

Date Submitted: 03/22/20 6:58 pm

## Viewing: **BENGBS-ENVR : Biological Engineering: Environmental Concentration**

Last approved: 03/16/20 5:03 pm

Last edit: 02/03/21 3:19 pm

Changes proposed by: tac

Catalog Pages Using  
this Program

[Biological Engineering B.S.B.E. with Environmental Concentration](#)

Submitter: 575-2351      User ID: tac      Phone:

Program Status      Active

Academic Level      Undergraduate

Type of proposal      Concentration

Select a reason for this modification

Making Minor Changes to an Existing Degree (e.g. changing 15 or fewer hours, changing admission/graduation requirements, adding/changing Focused Study or Track)

Effective Catalog Year      Fall 2021

College/School Code  
College of Engineering (ENGR)

Department Code  
Department of Biological and Agricultural Engineering (BAEG)

Program Code      BENGBS-ENVR

Degree      Bachelor of Science in Biological Engineering

CIP Code

### In Workflow

1. ENGR Dean Initial
2. Director of Program Assessment and Review
3. Registrar Initial
4. Institutional Research
5. BAEG Chair
6. ENGR Curriculum Committee
7. ENGR Faculty
8. AFLS Dean
9. ARSC Dean
10. EDUC Dean
11. ENGR Dean
12. Global Campus
13. Provost Review
14. University Course and Program Committee
15. Faculty Senate
16. Provost Final
17. Provost's Office-- Notification of Approval
18. Registrar Final
19. Catalog Editor Final

### Approval Path

1. 03/24/20 5:06 pm  
Norman Dennis (ndennis): Approved for ENGR Dean Initial
2. 05/08/20 1:51 pm  
Alice Griffin

- (agriffin): Approved for Director of Program Assessment and Review
3. 07/22/20 12:34 pm  
Lisa Kulczak  
(lkulcza): Approved for Registrar Initial
4. 07/22/20 1:03 pm  
Gary Gunderman  
(ggunderm): Approved for Institutional Research
5. 01/07/21 2:18 pm  
Lalit Verma  
(lverma): Approved for BAEG Chair
6. 01/12/21 4:34 pm  
Manuel Rossetti  
(rossetti): Rollback to BAEG Chair for ENGR Curriculum Committee
7. 02/04/21 11:32 am  
Linda Pate (lpate): Approved for BAEG Chair
8. 02/18/21 9:37 am  
Manuel Rossetti  
(rossetti): Approved for ENGR Curriculum Committee
9. 02/18/21 9:44 am  
Norman Dennis  
(ndennis): Approved for ENGR Faculty

- 10. 02/18/21 9:52 am  
Lona Robertson  
(ljrobert): Approved  
for AFLS Dean
- 11. 02/18/21 7:48 pm  
Jeannie Hulen  
(jhulen): Approved  
for ARSC Dean
- 12. 02/18/21 7:54 pm  
Ketevan  
Mamiseishvili  
(kmamisei):  
Approved for EDUC  
Dean
- 13. 02/18/21 7:55 pm  
Norman Dennis  
(ndennis): Approved  
for ENGR Dean
- 14. 02/19/21 8:35 am  
Suzanne Kenner  
(skenner): Approved  
for Global Campus
- 15. 02/19/21 9:30 am  
Terry Martin  
(tmartin): Approved  
for Provost Review

### History

- 1. Mar 16, 2020 by  
Lisa Kulczak (lkulcza)

14.4501 - Biological/Biosystems Engineering.

Program Title

Biological Engineering: Environmental Concentration

Program Delivery

Method

On Campus

Is this program interdisciplinary?

No

Does this proposal impact any courses from another College/School?

Yes

College(s)/School(s)

College/School Name
Bumpers College of Agricultural, Food, and Life Sciences (AFLS)
Fulbright College of Arts and Sciences (ARSC)

What are the total  
hours needed to  
complete the  
program?

12

## Program Requirements and Description

---

Requirements

### Requirements for B.S. in Biological Engineering with Environmental Concentration

---

The undergraduate program in biological engineering, leading to a Bachelor of Science degree in Biological Engineering, is accredited by the Engineering Accreditation Commission **of ABET**, [www.abet.org](http://www.abet.org) **of ABET**. The B.S. in Biological Engineering degree is conferred by the College of Engineering and is granted after the successful completion of 128 hours of approved course work.

Diverse applications of biological engineering can be pursued through elective coursework. Each student is required to complete 12 semester hours of biological/engineering/technical electives that are relevant to their career goals. Students may choose to pursue the Environmental Concentration within the B.S. in Biological Engineering by carefully choosing their electives to fit the special requirements for the concentration. At least 3 hours must be selected from a list of acceptable biological electives for the environmental concentration. Two 3-hour elective slots are fulfilled by choosing CVEG 3243 and CVEG 4243, see below. The remaining 3 hours of technical electives can be selected from a set of engineering, biology, agriculture, sustainability, and other science/technical areas. A list of acceptable **technical** electives, for the environmental concentration, is maintained by the department.

**Students are required to complete 40 hours of upper division courses (3000-4000 level). It is recommended that students consult with their academic adviser when making course selections.**

### Requirements for Environmental Concentration

---

Complete 12 hours from the following courses:

<a href="#">CVEG 3243</a>	Environmental Engineering	3
<a href="#">CVEG 4243</a>	Environmental Engineering Design	3
Biological Electives 1		3
Technical Electives 1		3

1A list of biological and technical electives for the Environmental Concentration is maintained by the department.

## 8-Semester Plan

## Biological Engineering B.S. with Environmental Concentration

### Eight-Semester Degree Program

The Bachelor of Science in Biological Engineering with Environmental Concentration program is eligible for students who want to participate in an Eight Semester Degree Program. See the [Eight-Semester Degree Policy](#) for more details. The plan below lists a semester-by-semester sequence of courses to finish the degree in eight semesters. University core courses for engineering are listed at the bottom of this page. Students may submit a maximum of 4 hours of "D" in BENG courses for their degree. Some courses are not offered every semester, so students who deviate from the suggested sequence must pay careful attention to course scheduling and course pre-requisites.

First Year	Units
	FallSpring
<a href="#">GNEG 1111</a> Introduction to Engineering I	1
<a href="#">ENGL 1013</a> Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3
<a href="#">CHEM 1103</a> University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture)	3
<a href="#">MATH 2554</a> Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)	4
<del><a href="#">PHYS 2054</a> University Physics I (ACTS Equivalency = PHYS 2034)</del>	<del>4</del> -
<b>U.S. History or Government Elective - Choose one course from the following (Satisfies General Education Outcomes 3.3 and 4.2):</b>	
<a href="#">HIST 2003</a> History of the American People to 1877 (ACTS Equivalency = HIST 2113)	3
or <a href="#">HIST 2013</a> History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or <a href="#">PLSC 2003</a> American National Government (ACTS Equivalency = PLSC 2003)	
<a href="#">GNEG 1121</a> Introduction to Engineering II	1
<a href="#">ENGL 1033</a> Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)	3
Freshman Engineering Science Elective	4
<a href="#">CHEM 1123</a> University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)	
& <a href="#">CHEM 1121L</a> University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)	
or <a href="#">BIOL 1543</a> and <a href="#">BIOL 1541L</a>	
<a href="#">MATH 2564</a> Calculus II (ACTS Equivalency = MATH 2505)	4
<del><a href="#">HIST 2003</a> History of the American People to 1877 (ACTS Equivalency = HIST 2113)</del>	<del>-</del> <del>3</del>

<del>HIST 2003 History of the American People to 1877 (ACTS Equivalency = HIST 2113)</del>	-	3
<del>or HIST 2013 History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)</del>		
<del>or PLSC 2003 American National Government (ACTS Equivalency = PLSC 2003)</del>		
<b>PHYS 2054 University Physics I (ACTS Equivalency = PHYS 2034)</b>		<b>4</b>
Year Total:		14 16
Second Year		Units
		FallSpring
<u>BENG 2632</u> Biological Engineering Design Studio		2
<u>MATH 2574</u> Calculus III (ACTS Equivalency = MATH 2603)		4
Sophomore Science Elective (whichever has not been taken)		4
<u>CHEM 1123</u> University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)		
& <u>CHEM 1121L</u> University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)		
or <u>BIOL 1543</u> and <u>BIOL 1541L</u>		
<del>BIOL 1543 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture)</del>	4	-
<del>&amp; BIOL 1541L Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)</del>		
<u>MEEG 2003</u> Statics		3
<b>PHYS 2074 University Physics II (ACTS Equivalency = PHYS 2044 Lecture)</b>		<b>4</b>
<u>BENG 2643</u> Biological Engineering Methods I		3
<u>MATH 2584</u> Elementary Differential Equations		4
<u>BIOL 2013</u> General Microbiology (ACTS Equivalency = BIOL 2004 Lecture)		4
& <u>BIOL 2011L</u> General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)		
<u>MEEG 2403</u> Thermodynamics		3
or <u>CHEG 2313</u> Thermodynamics of Single-Component Systems		
<del>Social Science Elective-University Core</del>	-	3
<b>Social Science Elective - Choose one course from the list below (Satisfies General Education Outcome 4.1)1</b>		<b>3</b>
Year Total:		17 17
Third Year		Units
		FallSpring
<u>BENG 3653</u> Global Bio-Energy Engineering		3
<u>BENG 3663</u> Biological Engineering Methods II		3
<u>BENG 3733</u> Transport Phenomena in Biological Systems		3
Choose one:		4
<u>CHEM 3603</u> Organic Chemistry I		
& <u>CHEM 3601L</u> Organic Chemistry I Laboratory		
<u>CHEM 2613</u> Organic Physiological Chemistry (ACTS Equivalency = CHEM 1224 Lecture)		
& <u>CHEM 2611L</u> Organic Physiological Chemistry Laboratory (ACTS Equivalency = CHEM 1224 Lab)		
<u>CVEG 3213</u> Hydraulics		3
or <u>MEEG 3503</u> Mechanics of Fluids		

or <a href="#">CHEG 2133</a> Fluid Mechanics		
<a href="#">BENG 3723</a> Unit Operations in Biological Engineering		3
<a href="#">BENG 3113</a> Measurement and Control for Biological Systems		3
<a href="#">CVEG 3223</a> Hydrology		3
Biological Elective (Environmental, choose from a list maintained by the department.)		3
Engineering Elective (Environmental), must choose:		3
<a href="#">CVEG 3243</a> Environmental Engineering		
Year Total:		16 15
Fourth Year		Units
		FallSpring
<a href="#">BENG 4812</a> Senior Biological Engineering Design I		2
<a href="#">BENG 4831</a> Biological Engineering Professionalism		1
<a href="#">BENG 4743</a> Food and Bio-Product Systems Engineering		3
<a href="#">BENG 4933</a> Sustainable Watershed Engineering		3
<b>Humanities Elective - Choose one course from the list below (Satisfies General Education Outcomes 3.2 and 5.1)2</b>		<b>3</b>
Social Science Elective - Choose any course listed on the State Minimum Core.		3
<del>Technical Elective (Environmental)</del>		<del>3 -</del>
<del><a href="#">CVEG 4243</a> Environmental Engineering Design</del>		
<a href="#">BENG 4823</a> Senior Biological Engineering Design II (Satisfies General Education Outcome 6.1)		3
<a href="#">BENG 4663</a> Sustainable Biosystems Designs		3
Technical Elective (Environmental), must choose:		3
<a href="#">CVEG 4243</a> Environmental Engineering Design		
<b>Fine Arts Elective - Choose one course from the list below (Satisfies General Education Outcome 3.1):3</b>		<b>3</b>
Social Science Elective - Choose any course listed on the State Minimum Core.		3
<del>Social Science Elective-University Core</del>		<del>- 3</del>
Technical Elective (Environmental, choose from a list maintained by the department.)		3
Year Total:		15 18

Total Units in Sequence: 128

**1**This Social Science Elective should be selected from the following courses in order to meet State Minimum Core and the General Education Outcome 4.1: [ANTH 1023](#), [COMM 1023](#), [GEOS 2003](#), [GEOS 2003H](#), [HDFS 1403](#), [HDFS 2413](#), [HDFS 2603](#), [HIST 1113](#), [HIST 1113H](#), [HIST 1123](#), [HIST 1123H](#), [HIST 2093](#), [HUMN 1114H](#), [HUMN 2114H](#), [PLSC 2013](#), or [RESM 2853](#).

**2**The Humanities Elective should be selected from the following courses in order to meet State Minimum Core and the General Education Outcomes 3.2 and 5.1: [CLST 1003](#), [CLST 1013](#), [PHIL 2003](#), [PHIL 2003C](#), [PHIL 2003H](#), [PHIL 2103](#), or [PHIL 2103C](#).

**3**The Fine Arts Elective should be selected from the following courses in order to meet the State Minimum Core and the General Education Outcome 3.1: [ARHS 1003](#), [COMM 1003](#), [DANC 1003](#), [MLIT 1003](#),

**MLIT 1003H, MLIT 1013, MLIT 1013H, MLIT 1333, THTR 1003, or THTR 1013.**

Are Similar Programs available in the area?

No

Estimated Student Demand for Program **25-50 NA**

Scheduled Program Review Date See BENGBS.

Program Goals and Objectives

**Program Goals and Objectives**

**The objective of the Environmental Concentration is to meet the listed objectives of the of the Biological Engineering program, with specific applications in the environmental area. See BENGBS.**

Learning Outcomes

**Learning Outcomes**

**The learning outcomes for the Environmental Concentration are the same as the listed outcomes for the Biological Engineering program, with specific applications in the environmental area. See BENGBS.**

Description and justification of the request

<b>Description of specific change</b>	<b>Justification for this change</b>
Eliminate ENGL 1023 as an alternate to ENGL 1033.	ENGL 1023 is not listed as meeting General Education Learning Outcome 1.2 at this time.



Description of specific change	Justification for this change
<p>Limit the choices for one of the Social Science Electives (University Core) to:</p> <p>ANTH 1023            COMM 1023            GEOS 2003            GEOS 2003H            HDFS 1403            HDFS 2413            HDFS 2603            HIST 1113            HIST 1113H            HIST 1123            HIST 1123H            HIST 2093            HUMN 1114H            HUMN 2114H            PLSC 2013            RESM 2853.</p>	<p>These courses will meet General Education Learning Outcome 4.1.</p>
<p>Limit the choices for the Fine Arts Elective (University Core) to:</p> <p>ARHS 1003            COMM 1003            DANC 1003            MLIT 1003            MLIT 1003H            MLIT 1013            MLIT 1013H            MLIT 1333            THTR 1003            THTR 1013.</p>	<p>These courses will meet General Education Learning Outcome 3.1.</p>

Description of specific change	Justification for this change
Limit the choices for the Humanities Elective (University Core) to:  CLST 1003 CLST 1013 PHIL 2003 PHIL 2003C PHIL 2003H PHIL 2103 PHIL 2103C.	These courses will meet General Education Learning Outcomes 3.2 and 5.1.
Notes were added to indicate which courses satisfied the General Education Learning Outcomes: 1.1., 1.2, 2.1, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 5.1 and 6.1, respectively.	This will help the student to see how their program meets the General Education requirements.

Upload attachments

Reviewer Comments

**Norman Dennis (ndennis) (03/24/20 5:06 pm):** Deleted Education and Health Professions from workflow. The one course listed as an elective to me gen ed requirements is in the state core

**Alice Griffin (agriffin) (05/06/20 4:27 pm):** Revised formatting of the eight semester plan to provide consistency with the General Education curriculum language. Removed lists of courses and added footnotes. Hyper-linked courses for access to course details.

**Alice Griffin (agriffin) (05/08/20 1:47 pm):** Added statement in program requirements regarding the 40 hour rule with permission from the college dean's office.

**Lisa Kulczak (lkulcza) (10/27/20 12:20 pm):** Per email from Norm Dennis, updated ABET info/link in program requirements.

**Manuel Rossetti (rossetti) (01/12/21 4:34 pm):** Rollback: Rollback to allow change with FEP science elective and Physics 1 to be addressed.

Key: 744