

The completed and signed proposal should be submitted by the Dean's Office to: [curriculumplanning@asu.edu](mailto:curriculumplanning@asu.edu). Before academic units can advertise undergraduate concentrations 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 Executive Vice President and Provost of the University.

**Definition and minimum requirements:**

A concentration is a formalized selection of courses within a major.

- A concentration requires a minimum of 15 semester hours of which at least 9 semester hours must be upper division. Specialized concentrations (e.g., BIS Concentrations) may have additional or different requirements.
- A concentration is offered by a single unit and is intended exclusively for students pursuing a particular major. If a concentration consists of courses from more than one college the approval of each college Dean is required.

**College/School/Institute:** Technology and Innovation

**Department/Division/School:** Engineering

**Proposing Faculty Group (if applicable):**

**If this is an official joint degree program?** No, this is not a joint degree program

If "Yes" List all the additional college(s)/school(s)/institute(s) that will be involved in offering the degree program and providing the necessary resources. Note: All units offering this program must have collaborated in the proposal development and completed the appropriate unit and college/school approvals.

**Existing degree type and name of degree program under which this concentration will be established:** BSE Engineering

**Proposed Concentration Name:** Humanitarian Engineering

**Requested effective catalog year?** 2014-15

For deadline dates see: [Curriculum Workflow Calendars](#).

**Delivery method:** On-campus only (ground courses and/or iCourses)

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 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. Ann McKenna      **Title:** Engineering Department Chair  
**Phone number:** 7-5121      **Email:** Ann.McKenna@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 program

**College/School/Division Dean name:** See attached email

**Signature** \_\_\_\_\_ **Date:** 9/11/2013

**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.*

## 1. Overview

### A. Description

Provide a brief description of the new concentration (including the specific focus of the new concentration, relationship to other concentrations in this degree program, etc).

The Humanitarian Engineering Concentration within the ASU College of Technology and Innovation's BSE Engineering program will provide an opportunity for undergraduates to receive engineering technical content in the context of the developing world. The world-class Global Resolve program within the CTI will partner with the program to help enable program goals (see <http://globalresolve.asu.edu/> for a description of how Global Resolve works with a range of partners to develop sustainable technologies and programs in energy, clean water, and local economic development for rural communities in the developing world). The concentration blends technical rigor in engineering topics with rigorous design and development processes that include consideration of cultural, geographical and humanitarian issues. The concentration will include hands-on experience in humanitarian projects in Arizona and in the developing world. Such projects will be conducted on the ASU Polytechnic campus during the Fall and Spring semesters, and students will be offered the opportunity to implement or evaluate developed projects during summer trips to different developing world locations. The concentration's course of study emphasizes engineering solutions with integrated building, energy, agricultural and water technologies in small-scale site, village, and neighborhood contexts. The education received by students will include focused content on water systems, energy systems, structural systems, agricultural systems, and development practices, along with complementary content, to produce a well-rounded and competent engineering professional. This concentration will prepare students for graduate school in civil engineering, sustainability, and development, careers in U.S. and global general engineering applications/companies, disaster relief, aid and NGO development work.

### B. Demand

Explain the unit's need for the new concentration (e.g., market demand, research base, direction of the discipline, and interdisciplinary considerations). How will the new concentration complement the existing degree program?

This proposed concentration will fill a currently unmet demand at ASU and in Arizona for a program focused on engineering to improve the lives of underprivileged people and/or those in under-developed nations throughout the world. There are only a handful of programs in the USA, and around the world, that offer a program of study focused on engineering in the context of the developing world. The concentration's uniqueness will ensure national notice; the concentration's content and context will appeal to a diverse and gender-balanced spectrum of students. We expect it to be a powerful recruiting tool to attract students to the engineering program at ASU Poly. The CTI has long partnered with the School of Sustainability, integrating technical expertise and engineering students with the SOS's focus on human-environment relationships. The number of students enrolling in the CTI classes related to this area of study, e.g., ALT 412, Village Energy Systems, over multiple semesters indicated significant student interest in this area.

## 2. Support and Impact

### A. Faculty governance

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

### B. Other related programs

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

We are not aware of Fulton School of Engineering programs/concentrations that focus on the engineering aspects of the problems faced by the developing world. Still a statement was obtained from the FSE. As noted above, the School of Sustainability has been a partner in related work and a statement was obtained from them. In addition, a statement of support was obtained from the School of Letters and Sciences.

### C. Letter(s) of support

Provide a supporting letter from each college/school dean from which individual courses, or the entire concentration, 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 concentration. Examples of program learning outcomes can be found at (<http://www.asu.edu/oue/assessment.html>).

In addition to the BSE Engineering program student outcomes (Technical Competence, Design, Engineering Practice, Problem Solving, Professionalism, Communication, Perspective, Critical Thinking and Decision Making, Teamwork), students will achieve the following outcomes:

1. Students will demonstrate a working knowledge of the components and function of engineered systems for water, structural, energy, and development in the developing world.
2. Students will demonstrate the ability to design and implement engineered systems in humanitarian and developing world contexts.

#### B. Admissions criteria

List the admissions criteria for the proposed concentration. If they are identical to the admission criteria for the existing major and degree program under which this concentration will be established, please note that here.

Same admission criteria as the existing BSE Engineering degree.

C. Curricular structure

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

**Required Core Courses for the Degree/Major**

In addition to the 24 credits of required concentration courses listed below, the BSE Engineering degree has 30 credit hours of required core courses (plus a capstone sequence). All of these degree core courses exist and are staffed by the Department of Engineering faculty.

Prefix	Number	Title	Is this a new Course?	Credit Hours
EGR	101	Foundations of Engineering Design Project I	N	3
EGR	102	Foundations of Engineering Design Project II	N	3
EGR	104	Critical Inquiry in Engineering	N	3
EGR	201	Use-Inspired Design Project I	N	3
EGR	202	Use-Inspired Design Project II	N	3
EGR	216	Engineering Electrical Fundamentals	N	3
EGR	217	Engineering Mechanics Fundamentals	N	3
EGR	218	Materials and Manufacturing Processes	N	3
EGR	219	Computational Modeling of Engineering Systems	N	3
EGR	280	Engineering Statistics	N	3

Capstone courses are shown below

*Section sub-total:* 30

**Required Concentration Courses**

Prefix	Number	Title	Is this a new Course?	Credit Hours
EGR	307	Humanitarian Engineering Project I	Yes	3
EGR	317	Humanitarian Engineering Project II	Yes	3
EGR	321	Water Resource Systems	Yes	3
EGR	325	Water and Wastewater Treatment	Yes	3
EGR	340	Engineering Thermo-Fluids I	No	3
EGR	371	Best Practices for Humanitarian Engineering	Yes	3
EGR	476	Energy Infrastructures	Yes	3
ETM	485	GIS in Natural Resources	No	3

*Section sub-total:* 24

**Elective Concentration Courses**

Prefix	Number	Title	Is this a new Course? (Select one)	Credit Hours
<i>Section sub-total:</i>				0

**Other Concentration Requirements**

E.g. – Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable	Credit Hours
EGR 401 Professional Design Project I (part of the degree core)	3
EGR 402 Professional Design Project II (part of the degree core)	3
<i>Section sub-total:</i>	6
<b>Total minimum credit hours required for concentration</b>	<b>60</b>

**Academic Curriculum and Requirements (Continued)**

**D. Minimum residency requirement**

How many hours of the concentration must be ASU credit?

The minimum residency requirement of the concentration is 15 credits; EGR 307 and 317 must be taken at ASU.

**E. Provide a brief course description for each new course.**

**EGR 307: Humanitarian Engineering Project I**

Students learn to analyze, design, implement, and characterize an engineered system that addresses a humanitarian objective. The project includes modeling, analysis, and measurement of the behavior of the system. Professional and engineering skills are developed in this project setting. Prerequisites: EGR 202: Use Inspired Design Project II and EGR 217: Engineering Fundamentals II or EGR 294 Topic: Engineering Fundamentals II. Pre or Corequisite: EGR 321: Water Resource Systems

**EGR 317: Humanitarian Engineering Project II**

Students apply design principles to conceptualize, implement, and characterize an engineered system that addresses a humanitarian objective in a project setting. This project emphasizes communication with project stakeholders; applying an appropriate design approach; thinking critically in developing system specifications and evaluating a prototype relative to these specifications; and increasing technical competence. Prerequisites: EGR 307: Humanitarian Engineering Project I and EGR 371: Best Practices for Humanitarian Engineering

**EGR 321: Water Resource Systems**

Fundamentals of water supply and surface water hydrology in the context of the engineering, design, and analysis of water resources systems. Particular emphasis is placed on those aspects of water systems that apply in the context of the developing world as well as in the context of environmentally sustainable systems. The course delivery is designed for engineering students with a broad understanding of engineering fundamentals but without specialist civil engineering knowledge. EGR 217: Engineering Fundamentals II or EGR 294 Topic: Engineering Fundamentals II and EGR 219: Computational Modeling of Engineering Systems or EGR 294 Topic: Computational Modeling

**EGR 325: Water and Wastewater Treatment**

The essential elements of aquatic chemistry, water pollution and water and wastewater treatment technologies provide a fundamental basis for understanding sustainable water and wastewater treatment processes and their design considerations. Critical evaluation of contemporary issues concerning our water environment and the associated regulatory framework are included to strengthen and emphasize importance of adequate practices used in operation and design of engineered water and wastewater treatment systems. Prerequisites: CHM 113: General

Chemistry I and EGR 321: Water Resource Systems

**EGR 371: Best Practices for Humanitarian Engineering**

Technological and process-based best practices for engineering students to gain applied competence in low-cost and low-tech appropriate methods and technologies for small scale technical problems in local and international humanitarian development contexts. Prerequisites: Junior or senior standing in an engineering program in CTI or the Fulton Schools

**EGR 476: Energy Infrastructures**

Comprehensive study of sustainable energy conversion systems. Students learn to quantify and measure the concepts of sustainability of energy resources within the framework of the laws of thermodynamics. The course covers conventional energy sources for primary power (fossil fuels, nuclear, and hydroelectric), their sustainability, their resource level and their environmental impact. The course also covers the science and technology of heat engines and direct conversion methods. Conservation and storage are also considered. Prerequisite: EGR 340: Engineering Thermo-Fluids

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

**4. Administration and Resources**

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

This is a new concentration in the existing BSE Engineering degree which was designed to support multiple concentrations. Thus, the concentration will be administered using the framework and resources currently in place for the BSE Engineering degree and its existing concentrations and emphasis areas. This framework includes admission, recruiting, advising, retention, etc.

**B. What are enrollment projections for the next three years?**

	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b> (Yr. 1 continuing + new entering)	<b>3<sup>rd</sup> Year</b> (Yr. 1 & 2 continuing + new entering)
Number of Students (Headcount)	25	75	150

**C. Resources**

What are the resource implications for the proposed concentration, 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 concentration 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 concentration.

The proposed concentration will be taught with existing faculty in existing engineering studio classrooms. No new resources are anticipated.

**D. Primary Faculty**

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

<b>Name</b>	<b>Title</b>	<b>Area(s) of Specialization as they relate to proposed concentration</b>
Dr. Mark Henderson	Professor	Engineering for developing countries
Dr. Kiril Hristovski	Assistant Professor	Environmental engineering
Dr. Nathan Johnson	Assistant Professor	Energy engineering, engineering for developing countries
Dr. Micah Lande	Assistant Professor	Engineering Design
Dr. Arunachalanadar Madakannan	Associate Professor	Renewable Energy
Dr. Ann McKenna	Professor	Engineering Design
Dr. Pavlos Mikellides	Associate Professor	Thermodynamics
Dr. John Rajadas	Associate Professor	Thermodynamics
Dr. Bradley Rogers	Associate Professor	Thermodynamics, energy systems, engineering for the developing world
Dr. Benjamin Ruddell	Assistant Professor	Water resources, characterization of matter and energy flows in natural systems.

**5. Additional Materials**
**A. Major Map**

Attach a copy of the “proposed” major map for this degree program and each concentration(s) to be offered. Instructions on how to create a “proposed major map” in BAMM can be found in the Build a Major Map Training Guide.






















**B. Appendix**

Complete and attach the Appendix document.

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

**2014 - 2015 Major Map  
Engineering (Humanitarian Engineering), BSE (Proposed)**

LVGJLXT

<b>Term 1</b> 0 - 14 Credit Hours <b>Critical course signified by</b> 	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
 CHM 113: General Chemistry I (SQ)	4		<ul style="list-style-type: none"> <li>• An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses</li> <li>• ASU Math Placement Exam score determines placement in Mathematics course</li> <li>• ASU 101 or College specific equivalent First Year Seminar required of all freshman students</li> <li>• CTI 101 required of all freshman students</li> </ul>
 CTI 101: Success in Technology & Innovation	1		
 EGR 101: Foundations of Engineering Design Project I	3		
 MAT 265: Calculus for Engineers I (MA)	3	C	
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
Term hours subtotal:	14		
<b>Term 2</b> 15 - 29 Credit Hours <b>Critical course signified by</b> 	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
 EGR 102: Foundations of Engineering Design Project II	3		
 MAT 266: Calculus for Engineers II (MA)	3	C	
 PHY 121: University Physics I: Mechanics (SQ)	3		
EGR 104: Critical Inquiry in Engineering (L)	3		
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
 Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
Term hours subtotal:	15		
<b>Term 3</b> 30 - 44 Credit Hours <b>Critical course signified by</b> 	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
 EGR 201: Use-Inspired Design Project I	3		
 EGR 216: Engineering Electrical Fundamentals	3		
 EGR 218: Materials and Manufacturing Processes	3		
 MAT 267: Calculus for Engineers III (MA)	3	C	
EGR 280: Engineering Statistics (CS)	3		
Complete Mathematics (MA) requirement.			
Term hours subtotal:	15		
<b>Term 4</b> 45 - 59 Credit Hours <b>Critical course signified by</b> 	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
 EGR 202: Use-Inspired Design Project II	3		
 EGR 217: Engineering Mechanics Fundamentals	3		
EGR 219: Computational Modeling of Engineering Systems	3		
MAT 275: Modern Differential Equations (MA)	3		
Social and Behavioral Sciences (SB)	3		
Term hours subtotal:	15		
<b>Term 5</b> 60 - 75 Credit Hours <b>Necessary course signified by</b> 	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
 EGR 307: Humanitarian Engineering Project I. New course	3		<ul style="list-style-type: none"> <li>• Student will select one four credit science elective satisfying SQ</li> </ul>
 EGR 321: Water Resource Systems. New course	3		



EGR 371: Best Practices for Humanitarian Engineering. New course.	3
Science Elective (SQ) OR Science Elective AND PHY 122: University Physics Laboratory I (SQ)	4
Secondary Focus Area	3
<b>Term hours subtotal:</b>	<b>16</b>

OR PHY 122 which (combined with PHY 121) completes the SQ requirement and a 3 credit science elective.

- A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.

**Term 6** 76 - 90 Credit Hours Necessary course signified by

	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
EGR 317: Humanitarian Engineering Project II. New course	3		<ul style="list-style-type: none"> <li>• A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.</li> </ul>
EGR 325: Water and Wastewater Treatment. New course.	3		
HST 318: History of Engineering ((L or SB) & G)	3		
MAT 343: Applied Linear Algebra	3		
Secondary Focus Area	3		
<b>Term hours subtotal:</b>	<b>15</b>		

**Term 7** 91 - 105 Credit Hours Necessary course signified by

	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
EGR 340: Engineering Thermo-Fluids I	3		<ul style="list-style-type: none"> <li>• A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.</li> </ul>
EGR 401: Professional Design Project I (L)	3		
ETM 485: GIS in Natural Resources	3		
Upper Division Secondary Focus Area	3		
Humanities, Fine Arts and Design (HU) AND Historical Awareness (H)	3		
<b>Term hours subtotal:</b>	<b>15</b>		

**Term 8** 106 - 120 Credit Hours Necessary course signified by

	<b>Hours</b>	<b>Minimum Grade</b>	<b>Notes</b>
EGR 402: Professional Design Project II	3		<ul style="list-style-type: none"> <li>• A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.</li> </ul>
EGR 476: Energy Infrastructures. New course	3		
Upper Division Secondary Focus Area	3		
Upper Division Social and Behavioral Sciences (SB) AND Cultural Diversity in the U.S. (C) OR Upper Division Humanities, Fine Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
Humanities, Fine Arts and Design (HU)	3		
<b>Term hours subtotal:</b>	<b>15</b>		

Science Elective

BIO 181: General Biology I (SQ)

BIO 182: General Biology II (SG)

CHM 116: General Chemistry II (SQ)

GLG 101: Introduction to Geology I (Physical) (SQ) AND GLG 103: Introduction to Geology I-Laboratory (SQ)

PHY 131: University Physics II: Electricity and Magnetism (SQ) AND PHY 132: University Physics Laboratory II (SQ)

GLG 101: Introduction to Geology I (Physical) (SQ)

PHY 131: University Physics II: Electricity and Magnetism (SQ)

Notes:

- A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.

**Total Hours:** 120

**Upper Division Hours:** 45 minimum

**Major GPA:** 2.00 minimum

**Cumulative GPA:** 2.00 minimum

**Total hrs at ASU:** 30 minimum

**Hrs Resident Credit for Academic Recognition:** 56 minimum

**Total Community College Hrs:** 64 maximum

**General University Requirements Legend**

General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Fine Arts and Design (HU)
- Social and Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

General Studies Awareness Requirements:

- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

General Studies designations listed on the major map are current for the 2014 - 2015 academic year.

**APPENDIX**  
**OPERATIONAL INFORMATION FOR UNDERGRADUATE CONCENTRATIONS**

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

Please consider the student audience in creating your text.)

**1. Proposed Concentration Name: Engineering (Humanitarian Engineering)**

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

The BSE engineering program within the Department of Engineering at the Polytechnic campus is a multidisciplinary engineering program with multiple concentrations or emphasis areas. The program allows students to learn in a problem-focused curriculum with hands-on projects. Additionally, development of applied industry skills are integrated into the program. In the junior and senior years, students will take courses in water and energy systems as well as work with ASU's Global Resolve organization to adapt these systems to local and developing world needs. Graduates of the bachelor's program with a humanitarian engineering concentration will be positioned to work on multidisciplinary teams addressing vital engineering needs of communities in the developing world. They will have real-world experience with the challenges and opportunities inherent in this environment and be able to make an impact by improving people's lives by solving real problems.

**3. Contact and Support Information**

Building Name, code and room number: ( <i>Search ASU map</i> )	TECH 101
Program office telephone number: ( <i>i.e. 480/965-2100</i> )	480/727-1874
Program Email Address:	egr@asu.edu
Program Website Address:	https://technology.asu.edu/egr

**4. 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 Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.*

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

Downtown Phoenix     Polytechnic     Tempe     West    Other:

**6. Additional Program Description Information**

- A. Additional program fee required for this program?      No (the CTI has differential tuition)
- B. Does this program have a second language requirement?      No

**7. Career Opportunities & Concentrations**

Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration. (150 words maximum)

The humanitarian concentration prepares students for graduate school in civil engineering, sustainability, and development or careers in U.S. or global general engineering applications and companies, disaster relief, aid and nongovernmental organization development work.

**8. Additional Admission Requirements**

If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)

None

**9. Keywords**

List all keywords used to search for this program. Keywords should be specific to the proposed program.

Engineering, Humanitarian Engineering, Global Resolve, Engineering for the Developing World, Engineering for the bottom of the pyramid, sustainability

**10. Advising Committee Code**

List the existing advising committee code to be associated with this degree. UGTIGA

*Note: If a new advising committee needs to be created, please complete the following form:*

[Proposal to create an undergraduate advising committee](#)

**11. First Required Math Course**

List the first math course required in the major map. MAT 265

**12. Western Undergraduate Exchange (WUE) Eligible:**

Has a request been submitted to the Provost by the Dean to consider this degree program as eligible for WUE?

The degree program is currently eligible for WUE.

*Note: No action will be taken during the implementation process with regards to WUE until approval is received from the Provost.*

**13. Area(s) of Interest**

A. Select **one (1)** primary Area of Interest from the list below that applies to this program.

- |  |   |
|--|---|
| <input type="checkbox"/> <u><a href="#">Architecture, Construction &amp; Design</a></u>    | <input checked="" type="checkbox"/> <u><a href="#">Engineering &amp; Technology</a></u>     |
| <input type="checkbox"/> <u><a href="#">Artistic Expression &amp; Performance</a></u>      | <input type="checkbox"/> <u><a href="#">Environmental Issues &amp; Physical Science</a></u> |
| <input type="checkbox"/> <u><a href="#">Biological Sciences, Health &amp; Wellness</a></u> | <input type="checkbox"/> <u><a href="#">Interdisciplinary Studies</a></u>                   |
| <input type="checkbox"/> <u><a href="#">Business, Management &amp; Economics</a></u>       | <input type="checkbox"/> <u><a href="#">Languages &amp; Cultures</a></u>                    |
| <input type="checkbox"/> <u><a href="#">Communication &amp; Media</a></u>                  | <input type="checkbox"/> <u><a href="#">Law &amp; Justice</a></u>                           |
| <input type="checkbox"/> <u><a href="#">Computing &amp; Mathematics</a></u>                | <input type="checkbox"/> <u><a href="#">Social Science, Policies &amp; Issues</a></u>       |
| <input type="checkbox"/> <u><a href="#">Education &amp; Teaching</a></u>                   |   |

B. Select **any** additional Areas of Interest that apply to this program from the list below.

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> <u><a href="#">Architecture, Construction &amp; Design</a></u> | <input type="checkbox"/> <u><a href="#">Engineering &amp; Technology</a></u>                           |
| <input type="checkbox"/> <u><a href="#">Artistic Expression &amp; Performance</a></u>              | <input checked="" type="checkbox"/> <u><a href="#">Environmental Issues &amp; Physical Science</a></u> |
| <input type="checkbox"/> <u><a href="#">Biological Sciences, Health &amp; Wellness</a></u>         | <input type="checkbox"/> <u><a href="#">Interdisciplinary Studies</a></u>                              |
| <input type="checkbox"/> <u><a href="#">Business, Management &amp; Economics</a></u>               | <input type="checkbox"/> <u><a href="#">Languages &amp; Cultures</a></u>                               |
| <input type="checkbox"/> <u><a href="#">Communication &amp; Media</a></u>                          | <input type="checkbox"/> <u><a href="#">Law &amp; Justice</a></u>                                      |
| <input type="checkbox"/> <u><a href="#">Computing &amp; Mathematics</a></u>                        | <input type="checkbox"/> <u><a href="#">Social Science, Policies &amp; Issues</a></u>                  |
| <input type="checkbox"/> <u><a href="#">Education &amp; Teaching</a></u>                           |  |

The following fields are to be completed by the Office of the Executive Vice President and Provost of the University.

CIP Code: \_\_\_\_\_

Plan Code: \_\_\_\_\_

**From:** [Mitzi Montoya](#)  
**To:** [Scott Danielson](#)  
**Subject:** Re: Approval of the Humanitarian Engineering Concentration Proposal  
**Date:** Saturday, September 14, 2013 6:34:51 PM

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Approved.

*Mitzi M. Montoya  
Arizona State University  
Sent from my DROID*

*From: Scott Danielson  
Sent: Tuesday, September 10, 2013 2:08 PM  
To: Mitzi Montoya  
Cc: Ann McKenna  
Subject: Approval of the Humanitarian Engineering Concentration Proposal*

*Dean Montoya,*

*I am asking for your approval on the attached proposal for a new concentration in Humanitarian Engineering within the BSE in Engineering degree to be offered in the College of Technology and Innovation at the Polytechnic campus. Your approval is needed before I can send the proposal forward to the Provost's office.*

*Your approval indicates that the proposal has been approved by the Department and College levels of review and the College has the resources to offer this degree program. Thus, you recommend implementation of the proposed degree program.*

*Thank you.*

*Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University  
480-727-1185*

**From:** [Ann McKenna](#)  
**To:** [Scott Danielson](#)  
**Subject:** Re: Approval of the Humanitarian Engineering Concentration Proposal  
**Date:** Tuesday, September 10, 2013 3:44:59 PM

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Dear Dr. Danielson,

I approve the proposal for a new concentration in Humanitarian Engineering within the BSE degree program.

Regards,

Ann

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Ann McKenna, Ph.D.  
Professor and Chair  
Department of Engineering & Computing Systems  
College of Technology & Innovation  
Arizona State University  
7171 E. Sonoran Arroya Mall  
Peralta 330B  
Mesa, AZ 85212  
Phone: 480-727-5121  
Email: [ann.mckenna@asu.edu](mailto:ann.mckenna@asu.edu)

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**From:** Scott Danielson <[Scott.Danielson@asu.edu](mailto:Scott.Danielson@asu.edu)>  
**Date:** Tuesday, September 10, 2013 2:05 PM  
**To:** Ann McKenna <[ann.mckenna@asu.edu](mailto:ann.mckenna@asu.edu)>  
**Subject:** Approval of the Humanitarian Engineering Concentration Proposal

Dr. McKenna,

Via a positive response to this email, please indicate your approval of the attached proposal for a new concentration in Humanitarian Engineering within the BSE in Engineering degree. This will also serve as the supporting letter from the chair of the academic unit verifying that the proposed concentration has received faculty approval through appropriate governance procedures in the unit and that the unit has the resources to support the concentration as presented in the proposal, without impacting core course resources.

Thank you.

Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University  
480-727-1185

**From:** [Candice Carr Kelman](#)  
**To:** [Scott Danielson](#)  
**Cc:** [Christopher Boone \(caboone@asu.edu\)](mailto:caboone@asu.edu)  
**Subject:** RE: Humanitarian Concentration to the BSE in Engineering at Poly  
**Date:** Wednesday, September 18, 2013 11:50:46 AM

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Hi Scott,

This sounds great. I imagine that many students will be glad to see this. If there is an elective list, feel free to include our International Development & Sustainability course, SOS 322. Could we see the list of courses you plan to include or is that forthcoming?

Also, would you like a letter or is an email good enough?

By the way, we are also getting ready to submit our Energy Certificate. We do have several CTI course on the electives list (including Village Energy Systems, as you likely recall. I believe that Chris is in the process of sending a letter to Mitzi to ask for her approval to include these courses.

Best,

**Candice Carr Kelman, Ph.D.**

Assistant Director  
School of Sustainability  
Arizona State University  
(480) 965-4460

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**From:** Scott Danielson  
**Sent:** Saturday, September 14, 2013 6:54 PM  
**To:** Candice Carr Kelman  
**Subject:** Humanitarian Concentration to the BSE in Engineering at Poly

Candice,

As part of the proposal submission process, I am asking for School of Sustainability comment on the CTI proposal for an Humanitarian Engineering Concentration to the BSE in Engineering at Poly. This concentration will be on this year's Academic Plan but we are getting ready to submit the proposal concurrently with the plan.

I have provided the basic information below about the proposal. As you can see, it is based the existing Global Resolve work and other work done with the School of Sustainability.

Please let me know your thoughts or if you have questions. Thanks.

Scott

Program Description:

The Humanitarian Engineering Concentration within the ASU College of Technology and Innovation's

BSE Engineering program will provide an opportunity for undergraduates to receive engineering technical content in the context of the developing world. The world-class Global Resolve program within the CTI will partner with the program to help enable program goals. The concentration blends technical rigor in engineering topics with rigorous design and development processes that include consideration of cultural, geographical and humanitarian issues. The concentration will include hands-on experience in humanitarian projects in Arizona and in the developing world. The concentration's course of study emphasizes engineering solutions with integrated building, energy, agricultural and water technologies in small-scale site, village, and neighborhood contexts. The education received by students will include focused content on water systems, energy systems, structural systems, agricultural systems, and development practices, along with complementary content, to produce a well-rounded and competent engineering professional. This concentration will prepare students for graduate school in civil engineering, sustainability, and development, careers in U.S. and global general engineering applications/companies, disaster relief, aid and NGO development work.

#### Demand Statement

This proposed concentration will fill a currently unmet demand at ASU and in Arizona for a program focused on engineering to improve the lives of underprivileged people and/or those in underdeveloped nations throughout the world. There are only a handful of programs in the USA, and around the world, that offer a program of study focused on engineering in the context of the developing world. The concentration's uniqueness will ensure national notice; the concentration's content and context will appeal to a diverse and gender-balanced spectrum of students. We expect it to be a powerful recruiting tool to attract students to the engineering program at ASU Poly. The CTI has long partnered with the School of Sustainability, integrating technical expertise and engineering students with the SOS's focus on human-environment relationships. The number of students enrolling in the CTI classes related to this area of study, e.g., ALT 412, Village Energy Systems, over multiple semesters indicated significant student interest in this area.

Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University  
480-727-1185



**From:** [James Collofello](#)  
**To:** [Scott Danielson](#)  
**Subject:** RE: Humanitarian Concentration to the BSE in Engineering at Poly  
**Date:** Thursday, September 19, 2013 8:18:39 PM

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Scott,

The Fulton Schools of Engineering does not have any concerns with your proposed Humanitarian concentration.

jim

James S. Collofello  
Associate Dean of Academic and Student Affairs  
Professor of Computer Science and Engineering  
School of Computing Informatics and Decision Systems Engineering  
Ira A. Fulton Schools of Engineering  
Arizona State University

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**From:** Scott Danielson  
**Sent:** Saturday, September 14, 2013 6:49 PM  
**To:** James Collofello  
**Subject:** Humanitarian Concentration to the BSE in Engineering at Poly

Jim,

As part of the proposal submission process, I am asking for Fulton School of Engineering comment on the CTI proposal for an Humanitarian Engineering Concentration to the BSE in Engineering at Poly. This concentration will be on this year's Academic Plan but we are getting ready to submit the proposal concurrently with the plan.

I have provided the basic information below about the proposal. As you can see, it is based the existing Global Resolve work.

Please let me know your thoughts or if you have questions. Thanks.

Scott

Program Description:

The Humanitarian Engineering Concentration within the ASU College of Technology and Innovation's BSE Engineering program will provide an opportunity for undergraduates to receive engineering technical content in the context of the developing world. The world-class Global Resolve program within the CTI will partner with the program to help enable program goals. The concentration blends technical rigor in engineering topics with rigorous design and development processes that include consideration of cultural, geographical and humanitarian issues. The concentration will include hands-on experience in humanitarian projects in Arizona and in the developing world. The

concentration's course of study emphasizes engineering solutions with integrated building, energy, agricultural and water technologies in small-scale site, village, and neighborhood contexts. The education received by students will include focused content on water systems, energy systems, structural systems, agricultural systems, and development practices, along with complementary content, to produce a well-rounded and competent engineering professional. This concentration will prepare students for graduate school in civil engineering, sustainability, and development, careers in U.S. and global general engineering applications/companies, disaster relief, aid and NGO development work.

#### Demand Statement

This proposed concentration will fill a currently unmet demand at ASU and in Arizona for a program focused on engineering to improve the lives of underprivileged people and/or those in underdeveloped nations throughout the world. There are only a handful of programs in the USA, and around the world, that offer a program of study focused on engineering in the context of the developing world. The concentration's uniqueness will ensure national notice; the concentration's content and context will appeal to a diverse and gender-balanced spectrum of students. We expect it to be a powerful recruiting tool to attract students to the engineering program at ASU Poly. The CTI has long partnered with the School of Sustainability, integrating technical expertise and engineering students with the SOS's focus on human-environment relationships. The number of students enrolling in the CTI classes related to this area of study, e.g., ALT 412, Village Energy Systems, over multiple semesters indicated significant student interest in this area.

Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University  
480-727-1185

**From:** [Frederick Corey](#)  
**To:** [Scott Danielson](#)  
**Subject:** RE: Humanitarian Concentration to the BSE in Engineering at Poly  
**Date:** Friday, September 20, 2013 4:47:52 PM

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Dear Dr. Danielson,

The School of Letters and Sciences is pleased to support this degree proposal. As you develop connections with other academic units, please keep us in mind. The courses in Science, Technology and Society would complement the degree program well.

Fred

Frederick C. Corey  
Vice Provost  
Dean, University College  
Director, School of Letters and Sciences  
Arizona State University

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**From:** Scott Danielson  
**Sent:** Friday, September 20, 2013 1:25 PM  
**To:** Frederick Corey  
**Subject:** Humanitarian Concentration to the BSE in Engineering at Poly

Dear Dr. Corey,

As part of the proposal submission process, I am asking for School of Letters and Sciences comment on the CTI proposal for an Humanitarian Engineering Concentration to the BSE in Engineering at Poly.

I have provided the basic information below about the proposal. However, if you should like more detail, the bulk of the proposal is also attached. As you can see, it is based the existing CTI Global Resolve work and other work done with the School of Sustainability.

Please let me know your thoughts or if you have questions. Thanks.

Scott

Program Description:

The Humanitarian Engineering Concentration within the ASU College of Technology and Innovation's BSE Engineering program will provide an opportunity for undergraduates to receive engineering technical content in the context of the developing world. The world-class Global Resolve program within the CTI will partner with the program to help enable program goals. The concentration blends technical rigor in engineering topics with rigorous design and development processes that include

consideration of cultural, geographical and humanitarian issues. The concentration will include hands-on experience in humanitarian projects in Arizona and in the developing world. The concentration's course of study emphasizes engineering solutions with integrated building, energy, agricultural and water technologies in small-scale site, village, and neighborhood contexts. The education received by students will include focused content on water systems, energy systems, structural systems, agricultural systems, and development practices, along with complementary content, to produce a well-rounded and competent engineering professional. This concentration will prepare students for graduate school in civil engineering, sustainability, and development, careers in U.S. and global general engineering applications/companies, disaster relief, aid and NGO development work.

#### Demand Statement

This proposed concentration will fill a currently unmet demand at ASU and in Arizona for a program focused on engineering to improve the lives of underprivileged people and/or those in under-developed nations throughout the world. There are only a handful of programs in the USA, and around the world, that offer a program of study focused on engineering in the context of the developing world. The concentration's uniqueness will ensure national notice; the concentration's content and context will appeal to a diverse and gender-balanced spectrum of students. We expect it to be a powerful recruiting tool to attract students to the engineering program at ASU Poly. The CTI has long partnered with the School of Sustainability, integrating technical expertise and engineering students with the SOS's focus on human-environment relationships. The number of students enrolling in the CTI classes related to this area of study, e.g., ALT 412, Village Energy Systems, over multiple semesters indicated significant student interest in this area.

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