

University Courses & Curricula Committee 2016-2017

March 29th, 2017
Talley Student Union 4140
12:45pm-2:45pm

Call to Order 12:45pm

- Welcome and Instructions, Chair Andy Nowel
- Remarks from Associate Vice Provost, Dr. Barbara Kirby
- Approval of UCCC March 15th, 2017 Minutes
- Course and Curricular Business

New Business

Consent Agenda		
Action	Type	Notes
AGI 111 Writing Skills I	Drop	Revisions in curricula for AAS accreditation
AGI 112 Writing Skills II	Drop	Revisions in curricula for AAS accreditation
AGI 114 Mathematical Skills I	Drop	Revisions in curricula for AAS accreditation
AGI 115 Mathematical Skills II	Drop	Revisions in curricula for AAS accreditation
AGI 151 Community Leadership and Development	Drop	Revisions in curricula for AAS accreditation
BIO 120 The Dinosaurian World	Drop	Replaced by BIO 230
LOG/MA 335 Symbolic Logic	Revisions	Revising instructor and requisites

University College			
Presenter	Reviewers	Action	Type
Fath	Klesath, Ophanides, Harper	MUS 200 Understanding Music: Global Perspectives	Revising SLO, description
Fath	Podurgal, Despain, Young	MUS 320 Music of the 20th Century	Revising SLO, description, requisites
Beller	Hergeth, Ferguson, Hessling	NS 420 Naval Leadership and Ethics	Revising: SLOs, requisites

College of Sciences			
Presenter	Reviewers	Action	Type
Klesath	Lindsay, Tarp, Podurgal	BSC 410/(510) Animal Behavior	New Course

College of Agriculture and Life Sciences			
Presenter	Reviewers	Action	Type
Tarp	Driscoll, Beller, Wu	AGI 191 Professional Development	New Course
Tarp	Hergeth, Fath, Rieder	11BEBS BS in Biological Engineering	Revisions
Trivedi	Despain, Lindsay, Banks	11BEBS-11BEBEA BS in Biological Engineering-Agricultural Engineering Concentration	Revisions
Trivedi	Rieder, Klesath, Beller	11BEBS-11BEBEC BS in Biological Engineering-Ecological Engineering Concentration	Revisions

Informational

Recommendations to GA from Biannual Review Results	
Discontinue	Continue
BS English	BS and BA Interdisciplinary Studies
BS Criminology	BS Philosophy
BA Geology	BS Sociology
	BS Turfgrass Science

SLO = Student Learning Outcomes

Discussion: Feedback for Syllabus Availability.

Notes:

- All linked course actions are viewable in CIM.
- To view actions, please click on the hyperlink. You may need to use your Unity ID to log in.
- If you experience issues logging in, please go to <https://next-catalog.ncsu.edu/courseadmin/> and type the course prefix and number into the search bar.

University Courses and Curricula CommitteeMarch 15, 2017
Talley Student Union 4140
Call to Order: 12:47 pm

Members Present: Chair Andy Nowel, Amanda Beller, Scott Despain, Catherine Driscoll, Mian Wu, Elizabeth Fath, Andreas Orphanides, Kathleen Rieder, Helmut Hergeth, Edwin Lindsay, Richard Podurgal, Daniel Harper, Marta Klesath, Peter Hessling, David Tarpy, Shweta Trivedi,

Members Absent: Michael Robinson, Steven Peretti, Scott Ferguson, Alton Banks, Greg Young

Guest: Jane Lubischer, Jason DeRousie

Ex-Officio Members Present: Lexi Hergeth, Barbara Kirby, Rebecca Swanson, Kyle Pysher, John Harrington, Jordan Luzander

WELCOME AND INTRODUCTIONS

- **Remarks from Chair Andy Nowel-** Introduced guests and new XONV member from assessment, Jordan Luzader and asked members to speak into the microphones to be heard clearly on the recording.
- **Remarks from Associate Vice Provost Dr. Barbara Kirby-** Explained Jordan's role in assessment and how he can assist faculty with student learning outcomes, objectives, and other means of assessment. Dr. Kirby updated the committee on the Low Productivity enrollment report from General Administration. GA is now using only one metric which is average number of degrees produced over the past 5 years and they have set new minimums of 7 for baccalaureate degrees. Also, prior to this biennial review, GA combined numbers for the Bachelor of Arts and Bachelor of Science programs in the same discipline, ie: B.S. Criminology, B.A. Criminology. The departments worked with our office and the Provost's office to select one option for the low enrolled program and wrote a justification. All justifications have been submitted to the Provost office and will be forwarded to GA. OUCC will make the reports available to UCCC for information. General Administration manages programs so OUCC will not need to vote on the discontinuing a program or continuation options.
- **Approval of the Minutes from February 22nd 2017 – Approved Unanimously**
 - Discussion: Member Catherine Driscoll moved to approve. Minutes from the previous meeting were presented and approved without further discussion.

NEW BUSINESS

- **Consent Agenda—Approved Unanimously**
Discussion: Member Beth Fath moved to approve. Member asked why courses are being dropped and found the answers in CIM for each course.
- **BUS 429 Financial Modeling- Approved Pending**
Discussion: Member Richard Podurgal presented the course. Course approved pending the addition of the following to the syllabus; rounding statement, cost of textbook, a statement addressing +- grading, policy on late assignments, the updated disabilities statement, and the inclusion of Electronic Hosting statement. Also pending the addition of a justification statement why no new resources are needed for the course. The friendly suggestion was made to replace the phrasing of objective two, "understand". Assessment representative explained that objectives are broader and can use broader language
- **Business Management Finance Concentration – Approved Unanimously**
Discussion: Member Richard Podurgal presented the curricular action. No further discussion.
- **Business Analytics Honors Program- Approved Unanimously**
Discussion: Member Richard Podurgal presented the curricular action. No further discussion.
- **HESM 370 Foundations of Sport Coaching and Instruction—Approved Unanimously**
Discussion: Member Beth Fath presented the course.
- **Health Minor 24HLTHM - Approved Unanimously**
Discussion: Member Amanda Beller presented the curricular action.

- **BIO 230 The Science of Studying Dinosaurs- Approved Pending**
Discussion: Member Marta Klesath presented the course. Members briefly discussed a statement in CIM that a basic understanding of biology is expected and if this is necessary because of the prerequisites. Members decided the statement was a reiteration of the prerequisites used to answer questions without contradicting the prerequisites. Approved pending the addition of credit hours in the syllabus. Friendly suggestion was also made to provide additional clarification on the late assignments section of the syllabus.
- **PY 495 Special Topics in Physics- Approved Unanimously**
Discussion: Member Marta Klesath presented the course.
- **Biological Sciences (BS): Molecular, Cellular, & Developmental Biology 17BIOSCBS-17BIOSCMCD - Approved Unanimously**
Discussion: Member Marta Klesath presented the curricula action. No further discussion.
- **Fashion and Textile Management Degree (18FTMBS) 18FTMBMM and 18FTMFDP - Approved Unanimously**
Discussion: Member Helmut Hergeth presented the curricular action.
- **ENT 203 An Introduction to the Honey Bee and Beekeeping- Approved Unanimously**
Discussion: Member Shweta Trivedi presented the course. No further discussion.
- **HS 495 Experimental Courses in Horticultural Science - Approved Unanimously**
Discussion: Member Shweta Trivedi presented the course. No further discussion.
- **PO/FM 426 Feed Manufacturing Technology Laboratory- Approved Unanimously**
Discussion: Member David Tarpy presented the curricula action. Dr. Kirby asked if the corresponding lecture PO 425 would also be adjusted to insure the any mention of a required lab is removed based on this action. Presenter insured the lecture will be looked at to make sure a lab requirement is not listed.
- **FLF 212 French: Language, Culture, and Technology- Approved Unanimously**
Discussion: Member Catherine Driscoll presented the course.
- **SW 290 The Development of Social Welfare and Social Work in the U.S- Approved Unanimously**
Discussion: Member Scott Despain presented the course. Members made the friendly suggestion to provide additional information on how GEPs are met along with the quiz question example provided. Members discussed the requirements for CUE are to provide a few specific examples, Dr. Kirby commented that if the example is too vague CUE will address in that meeting. Member from assessment indicated the example is clear and aligned with the GEP category.
- **Forest Management Minor 15FGM - Approved Unanimously**
Discussion Member Edwin Lindsay presented the curricula action. Members discussed if students would receive credit for the Option B summer camp that is not associated with the minor. Dr. Kirby explained how the credit hours in option B were from the course work, not the summer camp.

Discussion: Dr. Kirby discussed the PREP feedback for the Agroecology and Sustainable Food Systems. Clarification is needed on the minimum hours for the display and another institution inquired about collaborating with them because they have a degree program with a similar concentration.

Meeting adjourned at 1:39 pm

Respectfully submitted by Lexi Hergeth



MEMORANDUM

To: University Courses and Curricula Committee

From: S. Andrew Hale, Ph.D. *S. Andrew Hale*
Undergraduate Coordinator, Bio & Ag Engineering

Subject: Degree Revision for 11BEBS, B.S. in Biological Engineering

At the request of the Office of Courses and Curricula, the following format A and format B curriculum revisions are attached. They show the requested modifications needed for final implementation of the Spring 2016 modification in 11BEBS.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: x Proposed Effective Semester: Spring 2016

Degree/Plan Title: B.S. in Biological Engineering

Concentration/Subplan Title: None

Plan SIS Code: 11BEBS

Subplan SIS Code:

New Degree Audit required? (Y or N) Y

Change already made online from March 16, 2016 Meeting

New Change

Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol. Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH *** Chemistry Elective ²	4
E 101 Introduction to Engr & Prob Solv ¹	1	MA 241 Calculus II ^{1A}	4
E 115 Intro to Computing Environ	1	PY 205 Physics for Engr & Sc I ^{1B}	3
ENG 101 Academic Writing and Research ^{1H}	4	PY 206 Physics for Engr & Sc I Lab ^{1B}	1
MA 141 Calculus I ^{1A}	4	Economics (GEP Soc Sci Req ^D) ³	3
HES 1**_ Fitness & Wellness Course ^E	1		
	<i>Total:15</i>		<i>Total:15</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 200 Comp Meth In Biol Engr	2	BAE 202 Intro to BAE Methods <i>or</i>	4
MAE 206 Engineering Statics <i>or</i>		(BAE 203 Intro to ACAD and	2
CE 214 Engineering Mechanics-Statics ¹	3	BAE 204 Intro to Env & Eco Eng)	2
MA 242 Calculus III	4	MAE 208 Engineering Dynamics ¹	3
PY 208 Physics for Engr & Sc II ^{1B}	4	MA 341 Applied Diff Equations	3
PY 209 Physcis for Engr & Sc II Lab	4	MAE 201 Engr Thermodynamics I	3
BIO 181 Intro Biol: Ecol, Evol & Biodiv ^B <i>or</i>	4	Biol Science/Chemistry Elective ⁴	3
BIO 183 Intro. Biol: Cell & Mol Biol ^B			
	<i>Total:17</i>		<i>Total:16</i>
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 302 Transport Phenomena	3	BAE *** BAE Elective⁵	3
BAE *** BAE Elective ⁵	3	MAE 214 Solid Mechanics <i>or</i>	3
MAE 308 Fluid Mechanics <i>or</i>		CE 313 Mechanics of Solids ¹	3
CE 382 Hydraulics ¹	3	ST 370 Prob & Statistics for Engr	3
ENG 331 Comm. Engr. & Tech. <i>or</i>	3	BAE 401 Instrumentation for Bio Sys	3
ENG 333 Comm. Sci. & Res.	3	Advanced Biology Elective⁶	3
BAE 305 Bio Eng Circuits	4		
	<i>Total:16</i>		<i>Total:15</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 451 Engr Design I	2	BAE 452 Engr Design II	2
Engr Elective ⁷	3	Adv. Bio Eng Elective⁹	3
Engr Elective⁷	3	GEP Social Science Elective ^D	3
BAE *** BAE Elective⁵	3	GEP Interdisciplinary Persp. Elec. ^G	2
Ethics (GEP Interdisc. Persp. Elec. ^G) ⁸	3	GEP Additional Breadth Requirement ^F	3

adding will effect total

online not in either

GEP Humanities Requirement

Next Page

GEP Humanities Requirement ^C	3	GEP Humanities Requirement ^C HES_***Phys Ed/Healthy Living Elective ^E	3 1
	Total:17		Total:17
Minimum Credit Hours Required for Graduation : 128			

Major/Program Footnotes:

- ¹Must be completed with a grade of C- or higher.
- ²Choose from CH 201 & 202; CH 220 & 222; or CH 221 & 222.
- ³Choose from EC 205, ARE 201 or EC 201.
- ⁴Choose from SSC 200, CH 201 & 202; CH 220 & 222; CH 221 & 222 or any advanced biology elective.
- ⁵Choose from BAE 361, 322, 371 or 481.
- ⁶Choose from GN 311, HS 462, MB 351, PB 321, PB/BIO 360, BIO 361, BIO 414 or SSC 332.
- ⁷Choose from BAE 361, 422, 425, 462, 471, 472, 473, 474, 481, 528 or 578; or CHE 435; or ISE 311.
- ⁸Choose from IDS 201, STS 302 or STS 304.
- ⁹Choose from BAE 425, 474 or 488.

***General Education Program (GEP) requirements and GEP Footnotes:**

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied. University approved GEP course lists for each of the following categories can be found at <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)
Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **MA 141, MA 241**
 - B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **CH 101, CH 102, BIO 181, PY 205, PY 208**
 - C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
 - D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **EC 201, 205 or ARE 201**
 - E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
 - F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
 Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
 - G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
 - H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better)
- The following Co-Requisites must be satisfied to complete the General Education Program requirements:**
- I. **U.S. Diversity (USD)**
Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**
 - J. **Global Knowledge (GK)**
Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**
 - K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: x Proposed: Proposed Effective Semester:

Degree/Plan Title: B.S. in Biological Engineering

Concentration/Subplan Title: None

Plan SIS Code: 11BEBS

Subplan SIS Code:

New Degree Audit required? (Y or N)

Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol. Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH *** Chemistry Elective ²	4
E 101 Introduction to Engr & Prob Solv ¹	1	MA 241 Calculus II ^{1A}	4
E 115 Intro to Computing Environ	1	PY 205 Physics for Engr & Sc I ^{1B}	3
ENG 101 Academic Writing and Research ^{1H}	4	PY 206 Physics for	1
MA 141 Calculus I ^{1A}	4	Economics (GEP Soc Sci Req ^D) ³	3
HES_ 1** Fitness & Wellness Course ^E	1		
	Total:15		Total:16
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 200 Comp Meth In Biol Engr	2	BAE 202 Intro to BAE Methods	4
MAE 206 Engineering Statics or		MAE 208 Engineering Dynamics or	
CE 214 Engineering Mechanics-Statics ¹	3	CE 215 Engr Mechanics-Dynamics ¹	3
MA 242 Calculus III	4	MA 341 Applied Diff Equations	3
PY 208 Physics for Engr & Sc II ^{1B}	4	MAE 301 Engr Thermodynamics I	3
PY 209 Physics for Engr & Sc II Lab		Biol Science/Chemistry Elective ⁴	3
BIO 181 Intro Biol: Ecol, Evol & Biodiv ^B or	4		
BIO 183 Intro. Biol: Cell & Mol Biol ^B			
	Total:17		Total:16
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 302 Transport Phenomena	3	BAE 315 Prop Biol Eng Materials	3
BAE *** BAE Elective ⁵	3	BAE *** BAE Elective ⁵	3
MAE 308 Fluid Mechanics or		MAE 314 Solid Mechanics or	
CE 382 Hydraulics ¹	3	CE 313 Mechanics of Solids ¹	3
ECE 331 Prin Elect Engr I	3	ST 370 Prob & Statistics for Engr	3
Advanced Biology Elective ⁶	3	GEP Humanities Requirement ^C	3
		HES_ ***Phys Ed/Healthy Living Elective ^E	1
	Total:15		Total:16
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 401 Bioinstrumentation	3	BAE 452 Engr Design II	2
BAE 451 Engr Design I	2	BAE 425 Industrial Microbiology & Bioprocess or	
Engr Elective ⁷	3	BAE 474 Ecological Engineering	3
Ethics (GEP Interdisc. Persp. Elec. ^G) ⁸	3	GEP Social Science Elective ^D	3

ENG 331 Comm. Engr. & Tech.or ENG 333 Comm. Sci. & Res.	3	GEP Interdisciplinary Persp. Elec. ^G GEP Additional Breadth Requirement ^F GEP Humanities Requirement ^C	2 3 3
	<i>Total:14</i>		<i>Total:16</i>
Minimum Credit Hours Required for Graduation : 125			

Major/Program Footnotes:

- ¹Must be completed with a grade of C- or higher.
²Choose from CH 201& 202; CH 220; or CH 221 & 222.
³Choose from EC 205, ARE 201 or EC 201.
⁴Choose from SSC 200, CH 201& 202; CH 220; CH 221 & 222 or any advanced biology elective.
⁵Choose from BAE 361, 322, 371 or 481.
⁶Choose from GN 311, HS 462, MB 351, PB 321, PB/BIO 360, BIO 361, BIO 414 or SSC 332.
⁷Choose from BAE 361, 422, 425, 462, 471, 472, 473, 474, 481, 528 or 578; or CHE 435; or ISE 311.
⁸Choose from IDS 201, STS 302 or STS 304.

***General Education Program (GEP) requirements and GEP Footnotes:**

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied. University approved GEP course lists for each of the following categories can be found at <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)
Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **MA 141, MA 241**
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **CH 101, CH 102, BIO 181, PY 205, PY 208**
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **EC 201, 205 or ARE 201**
- E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
- F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
 Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
- G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
- H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better)

The following Co-Requisites must be satisfied to complete the General Education Program requirements:

- I. **U.S. Diversity (USD)**
Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**
- J. **Global Knowledge (GK)**
Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

CURRICULUM REQUIREMENTS**Format B**

<u>Degree/Plan Title</u> : B.S. in Biological Engineering	<u>Plan SIS Code</u> : 11BEBS
<u>Concentration/Subplan Title</u> : None	<u>Subplan SIS Code</u> :
<u>Indicate requirements status</u> : Current: Proposed: X <u>Proposed Effective Semester</u> : Spring 2016	
<u>New Degree Audit required?</u> (Y or N) Y	
<u>Critical Path Courses</u> - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.	

MAJOR FIELD OF STUDY REQUIREMENTS:		
<i>Required Courses/Groups/ Electives:</i>	<i>Credit Hours</i>	<i>GEP category, if applicable</i>
Indicate if course or course groupings have a C-wall or MGPA requirement and which are considered Critical Path courses – indicate with (CP) next to applic. course.		List GEP category and hours satisfied by a Major requirement
<u>Math</u> MA 141, MA 241, MA 242, MA 341	15	Mathematics (6 hours)
ST 370	3	
<u>Sciences</u> CH 101, CH 102, PY 205, PY 206, PY 208, PY 209, BIO 181, SSC 200	19	Natural Sciences (8 hours)
CH 201 & 202, CH 220 & 222, CH 221 & 222	4	
<u>Advanced Biology Elective</u> GN 311, HS 462, MB 351, PB 321, PB/BIO 360, BIO 361 BIO 414, SSC 332	3	
<u>Economics Elective</u> EC 201, EC 205 or ARE 201	3	Social Sciences (3 hours)
<u>Major Courses</u> BAE 200, BAE 202 or (BAE 203 and BAE 204), BAE 302, BAE 305, BAE 401, BAE 451, BAE 452	20	
MAE 201	3	
MAE 206 or CE 214	3	
MAE 208	3	
CE 382	3	
MAE 214 or CE 313	3	
<u>BAE Elective</u> BAE 322, BAE 361, BAE 371, BAE 481	9	
<u>Engineering Elective</u> BAE 322, BAE 361, BAE 425, BAE 462, BAE 371, BAE 472, BAE 473, BAE 474, BAE 478, BAE 481, BAE 528, CHE 435, ISE 311	3	
<u>Advanced Biological Engineering Elective</u> BAE 425, BAE 474	3	
<u>Ethics Elective</u> IDS 201, STS 302, STS 304	3	Interdisciplinary Perspectives (3 hours)

Communications Elective ENG 331, ENG 333	3	
Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	103 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101, E 115	2	
Other: ENG 331 or 333	3	Satisfies Communications in the Major GEP co-requisite
Total credit hours under College Requirements:	5	

NCSU GENERAL EDUCATION PROGRAM REQUIREMENTS		At least one of the following must be listed:
<p><i>Courses in the Major and/or Minor may also fulfill a General Education requirement; however, a GEP category may not be subset to require a specific course from the category list. Required courses must be listed in the Major/College requirements.</i></p> <p><i>Specific courses should not be listed in any of the fields below other than ENG 101.</i></p>		<ol style="list-style-type: none"> 1 Choose course(s) from the University Approved GEP course list for this category. 2 Minimum requirements are satisfied by Major/College course requirements. 3 Major/College course requirement satisfies <u>X</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category. 4 Co-requisite is satisfied by a Major/College course requirement. 5 Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts. 6 Choose course(s) from the University Approved GEP course lists for Natural Sciences/Mathematical Sciences.
General Education Program Requirements: <i>Minimum 39-40 hrs</i>	Credit hours	How will the GEP requirement be met? <i>(Choose applicable statement from 1-6 listed above)</i>
Mathematical Sciences (6 credits) <i>(At least 1 course with MA or ST prefix)</i> <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
Natural Sciences (7 credits) <i>(At least 1 lab course or course with a lab)</i> <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) <i>(Courses from two different disciplines)</i> <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	6	<i>(Choose statement 1, 2 or 3)</i> Choose course(s) from the University Approved GEP course lists for the Humanities.
Social Sciences (6 credits) <i>(Courses from two different disciplines)</i> <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	3	<i>(Choose statement 1, 2 or 3)</i> Major course requirement satisfies <u>3</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
Additional Breadth (3 credits) <i>(Choose approach that is different from the approach of the Major)</i> <i>Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge or U.S. Diversity co-requisites.</i>	3	<i>(Choose statement 5 or 6)</i> Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts.
Interdisciplinary Perspectives (5 credits) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	2	<i>(Choose statement 1, 2 or 3)</i> Major course requirement satisfies <u>3</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.

Health and Exercise Studies (Including one <i>Fitness and Wellness</i> course)	(2 credits)	2	Choose course(s) from the University Approved GEP course list for this category.
Total credit hours needed to complete GEP that are not satisfied as part of the Major/College requirements.		20 hours	
GEP Co-Requisites:			<i>Courses taken in the Major, GEP, or Minor may double-count to fulfill the co-requisites. Courses that satisfy the U.S. Diversity or Global Knowledge co-requisite are marked on course lists with a "USD" or "GK" indicator.</i>
U.S. Diversity co-requisite	(USD)	n/a	Choose course(s) from the University Approved GEP course list for this category.
Global Knowledge co-requisite	(GK)	n/a	Choose course(s) from the University Approved GEP course list for this category.
Foreign Language Proficiency		n/a	Proficiency at the FL_102 level required.
The following requirements must be satisfied within the College/Program:			Place an X in the credit hour box to indicate below that the requirement is "Satisfied by College/Program Requirements"
Communication in the Major (Advanced Communication)		X	Satisfied by College/Program Requirements
Technology Fluency		X	Satisfied by College/Program Requirements
Total credit hours required to complete Degree: Total must be within 120-128 credit hours.		128 Total hours	As applicable, indicate here the overall GPA requirement for degree completion including course completion.

MEMORANDUM

To: University Courses and Curricula Committee

From: S. Andrew Hale, Ph.D. *S. Andrew Hale*
Undergraduate Coordinator, Bio & Ag Engineering

Subject: Degree Revision for 11BEBS-11BEBEA, B.S. in Biological Engineering – Agricultural Engineering Concentration

At the request of the Office of Courses and Curricula, the following format A and format B curriculum revisions are attached. They show the requested modifications needed for final implementation of the Spring 2016 modification in 11BEBS-11BEBEA.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: x Proposed Effective Semester: Spring 2016

Degree/Plan Title: B.S. in Biological Engineering

Concentration/Subplan Title: Agricultural Engineering

Plan SIS Code: 11BEBS

Already Addressed
from March 2016
Meeting

Subplan SIS Code: 11BEBA

New Degree Audit required? (Y or N) Y

Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol. Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH*** Chemistry Elective ³	4
E 101 Introduction to Engr & Prob Solv ¹	1	MA 241 Calculus II ^{1A}	4
E 115 Intro to Computing Environ	1	PY 205 Physics for Engineers & Scientists I ^{1B}	3
ENG 101 Academic Writing & Research ^{1H}	4	PY 206 Physics for Engineers & Scientists I Lab	1
MA 141 Calculus I ^{1A}	4	GEP Humanities Requirement ^C	3
EC 205 Economics (GEP Soc Sci Req ^D) ²	3	HES_*** Health & Exercise Studies Course ^E	1
	<i>Total:17</i>		<i>Total:16</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 200 Comp Meth in Biol Engr	2	BAE 202 Intro to BAE Methods	4
MAE 206 Engineering Statics or CE 214 Engineering Mechanics-Statics ¹	3	MAE 208 Engineering Dynamics ¹	3
MA 242 Calculus III	4	MA 341 Applied Diff Equations	3
PY 208 Physics for Engineers & Scientists II ^B	3	MAE 301 Engr Thermodynamics I	3
PY 209 Physics for Engineers & Scientists II Lab	1	SSC 200 Soil Science	3
BIO 181 Intro Biol: Ecol, Evol & Biodiv ^B or BIO 183 Intro Biol: Cell & Mol Bio ^B	4		
	<i>Total:17</i>		<i>Total:16</i>
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 325 Intro Geomatics	3	BAE 401 Instrumentation for Bio Sys	3
BAE 302 Transport Phenomena	3	BAE 361 Analytical Methods Engr Des	3
MAE 308 Fluid Mechanics or CE 382 Hydraulics ¹	3	MAE 314 Solid Mechanics or CE 313 Mechanics of Solids ¹	3
BAE 305 Bio Eng Circuits	4	ST 370 Prob & Statistics for Engr	3
ENG 331 Comm. Engr. & Tech. or	3	Adv. Biology Elective ⁵	3
ENG 333 Comm. Sci. & Res.			
	<i>Total:16</i>		<i>Total:15</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 451 Engr Design I	2	BAE 452 Engr Design II	2
BAE 462 Machinery Design Appl	3	BAE 488 Postharvest Engineering	3
HES_*** Health & Exercise Studies Course ^E	1	BAE 481 Structures and Environment	3
Ethics (GEP Interdisciplinary Persp. Elec. ^G) ⁶	3	BAE Elective⁴	3
GEP Humanities Requirement^C	3	GEP Interdisciplinary Persp. Elec. ^G	2
GEP Social Science Elective^D	3	GEP Additional Breadth Requirement ^F	3
	<i>Total:15</i>		<i>Total:16</i>
Minimum Credit Hours Required for Graduation : 128			

Major/Program Footnotes:

- ¹ Must be completed with a grade of C- or higher.
- ² Choose from EC 201 or 205, or ARE 201.
- ³ Choose from CH 201 & 202, CH 220 & 222, or CH 221 & 222
- ⁴ Choose from BAE 322, or 371
- ⁵ Choose from PB 321, PB 360, MB 351, SSC 332, or HS 462
- ⁶ Choose from IDS 201, STS 302, or STS 304.

← Underlined changes were already reflected on file

* General Education Program (GEP) requirements and GEP Footnotes:

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied.

University approved GEP course lists for each of the following categories can be found at <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)
Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **MA 141, MA 241**
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **CH 101, CH 102, BIO 181, BIO 183, PY 205, PY 206, PY 208, PY 209**
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **EC 201, EC 205 or ARE 201**
- E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
- F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
 Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
- G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: **None**
- H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better)

The following Co-Requisites must be satisfied to complete the General Education Program requirements:

- I. **U.S. Diversity** (USD)
Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**
- J. **Global Knowledge** (GK)
Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: **None**

Foreign Language proficiency - Proficiency at the FL_102 level is required for graduation.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: x Proposed: Proposed Effective Semester:

Degree/Plan Title: B.S. in Biological Engineering

Concentration/Subplan Title: Agricultural Engineering

Plan SIS Code: 11BEBS

Subplan SIS Code: 11BEBEA

New Degree Audit required? (Y or N)

Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol. Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH*** Chemistry Elective ³	4
E 101 Introduction to Engr & Prob Solv ¹	1	MA 241 Calculus II ^{1A}	4
E 115 Intro to Computing Environ	1	PY 205 Physics for Engineers & Scientists I ^{1B}	3
ENG 101 Academic Writing & Research ^{1H}	4	PY 206 Physics for Engineers & Scientists I Lab	1
MA 141 Calculus I ^{1A}	4	GEP Humanities Requirement ^C	3
EC 205 Economics (GEP Soc Sci Req ^D) ²	3	HES_*** Health & Exercise Studies Course ^E	1
	Total:17		Total:17
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 200 Comp Meth in Biol Engr	2	BAE 202 Intro to BAE Methods	4
MAE 206 Engineering Statics or CE 214 Engineering Mechanics-Statics ¹	3	MAE 208 Engineering Dynamics or CE 215 Engr Mechanics-Dynamics ¹	3
MA 242 Calculus III	4	MA 341 Applied Diff Equations	3
PY 208 Physics for Engineers & Scientists II ^B	3	MAE 301 Engr Thermodynamics I	3
PY 209 Physics for Engineers & Scientists II Lab	1	PB 321 Intro to Whole Plant Physiology or SSC 200 Soil Science	3
BIO 181 Intro Biol: Ecol, Evol & Biodiv ^B or BIO 183 Intro Biol: Cell & Mol Bio ^B	4		
	Total:17		Total:16
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 325 Intro Geomatics	3	BAE 315 Prop Biol Eng Materials	3
BAE 302 Transport Phenomena	3	BAE 361 Analytical Methods Engr Des	3
BAE*** BAE Elective ⁴	3	MAE 314 Solid Mechanics or CE 313 Mechanics of Solids ¹	3
MAE 308 Fluid Mechanics or CE 382 Hydraulics ¹	3	ST 370 Prob & Statistics for Engr	3
ECE 331 Princ Elect Engr I	3	Adv. Biology Elective ⁵	3
	Total:15		Total:15
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 401 Bioinstrumentation	3	BAE 452 Engr Design II	2
BAE 451 Engr Design I	2	BAE 425 Indust. Microbiology & Bioproc. or BAE 474 Ecological Engineering	3
BAE 462 Machinery Design Appl	3	GEP Social Science Elective ^D	3
ENG 331 Comm. Engr. & Tech. or ENG 333 Comm. Sci. & Res.	3	GEP Humanities Requirement ^C	3
HES_*** Health & Exercise Studies Course ^E	1	GEP Interdisciplinary Persp. Elec. ^G	2
Ethics (GEP Interdisciplinary Persp. Elec. ^G) ⁶	3	GEP Additional Breadth Requirement ^F	3
	Total:15		Total:16
Minimum Credit Hours Required for Graduation : 128			

Major/Program Footnotes:

- ¹ Must be completed with a grade of C- or higher.
- ² Choose from EC 201 or 205, or ARE 201.
- ³ Choose from CH 201 & 202, CH 220, or CH 221 & 222
- ⁴ Choose from BAE 322, 371, or 481
- ⁵ Choose from MB 351, SSC 332, or HS 462
- ⁶ Choose from IDS 201, STS 302, or STS 304.

* General Education Program (GEP) requirements and GEP Footnotes:

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied.

University approved GEP course lists for each of the following categories can be found at <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)
Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: MA 141, MA 241
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: CH 101, CH 102, BIO 181, BIO 183, PY 205, PY 206, PY 208, PY 209
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: EC 201, EC 205 or ARE 201
- E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
- F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
 Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
- G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None
- H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better)

The following Co-Requisites must be satisfied to complete the General Education Program requirements:

- I. **U.S. Diversity (USD)**
Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None
- J. **Global Knowledge (GK)**
Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

CURRICULUM REQUIREMENTS

Format B

<u>Degree/Plan Title:</u> B.S. in Biological Engineering	<u>Plan SIS Code:</u> 11BEBS
<u>Concentration/Subplan Title:</u> Agricultural Engineering	<u>Subplan SIS Code:</u> 11BEBEA
<u>Indicate requirements status:</u> Current: Proposed: X	<u>Proposed Effective Semester:</u> Spring 2016
<u>New Degree Audit required?</u> (Y or N) Y	
<u>Critical Path Courses</u> - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.	

MAJOR FIELD OF STUDY REQUIREMENTS:	Credit Hours	GEP category, if applicable
<i>Required Courses/Groups/ Electives:</i>		
Indicate if course or course groupings have a C-wall or MGPA requirement and which are considered Critical Path courses – indicate with (CP) next to applic. course.		List GEP category and hours satisfied by a Major requirement
Math MA 141, MA 241, MA 242, MA 341	15	Mathematics (6 hours)
ST 370	3	
Sciences CH 101, CH 102, PY 205, PY 206, PY 208, PY 209, BIO 181, SSC 200	19	Natural Sciences (8 hours)
CH 201 & 202, CH 220 & 222, CH 221 & 222	4	
Advanced Biology Elective MB 351, SSC 332, HS 462	3	
Economics Elective EC 201, EC 205 or ARE 201	3	Social Sciences (3 hours)
Major Courses BAE 200, BAE 202, BAE 302, BAE 305, BAE 401, BAE 451, BAE 452	20	
MAE 201	3	
MAE 206 or CE 214	3	
MAE 208	3	
CE 382	3	
MAE 214 or CE 313	3	
BAE Elective BAE 322, BAE 371, BAE 481	3	Interdisciplinary Perspectives (3 hours)
Ethics Elective IDS 201, STS 302, STS 304	3	

Communications Elective ENG 331, ENG 333	3	
Concentration Courses/Groups/Electives: BAE 325, BAE 361, BAE 462, BAE 488	1	
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	103 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101, E 115	2	
Other: ENG 331 or 333	3	Satisfies Communications in the Major GEP co-requisite
Total credit hours under College Requirements:	5	

<u>NCSU GENERAL EDUCATION PROGRAM REQUIREMENTS</u>		<u>At least one of the following must be listed:</u>
<p><i>Courses in the Major and/or Minor may also fulfill a General Education requirement; however, a GEP category may not be subset to require a specific course from the category list. Required courses must be listed in the Major/College requirements.</i></p> <p><i>Specific courses should not be listed in any of the fields below other than ENG 101.</i></p>		<ol style="list-style-type: none"> 1 Choose course(s) from the University Approved GEP course list for this category. 2 Minimum requirements are satisfied by Major/College course requirements. 3 Major/College course requirement satisfies X credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category. 4 Co-requisite is satisfied by a Major/College course requirement. 5 Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts. 6 Choose course(s) from the University Approved GEP course lists for Natural Sciences/Mathematical Sciences.
General Education Program Requirements: <i>Minimum 39-40 hrs</i>	Credit hours	How will the GEP requirement be met? (Choose applicable statement from 1-6 listed above)
Mathematical Sciences (6 credits) <i>(At least 1 course with MA or ST prefix) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
Natural Sciences (7 credits) <i>(At least 1 lab course or course with a lab) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) <i>(Courses from two different disciplines) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	6	<i>(Choose statement 1, 2 or 3)</i> Choose course(s) from the University Approved GEP course lists for the Humanities.
Social Sciences (6 credits) <i>(Courses from two different disciplines) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	3	<i>(Choose statement 1, 2 or 3)</i> Major course requirement satisfies 3 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
Additional Breadth (3 credits) <i>(Choose approach that is different from the approach of the Major) Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge or U.S.</i>	3	<i>(Choose statement 5 or 6)</i> Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual &

Diversity co-requisites.		Performing Arts.
Interdisciplinary Perspectives (5 credits) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.	2	(Choose statement 1, 2 or 3) Major course requirement satisfies <u>3</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
Health and Exercise Studies (2 credits) (Including one Fitness and Wellness course)	2	Choose course(s) from the University Approved GEP course list for this category.
Total credit hours needed to complete GEP that are not satisfied as part of the Major/College requirements.	20 hours	
GEP Co-Requisites:		<i>Courses taken in the Major, GEP, or Minor may double-count to fulfill the co-requisites. Courses that satisfy the U.S. Diversity or Global Knowledge co-requisite are marked on course lists with a "USD" or "GK" indicator.</i>
U.S. Diversity co-requisite (USD)	n/a	Choose course(s) from the University Approved GEP course list for this category.
Global Knowledge co-requisite (GK)	n/a	Choose course(s) from the University Approved GEP course list for this category.
Foreign Language Proficiency	n/a	Proficiency at the FL_102 level required.
The following requirements must be satisfied within the College/Program:		Place an X in the credit hour box to indicate below that the requirement is "Satisfied by College/Program Requirements"
Communication in the Major (Advanced Communication)	X	Satisfied by College/Program Requirements
Technology Fluency	X	Satisfied by College/Program Requirements
Total credit hours required to complete Degree: Total must be within 120-128 credit hours.	128 Total hours	As applicable, indicate here the overall GPA requirement for degree completion including course completion.

S. Andrew Hale

MEMORANDUM

To: University Courses and Curricula Committee

From: S. Andrew Hale, Ph.D.
Undergraduate Coordinator, Bio & Ag Engineering

Subject: Request to establish a new concentration 11BEBS, B.S. in Biological Engineering –
Ecological Engineering Concentration

At the request of the Office of Courses and Curricula, the following format A and format B curriculum revisions are attached. They show the requested modifications needed for final implementation of the Spring 2016 modification in 11BEBS-11BEBEC.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: x Proposed Effective Semester: Spring 2016

Degree/Plan Title: B.S. in Biological Engineering

Concentration/Subplan Title: Ecological Engineering

Plan SIS Code: 11BEBS

Subplan SIS Code:

New Degree Audit required? (Y or N) Y

Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol-Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH 221 Organic Chemistry I	3
E 101 Introduction to Engr & Prob Solv ²	1	CH 222 Organic Chemistry Lab	1
E 115 Intro to Computing Environ	1	MA 241 Calculus II ^{1A}	4
ENG 101 Academic Writing and Research ^{2H}	4	PY 205 Physics for Engr & Sc I ^{1B}	3
MA 141 Calculus I ^{1A}	4	PY 206 Physics for Engr & Sc I Lab	1
HESF 1** Fitness & Wellness Course ^E	1	EC 205 Economics (GEP Soc Sci Req ^D) ³	3
	<i>Total:15</i>		<i>Total:15</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 200 Comp Meth In Biol Engr	2	BAE 203 Intro to Autocad Civil 3D & ArcMap	2
MAE 206 Engineering Statics or	3	BAE 204 Introduction to Eco & Env Engineering	2
CE 214 Engineering Mechanics-Statics ²	4	MAE 208 Dynamics ²	3
MA 242 Calculus III	4	MA 341 Applied Diff Equations	3
PY 208 Physics for Engr & Sc II ^B	3	MAE 301 Engr Thermodynamics I	3
PY 209 Physics for Engr & Sc II Lab	1	SSC 200 Soil Science ^B	3
BIO 181 Intro Biol: Ecol, Evol & Biodiv ^B	4		
	<i>Total:17</i>		<i>Total:16</i>
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 302 Transport Phenomena	3	BAE 376 Watershed Monitoring & Assessment	3
BAE 305 BE Circuits	4	ST 370 Prob & Statistics for Engr	3
BAE 371 Fundamentals of Hydro for Engr	3	MAE 314 Solid Mechanics or	3
CE 382 Hydraulics ²	3	CE 313 Mechanics of Solids ²	3
PB 360 Ecology	3	BAE 401 Sensors & Controls	3
		GEP Humanities Requirement ^C	3
	<i>Total:16</i>		<i>Total:15</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
BAE 451 Engr Design I	2	BAE 452 Engr Design II	2
BAE 325 Intro to Geomatics	3	Engineering Elective ⁵	3
BAE 473 Intro to Surface/Water Quality	3	GEP Social Science Elective ^D	3
Modeling	3	GEP Additional Breadth Requirement ^F	3
BAE 474 Applications of Ecological Engineering	3	GEP Humanities Requirement ^C	3
ENG 331 Comm. Engr. & Tech.or	3	GEP Interdisciplinary Persp. Elec. ^G	2
ENG 333 Comm. Sci. & Res.	3	HES_ *** Phys Ed/Healthy Living Elective ^E	1
Ethics (GEP Interdisciplinary Persp. Elec. ^G) ⁴	3		
	<i>Total:17</i>		<i>Total:17</i>
Minimum Credit Hours Required for Graduation : 128			

Major/Program Footnotes:

¹Must be completed with a grade of C or higher.

²Must be completed with a grade of C- or higher.

³Choose from EC 201 or 205, or ARE 201.

⁴Choose from IDS 201, STS 302, 304, 322, 323 or 325 which satisfy the Interdisciplinary Perspectives Requirement.

⁵Choose from BAE 322, 361, 478, 481, 574, 579 or 581.

* General Education Program (GEP) requirements and GEP Footnotes:

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied. University approved GEP course lists for each of the following categories can be found at <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)
Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: MA 141, MA 241
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: CH 101, CH 102, BIO 181, PY 205, PY 206, PY 208, PY 209
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: EC 201, 205 or ARE 201
- E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
- F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
 Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
- G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None
- H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better)

The following Co-Requisites must be satisfied to complete the General Education Program requirements:

- I. **U.S. Diversity** (USD)
Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None
- J. **Global Knowledge** (GK)
Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

CURRICULUM REQUIREMENTS

Format B

Degree/Plan Title: B.S. in Biological Engineering	Plan SIS Code: 11BEBS
Concentration/Subplan Title: Ecological Engineering	Subplan SIS Code:
Indicate requirements status: Current: Proposed: X Proposed Effective Semester: Spring 2016	
New Degree Audit required? (Y or N) Y	
Critical Path Courses - Identify using the code (CP) which courses are considered critical path courses which represent specific major requirements that are predictive of student success in a given program/plan. Place the (CP) next to the credit hours for the course.	

MAJOR FIELD OF STUDY REQUIREMENTS:	Credit Hours	GEP category, if applicable
Required Courses/Groups/ Electives:		
Indicate if course or course groupings have a C-wall or MGPA requirement and which are considered Critical Path courses – indicate with (CP) next to applic. course.		List GEP category and hours satisfied by a Major requirement
Math MA 141, MA 241, MA 242, MA 341 ST 370 Sciences CH 101, CH 102, PY 205, PY 206, PY 208, PY 209, BIO 181, SSC 200 CH 221, CH 222 PB(BIO) 360 Economics Elective EC 201, EC 205 or ARE 201 BAE 200, BAE 302, BAE 305, BAE 401, BAE 451, BAE 452 MAE 201 MAE 206 or CE 214 MAE 208 CE 382 MAE 214 or CE 313 Engineering Elective BAE 322, BAE 361, BAE 478, BAE 481, BAE 574, BAE 579 BAE 581 Ethics Elective IDS 201, STS 302, STS 304	15 3 19 4 3 3 16 3 3 3 3 3 3 3	Mathematics (6 hours) Natural Sciences (8 hours) Social Sciences (3 hours) Interdisciplinary Perspectives (3 hours)
Concentration Courses/Groups/Electives: BAE 203, BAE 204, BAE 325, BAE 371, BAE 376, BAE 473, BAE 474	19	
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	103 hours	

COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101, E 115	2	
Other: ENG 331 or ENG 333	3	Satisfies Communications in the Major GEP co-requisite
Total credit hours under College Requirements:	5	

<u>NCSU GENERAL EDUCATION PROGRAM REQUIREMENTS</u>		At least one of the following must be listed:
<p><i>Courses in the Major and/or Minor may also fulfill a General Education requirement; however, a GEP category may not be subset to require a specific course from the category list. Required courses must be listed in the Major/College requirements.</i></p> <p><i>Specific courses should not be listed in any of the fields below other than ENG 101.</i></p>		<ol style="list-style-type: none"> Choose course(s) from the University Approved GEP course list for this category. Minimum requirements are satisfied by Major/College course requirements. Major/College course requirement satisfies <u>X</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category. Co-requisite is satisfied by a Major/College course requirement. Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts. Choose course(s) from the University Approved GEP course lists for Natural Sciences/Mathematical Sciences.
General Education Program Requirements: <i>Minimum 39-40 hrs</i>	Credit hours	How will the GEP requirement be met? <i>(Choose applicable statement from 1-6 listed above)</i>
Mathematical Sciences (6 credits) <i>(At least 1 course with MA or ST prefix) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
Natural Sciences (7 credits) <i>(At least 1 lab course or course with a lab) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements.
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) <i>(Courses from two different disciplines) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	6	<i>(Choose statement 1, 2 or 3)</i> Choose course(s) from the University Approved GEP course lists for the Humanities.
Social Sciences (6 credits) <i>(Courses from two different disciplines) Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	3	<i>(Choose statement 1, 2 or 3)</i> Major course requirement satisfies <u>3</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
Additional Breadth (3 credits) <i>(Choose approach that is different from the approach of the Major) Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge or U.S. Diversity co-requisites.</i>	3	<i>(Choose statement 5 or 6)</i> Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts.
Interdisciplinary Perspectives (5 credits) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy either the Global Knowledge or U.S. Diversity co-requisites.</i>	2	<i>(Choose statement 1, 2 or 3)</i> Major course requirement satisfies <u>3</u> credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
Health and Exercise Studies (2 credits) <i>(Including one Fitness and Wellness course)</i>	2	<i>Choose course(s) from the University Approved GEP course list for this category.</i>
Total credit hours needed to complete GEP that are not satisfied as part of the Major/College requirements.	20 hours	
GEP Co-Requisites:		<i>Courses taken in the Major, GEP, or Minor may double-count to fulfill the co-requisites. Courses that satisfy the U.S. Diversity or Global Knowledge co-requisite are marked on course lists with a "USD" or "GK" indicator.</i>
U.S. Diversity co-requisite (USD)	n/a	<i>(Choose statement 1 or 4)</i> Choose course(s) from the University Approved GEP course list for this category.
Global Knowledge co-requisite (GK)	n/a	<i>(Choose statement 1 or 4)</i> Choose course(s) from the University Approved GEP course list for this category.

Foreign Language Proficiency	n/a	Proficiency at the FL_102 level required.
The following requirements must be satisfied within the College/Program:		Place an X in the credit hour box to indicate below that the requirement is "Satisfied by College/Program Requirements"
Communication in the Major (Advanced Communication)	X	Satisfied by College/Program Requirements
Technology Fluency	X	Satisfied by College/Program Requirements
Total credit hours required to complete Degree: Total must be within 120-128 credit hours.	128 Total hours	As applicable, indicate here the overall GPA requirement for degree completion including course completion.

Consultations

BAE is currently in the process of updated the biological engineering curriculum. As part of this update, we would like to add BIO/PB 321 and 360 to the biological science elective list for the biological engineering curriculum - ag engineering concentration. We also wish to establish an ecological engineering concentration which would require the students to complete BIO/PB 360. Because these courses are already used as electives in or general biological engineering curriculum, we anticipate that only a few additional students per year would enroll. Copies of these curriculum actions are attached for your review.

Please let me know is this is acceptable.

Thanks,
Andy

--

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Andy,

Thanks for copying me here. Only the Ecology course (BIO/PB 360) is cross-listed, not PB 321. I'm sorry if that was unclear in my most recent response.

Thanks again,
Chad

We don't have any objection to adding BIO 360 (cross-listed with PB) to your elective lists. And if the new concentration will draw primarily from existing student numbers, I would not anticipate any problem with using BIO (PB) 360 as a requirement in that new concentration.

The other course you mention (321) is not cross-listed with the BIO prefix, so I'll defer to Chad on that one.

best,
jane

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