechnic ☐ Tempe ☐ West Other:

From: Chris Martin <Chris.Martin@asu.edu>
Date: January 29, 2016 at 2:56:58 PM MST
To: Larry Olson <larry.olson@asu.edu>
Subject: FW: ERM Minor

Hi Larry,

We in Science and Mathematics in the College of Letters and Sciences at the Polytechnic campus offer our full support of your proposal for an ERM minor.

All the best,

Chris Martin

Chris A. Martin, Ph.D.,
Professor and Faculty Head
Science and Mathematics Faculty
College of Letters and Sciences
Arizona State University
http://www.public.asu.edu/~camartin/

From: Larry Olson
Sent: Friday, January 29, 2016 2:48 PM
To: Chris Martin <Chris.Martin@asu.edu>
Cc: Cindy Boglin <Cindy.Boglin@asu.edu>
Subject: ERM Minor

Chris:
Thanks for looking at the proposed ERM minor (see attached). Hopefully this could be of benefit to some Applied Biology students or other science majors in your program.
Best regards,
Larry

From: Darryl Morrell [mailto:darrylmorrell@gmail.com] **On Behalf Of** Darryl Morrell
Sent: Wednesday, January 27, 2016 2:14 PM
To: Larry Olson <larry.olson@asu.edu>
Subject: Re: ERM minor

I support the creation of this minor. It does not compete with any of the concentration areas in the engineering program. I expect that it will be a viable option for some of our engineering students who want to focus on environmental issues in their secondary focus areas.

On Jan 27, 2016, at 12:15 PM, Larry Olson <larry.olson@asu.edu> wrote:

Darryl:
I've attached a proposed minor in ERM that could service engineering majors interested in the environment. Could you send me an email that indicates you would support this? Doesn't need to be elaborate, but I need it soon (tomorrow?).
Thanks
Larry
<Proposal to establish ERM minor.doc>

>>
>> Thanks for your time,
>> Becky
>>
>> --
>> Becky A. Ball, Ph.D.
>> Assistant Professor, School of Mathematical and Natural Sciences
>> Senior Sustainability Scientist, Global Institute of Sustainability
>> Barrett Honors Faculty Arizona State University
>>

<Proposal to establish ERM minor.doc>

I wonder if I could ask for a return favor. We are proposing a minor in Environmental & Resource Management (see attached) and it would help to have a letter of support from you. I think this minor would complement and not overlap with your major in Environmental Science and could potentially be helpful to students.

Would it be possible to send me a brief letter of support? Unfortunately, I didn't realize I needed letters at this stage and so my time frame has collapsed on me. If possible, I need it by tomorrow. I apologize for the quick turnaround, but appreciate whatever you can do. Hope things are going well for you with your new major.

Best regards,
Larry

-----Original Message-----
From: Becky Ball [mailto:becky.ball@asu.edu]
Sent: Tuesday, August 19, 2014 10:45 AM
To: Larry Olson <larry.olson@asu.edu>
Subject: Re: possible impact on ERM from proposed environmental science BS at West

Thank you!

On 8/19/2014 8:20 AM, Larry Olson wrote:
> Becky:
> Here is my letter. Let me know if there is anything else I can do to help.
> Best regards,
> Larry
>
> -----Original Message-----
> From: Becky Ball [mailto:becky.ball@asu.edu]
> Sent: Monday, August 18, 2014 2:34 PM
> To: Larry Olson
> Subject: Re: possible impact on ERM from proposed environmental
> science BS at West
>
> Hi Larry,
>
> Thanks for your phone call this morning. I appreciate that ERM is able to support the proposal, and I think that the 4+1 transition is a great opportunity for our students, and I will mention that in our committee meeting tomorrow. Attached is a draft letter of support that we're required to submit with the proposal. Please feel free to edit as much as you'd like, and then return a signed version to me.
>
> Thanks again for your time,
> Becky
>
> On 8/14/2014 1:45 PM, Larry Olson wrote:
>> Becky:
>> Are you available to talk by phone? I have a couple of things I'd like to propose but I think we can be supportive. I'm going to be out of my office most of the rest of the afternoon and have a retreat all day tomorrow, but I could call you whenever it would be convenient. Not sure what your phone number is though.
>> Thanks,
>> Larry
>> 4880-727-1499
>>
>> -----Original Message-----
>> From: Becky Ball [mailto:becky.ball@asu.edu]
>> Sent: Wednesday, August 13, 2014 2:52 PM
>> To: Larry Olson
>> Subject: possible impact on ERM from proposed environmental science
>> BS at West
>>
>> Dear Dr. Olson,
>>
>> I'm faculty at the West Campus in the School of Mathematical & Natural Sciences. We are designing a new Environmental Science B.S. degree. We have identified your BS in Environmental & Resource Management as a program that might be impacted by this new degree. Our degree will differ in that it is not going to be focused on resource and waste management. These are a small component of our proposed degree, but our new program will not focus heavily on technology for management; rather, the focus is on understanding the workings of the natural environment from both a chemistry and biology standpoint. While there may be some students that choose our degree program instead of CT&I's, we believe this number will be relatively small because there are often other reasons students have for staying at a particular campus. The new B.S.
>> degree may increase the pool of appropriately trained graduates with an interest in pursuing graduate studies in your program, which are not offered at West Campus.
>>
>> For the proposal document, we are required to include a statement of support from the impacted programs. Would you be willing to send me such a letter? Please let me know if I should contact someone else within CT&I. (The proposal requirements are rather vague about who should provide this statement of support.) If you'd prefer I draft one for you to edit and sign, I'm happy to do this.

From: Lara Ferry
Sent: Wednesday, January 27, 2016 2:25 PM
To: Larry Olson <larry.olson@asu.edu>
Cc: Becky Ball <Becky.Ball@asu.edu>
Subject: Re: possible impact on ERM from proposed environmental science BS at West

Hi Larry (and Becky)!

No worries! I don't see an issue with this minor and our ENV programs.

If there an an opportunity to collaborate on courses such that we could broaden what we are able to offer our respective students, and to encourage them to move between campuses, I would love to pursue it. We could coordinate scheduling between the two campuses so that we maximize enrollment at each location!

Best,

Lara Ferry, PhD
Interim Director & Professor, School of Mathematical & Natural Sciences
Honors Faculty, Barrett The Honors College

Arizona State University
Mailing Address (letters): PO Box 37100, MC 2352 • Phoenix, AZ 85069
Shipping Address (packages): 4701 W. Thunderbird Rd, FAB N137 • Glendale, AZ 85306
Office: FAB N153 • (602) 543-2817
Research Website: http://morphology.asu.edu

On Jan 27, 2016, at 1:49 PM, Becky Ball <Becky.Ball@asu.edu> wrote:

Hi Larry,

I believe the statement needs to come from my leadership, as I am just a peon Asst Proff with no authority. I'm cc'ing our interim director here.

Lara, ERM (part of Ira Fulton at Poly) is proposing a minor in ENV & Resource Management. ERM already has a major with that title, so this would just be the addition of a minor. Their major and future minor differ from ours, as it's more engineering/technology focused rather than biol/chem focused like us. (As a reminder, the other two statement requests we've gotten recently from Poly have been from ABS in CLS. This is the first from ERM.)

Cheers-
Becky

-------- Forwarded Message --------
Subject: RE: possible impact on ERM from proposed environmental science BS at West
Date: Wed, 27 Jan 2016 12:30:07 -0700
From: Larry Olson <larry.olson@asu.edu>
To: Becky Ball <Becky.Ball@asu.edu>

Hi Becky:

From: Mark Manfredo
Sent: Thursday, January 28, 2016 8:42 PM
To: Larry Olson <larry.olson@asu.edu>
Subject: support for ERM minor

Larry,

Thank you for sharing information regarding the proposed minor in Environmental and Resource Management through the Fulton Schools of Engineering, Polytechnic School. I am supportive of this proposal. I anticipate that the minor will be of interest to some of our students studying in the BA Business - Global Agribusiness and the BA Business - Food Industry Management here at the ASU Polytechnic Campus. This is particularly true with respect to students who maintain an interest in the sciences, and are looking at broadening their expertise to consider the management of environmental resources in the context of sustainable food production systems. Given the science based nature of the proposed courses for the minor, I do not see any points of duplication with our curriculum in the Morrison School of Agribusiness.

Best of luck with this proposal, and let me know if I can be of any further assistance.

Mark

Mark R. Manfredo
Arizona State University | **W. P. Carey School of Business**
Director, Morrison School of Agribusiness
Associate Dean, W. P. Carey School @ ASU Polytechnic
Dean's Council Distinguished Scholar
7271 E Sonoran Arroyo Mall | Mesa, AZ 85212
Ph: 480.727.1040 | Fax: 480.727.1961|Email: manfredo@asu.edu

From: Karen Mossberger
Sent: Wednesday, March 09, 2016 12:28 PM
To: Cindy Boglin <Cindy.Boglin@asu.edu>
Cc: Larry Olson <larry.olson@asu.edu>
Subject: RE: Minor in Environmental and Resource Management

Dear Cindy -

We do not see any conflict with our undergraduate concentration on sustainability within the PSPP, and we support this minor in your school. We do not currently have a course on Environmental Regulation within that concentration, and don't think that we have the faculty at the moment to provide one, given other demands. If you do deliver such a course, we would be happy to cross-list it as an option for our undergraduate sustainability concentration.

Thank you for contacting us, and we hope the new program is a success.

Best,

Karen Mossberger, Ph.D.
Professor and Director, School of Public Affairs
Arizona State University
411 North Central Ave., Suite 450
Phoenix, AZ 85004
602-496-1101
karen.mossberger@asu.edu

From: Cindy Boglin
Sent: Monday, March 07, 2016 8:37 AM
To: Karen Mossberger
Cc: Larry Olson
Subject: FW: Minor in Environmental and Resource Management

Dr. Mossberger,

We are in the process of proposing a new minor in Environmental and Resource Management through the Polytechnic School in the Ira A. Fulton Schools of Engineering. The Provost's office has requested that we contact you for an impact statement as we have a course in the proposal on Environmental Regulations. Is this something you would be able to provide?

Thank you,

Cindy

Cindy Boglin
Assistant Director | Advising Services Office
The Polytechnic School | Ira A. Fulton Schools of Engineering | Arizona State University
phone: 480-727-1874 | direct: 480-727-5213 | email: cindy.boglin@asu.edu
schedule an advising appointment | follow us on social media