



University Courses & Curricula Committee 2017-2018

March 28, 2018
 Talley Student Union 4140
 12:45pm-2:45pm

Call to Order 12:45pm

- Welcome from Chair Helmut Hergeth
- Remarks and Updates from OUCCAS/DASA
- Approval of UCCC March 14th 2018 Minutes
- Course and Curricular Business

Old Business

College of Sciences

Presenter	Reviewers	Action	Type
Klesath	Cherry, Havner, Griffin Hillis	ZO 334 Captive Animal Biology Field Laboratory	New Course Tabled at 3/14/2018 Meeting returning

New Business

Consent Agenda

Action	Type	Notes
CE 214 Engineering Mechanics-Statics	Minor	Requisites
CE 225 Mechanics of Solids	Minor	Requisites
CE 263 Introduction to Construction Engineering	Minor	Requisites
CE 282 Hydraulics	Minor	Requisites
CE 301 Civil Engineering Surveying and Geomatics	Minor	Requisites and description
CE 305 Traffic Engineering	Minor	Requisites and offering
CE 325 Structural Analysis I	Minor	Requisites and description
CE 327 Reinforced Concrete Design	Minor	Requisites
CE 332 Materials of Construction	Minor	Requisites and description
CE 339 Civil Engineering Systems	Minor	Requisites
CE 342 Engineering Behavior of Soils and Foundations	Minor	Requisites
CE 367 Mechanical and Electrical Systems in Buildings	Minor	Requisites
CE 373 Fundamentals of Environmental Engineering	Minor	Requisites
CE 378 Environmental Chemistry and Microbiology	Minor	Requisites
CE 381 Hydraulics Systems Measurements Lab	Minor	Requisites
CE 383 Hydrology and Urban Water Systems	Minor	Requisites
CE 413 Principles of Pavement Design	Minor	Requisites
CE 420 Structural Engineering Project	Minor	Requisites
CE 426 Structural Steel Design	Minor	Requisites
CE 437 Civil Engineering Computing	Minor	Requisites
CE 443 Seepage, Earth Embankments and Retaining Structures	Minor	Requisites and offering
CE 444 An Introduction to Foundation Engineering	Minor	Requisites
CE 450 Civil Engineering Project	Minor	Requisites
CE 476 Air Pollution Control	Minor	Requisites
CE 477 Principles of Solid Waste Engineering	Minor	Requisites
CE/MEA 479 Air Quality	Minor	Requisites
CE 484 Water Supply and Waste Water Systems	Minor	Requisites
CE 487 Introduction to Coastal and Ocean Engineering	Minor	Requisites

College of Agriculture and Life Sciences

Presenter	Reviewers	Action	Type
Trivedi	Despain, Kuzenski, Krause	ANS 290 Professional Development for Animal Science Careers	New Course

University College			
Presenter	Reviewers	Action	Type
Fath	Robinson, Rieder, Bruce	DAN 260 Hip-hop Dance	New Course

College of Natural Resources			
Presenter	Reviewers	Action	Type
Lindsay	Klesath, Trivedi, Rieder	SMT 206 Wood Manufacturing Site Visits	New Course
Lindsay	Despain, Cherry, Seracino	15PSEBS-15PSENDM Dual Major in Chemical Engineering (BS) and Paper Science & Engineering (BS)	Revisions
Lindsay	Carlson Welch, Bruce, Fath	Sustainable Materials Technology BS (15SMTBS)	Revising semester displays
Lindsay	Cherry, Krause, Hessling	Sustainable Materials Technology BS: Wood Products(15SMTBS-15SMTWP)	New Concentration in Wood Products

College of Engineering			
Presenter	Reviewers	Action	Type
Ferguson	Cherry, Griffin Hillis, Peterson	CE 250 Introduction to Sustainable Infrastructure	New Course
Ferguson	Kuzenski, Kause, Rieder	CE 405/(505) Railroad System Planning, Design, and Operation	New Course
Ferguson	Despain, Kuzenski, Krause	CE 499 Undergraduate Research Thesis in Civil, Construction and Environmental Engineering	New Course
Ferguson	Carlson Welch, Peterson, Fath	Civil Engineering BS (14CEBS)	Revising semester displays
Seracino	Griffin Hillis, Klesath, Nadvi	Construction Engineering BS General Concentration (14CONBS-14CONGEN)	Revising semester displays
Seracino	Robinson, Orphanides, Trivedi	Dual Degree in Textile Engineering & Chemical Engineering (14CHEBS-14CHETE)	Revising semester displays
Seracino	Lindsay, Rieder, Orphanides	Environmental Engineering BS (14ENEBS)	Revising semester displays
Seracino	Cherry, Peterson, Klesath	Nuclear Engineering 14NEBS	Revising semester displays

College of Humanities and Social Sciences			
Presenter	Reviewers	Action	Type
Despain	Ferguson, Lindsay, Seracino	ENG 209 Introduction to Shakespeare	Revisions: offering, description, SLOs
Despain	Havner, Orphanides, Nadvi	ENG 252 Major American Writers	Revisions: requisites, description, SLOs
Cherry	Peterson, Griffin Hillis, Bruce	FLG 323 Twentieth Century German Literature	Revisions: description, SLOs
Cherry	Krause, Carlson Welch, Klesath	HI 323 Science, American Style	New Course
Cherry	Trivedi, Lindsay, Bruce	HI 340 History of Agriculture	New Course

Discussion:

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.

SLO = Student Learning Outcomes

University Courses and Curricula CommitteeMarch 14, 2018
Talley Student Union 4140
Call to Order: 12:46 pm

Members Present: Chair Elect Marta Klesath, Zeenat Nadvi, Walter Robinson, Edwin Lindsay, Elizabeth Fath, Andreas Orphanides, Megan Cherry, Kathleen Rieder, John Kuzenski, Walter Robinson, Peter Hessling, Scott Despain, Berkley Griffin Hillis, Erin Peterson, Wendy Krause, Jackie Bruce, Scott Ferguson, Rudi Seracino, Kerry Havner, Shweta Trivedi

Members Absent: Chair Helmut Hergeth, Annie Carlson Welch

Guest: Stephanie Jeffries, Tsailu Liu, Matthew Peterson, Perry Peralta, Jason DeRousie, Candace Vick

Ex-Officio Members Present: Lexi Hergeth, Li Marcus, Sharon Broere, Rebecca Stojancic, Charles Clift

WELCOME AND INTRODUCTIONS

- **Remarks from Chair Elect** - Welcomed the committee members introduced guests.
- **Remarks from OUCCAS/DASA-** Li Marcus demonstrated a recent update to the CIM form in CourseLeaf that allows requisites and restrictions to be listed separately for graduate and undergraduate offerings of dual level courses. Li also provided a brief overview of the LUC courseleaf conference from the beginning of the month (mentioning that a summary will be available at the end of the month) and that the Process Map is in progress and will be available to committee members as beta testers in the next two weeks.
- **Approval of the Minutes from February 21st 2017 – Approved Unanimously**
 - Discussion: Member Walter Robinson moved to approve. Minutes from the previous meeting were presented and approved without further discussion.

NEW BUSINESS

- **Consent Agenda -Approved Unanimously**
Discussion: Member John Kuzenski moved to approve. Member commented that the introduction to digital techniques the D should be capitalized.
- **DS 100 Design in Culture and Context- Approved Unanimously**
Discussion: Member Kathleen Rieder presented the new course. Member commented that the syllabus indicates there are no expenses and asked if the other materials would be provided. Presenter responded these would be provided free of charge.
- **GD 210 Image and Tech Tinkering -Approved Unanimously**
Discussion: Member Kathleen Rieder presented the course action and introduced guest Matthew Peterson. Member commented that the attendance policy indicates after 3 absences the final grade will be affected without further information regarding what effect it will have. Guest clarified that this is generally handled on a case by case basis given that the collaboration in the class is crucial to success in the course. The general language allows flexibility in dealing with absences as needed.
- **GD 401 Graphic Design Practicum- Approved Unanimously**
Discussion: Member Kathleen Rieder presented the course. Member applauded the statement of identity in the syllabus. Member asked why the “seniors only” restriction is present in the description rather than the restrictions/requisites field, and the guest clarified that this was because that requirement is not meant to be coded into SIS as that enrollment requirement is managed via advising. Guest also clarified that all commas in the requisites are “ands.”
- **ES 113 Earth from Space –Approved Unanimously with friendly suggestions**
Discussion: Member Edwin Lindsay presented the course. Member commented that there are numerous typos on page 4, 5, 6, and 10 and suggested addressing these.
- **ENV 100 Student Success in Environmental First Year-Approved Unanimously with friendly suggestions**
Discussion: Member Edwin Lindsay presented the course. Member commented that the attendance policy URL should

be updated and the incomplete grading policy should be included.

- **ENV 101 Exploring the Environment-*Approved Pending with friendly suggestions***
Discussion: Member Edwin Lindsay presented the course. Member asked if this was a new course or a revision, this was approved for last Fall, updates are being made to the hours and separating one course into two courses with the same number of total hours. This also helps with other colleges and programs with their credit hours. Member indicated the student learning outcomes are not measurable, member suggested adjusting these so they are measurable after the course or during. Member suggested changing the tense of the student learning outcomes. Member asked about the walking during the field trip and how a student with disabilities would be able to participate. Guest responded that this would be handled on an individual basis based on the needs of the student. Member suggested providing welcoming language that students will be accommodated under the official statement from the DSO. Members made the motion to change the motion to approved pending the adjustment of the SLOs, friendly suggestions to add the welcoming language; member suggested speaking with the office of general counsel for welcoming language.
- **PRT 240 Geospatial Applications for Parks, Recreation and Tourism- *Approved Unanimously***
Discussion: Member Edwin Lindsay presented the course. No further discussion.
- **PRT 358 Recreation Program Planning- *Approved with friendly suggestions***
Discussion: Member Edwin Lindsay presented the course. Member commented in the syllabus, the word “assess”, is a typo. Member commented that the DSO is out of date and should be adjusted to the most recent statement.
- **PRT 375 Professional Development and Internship Orientation- *Approved with friendly suggestions***
Discussion: Member Edwin Lindsay presented the course. Member commented that the student learning outcomes in the syllabus and CIM do not match. Guest Candace Vick indicated what is in the syllabus is correct and the one missing outcome will be added to CIM. Member said that the first outcome should be adjusted, guest responded they will reword this to say students will be prepared to acquire an internship. Member indicated typos and grammatical errors requiring updates on pages 2 and 5 of the syllabus. Member Kerry Havner moved to change the motion to approved pending these typo corrections, members commented that they were not in favor of making the motion pending based on this. Members voted to deny the motion to amend the original motion [number in favor 1, 18 members opposed]. Member commented that attendance is worth 15% of the final grade and indicated the attendance sign-up sheet seems like this could easily be cheated and made the friendly suggestion to change the method of taking attendance to a method less dependent on the honor system. Guest commented that the course has indicated that attendance would be mandatory because there are interactions and participation that are essential to the course. Member suggested adjusting the “participation” vs. “attendance”.
- **PRT 478 Sustainable Sport Facility Management- *Approved Unanimously***
Discussion: Member Edwin Lindsay presented the new course. No further discussion.
- **SMT 200 Introduction to Sustainable Materials and Technology- *Approved with friendly suggestion***
Discussion: Member Edwin Lindsay presented the new course. Member commented that “sustainable” is spelled incorrectly. Member asked for clarity regarding how attendance factored into the grading as extra credit as a friendly suggestion.
- **SMT 240 Introduction to Wood Products Industries- *Approved Unanimously***
Discussion: Member Edwin Lindsay presented the new course. No further discussion.
- **SMT 308 Wood Processing- *Approved with friendly suggestions***
Discussion: Member Edwin Lindsay presented the new course. Member made the friendly suggestion to correct a typo on the third page of the syllabus from “give” to “given”.
- **SMT 320 Industrial Chemical Pollutants- *Approved Unanimously***
Discussion: Member Edwin Lindsay presented the new course. No further discussion.
- **SMT 450 Sustainable Business and Innovation- *Approved Unanimously***
Discussion: Member Edwin Lindsay presented the new course. No further discussion.
- **Undergraduate Certificate in Field Botany- *Approved Pending***
Discussion: Member Edwin Lindsay presented the new certificate. Member pointed out inconsistencies in the requisites if the required courses need to be passed with a C or C-. Presenter indicated he will confirm this with the college. Motion to amend standing motion to approved pending clarification of “c wall” approved unanimously.

- *Motion to combine the 15PRTBS sub plans for review. Vote approved to combine these actions into one.*
-BS Parks, Recreation and Tourism Management: Parks and Natural Resources Recreation (15PRTBS-15PRTNRR)
-BS Parks, Recreation and Tourism Management: Program Management (15PRTBS-15PRTPM)
-BS Parks, Recreation and Tourism Management: Sustainable Tourism (15PRTBS-15PRTST)
 Discussion: Member Edwin Lindsay presented the curricular action. Member asked for clarification on what is being revised, guest Candace Vick provided an explanation of all the changes and explained the changes are bolded. Member asked how the new 120 credit hour policy affects this curriculum and Candace Vick shared that she had been counseled by OUCCAS to complete the curricular approval process as the program stands in order to prevent the action from needing to be rolled back to the beginning.

All 15PRTBS Approved Unanimously.
- **Sport Management (15SPMGTBS)- Approved Unanimously**
 Discussion: Member Edwin Lindsay presented the curricular action. No further discussion.
- **ACC 280 Survey of Financial and Managerial Accounting- Approved with friendly suggestion**
 Discussion: Member John Kuzenski presented the new course. Member asked about the CengageNOW software being used for assignments in the course. Guest Jason DeRousie responded that all accounting courses are using this software which is similar to Moodle and has been properly vetted as appropriate software by OIT. Member made the friendly suggestion to include a rounding statement or an indication that the percentages are the minimum percentage required for the grading scale. Member asked if objectives are required, members clarified that course objectives are not required but student learning outcomes are. Guest Jason DeRousie explained the mapping of the accounting courses the committee has seen and commented that if a program has accounting courses then PCOM will reach out to the colleges to ensure the recent changes have been reflected. Friendly suggestion to adjust the grading scale.
- **ACC 499 Internship in ACC- Approved Unanimously**
 Discussion: Member John Kuzenski presented the course. Guest Jason DeRousie explained the course is expanding to various students wanting accounting credit. Member asked if this action needed a syllabus, OUCCAS responded that because this is a minor action a syllabus is not required.
- **BUS 470 Operations Modeling and Analysis- Approved Unanimously**
 Discussion: Member John Kuzenski presented the course. No further discussion.
- Motion to combine the two Minors being reviewed. Vote approved with 2 abstentions.**
- **Business Administration (20BMM)**
Business Entrepreneurship Minor- approved with friendly suggestion
 Discussion: Member John Kuzenski presented the curricular action. Guest Jason DeRousie explained that these two actions reflect the split of a single minor into two (a revision to an existing minor and the creation of a new minor) to clarify student's track choices in minor curricula. Member commented that in the second minor the catalog description there is a typo in "value within in."
- **ED 103 Intro to University Education- Approved Pending with friendly suggestions**
 Discussion: Member Peter Hessling presented the new course. Member commented that the learning outcomes 2, 4, 5, and 6 should be tweaked to be measurable. Motion to amend the motion to approved pending approved unanimously. Member pointed out a typo on the 6th learning outcome. Member commented the inclusion of the word "to" for grammatical accuracy in the 6th learning outcome. Members also suggested updating the DSO statement to the most recent statement. Pending the changes in the student learning outcomes and friendly suggestions to correct typos.
- **ZO 334 Captive Animal Biology Field Laboratory- Tabled**
 Discussion: Member Walter Robinson presented the new course. Member objected to the fact that the grading evaluation methods give 70% of the grade for a single written assignment for a laboratory course. Members discussed that the written assignment is multiple written assignments and whether or not this grading weight is appropriate for a lab course. Member also pointed out a grammatical error in the course description. Member indicated the attendance section should also include a statement to indicate that if a student had extenuating circumstances the instructor would work with them. Chair commented that within her department the absence policy would work independently with students if they had an action. Member suggested that the participation grade should be a larger portion of the course. Member moved to amend the motion to tabled, which was approved unanimously. Committee would also like clarification on what the ZIMS assignments will be and indicated that the committee needs this clarification to vote on the assignments. Member pointed out that ZIMS is software used by students and indicated the syllabus should indicate if the students will pay for this software.

- **Zoology Minor (17ZOM)- Approved Unanimously**
Discussion: Member Walter Robinson presented the curricula action. No further discussion.
- **ECE 309 Data Structures and Object-Oriented Programming for Electrical and Computer Engineers- Approved Unanimously**
Discussion: Member Scott Ferguson presented the course. No further discussion.
- **ECE 426 Analog Electronics Laboratory- Approved with friendly suggestions**
Discussion: Member Rudi Seracino presented the new course. Member indicated there is a mismatch between the grading components in the syllabus and CIM and member was unclear on what “heck off sheets” were, this could be a typo for “check off.” Member made a friendly suggestion to clarify this. Member indicated in CIM the requisites statement is unclear if this is a co or pre requisite, the committee discovered through the syllabus this is a pre-requisite.
- FLG 320 Introduction to German Literature- Approved with friendly suggestion**
Discussion: Member Scott Despain presented the course. Member made the friendly suggestion to update the effective date.
- **FLI 315 Italian Civilization and Culture- Approved with friendly suggestions**
Discussion: Member Scott Despain presented the new course. Member asked about the syllabus indicating assignments will be worth 20% and asked what the assignments would be; presenter explained that the topic schedule provides the written assignments and descriptions. Member made the friendly suggestion to correct the typo in the schedule “Assignments” and clarify what the assignments are.
- **FLS 335 Spanish for Native and Heritage Speakers- Approved with friendly suggestions.**
Discussion: Member Megan Cherry presented the course. Member suggested correcting a typo in the course description on the second line “at” instead of “and”. Member asked about the decimal places being used in the grading scale, the committee responded this is appropriate when using hyphens instead of greater than or equal to symbols. Member commented on page 4 of the syllabus using the term “me” is assumed to be personal but does not use this terminology consistently throughout the syllabus. Member suggested replacing “IE” with “EG” to indicate these are not the only ways to get an approved absence. Member asked about including all the university requirements in the syllabus, and there should be a statement that a student would need to include the policies. Li Marcus explained that instructors should use the PRRs provided in the syllabus regulation and include stipulations and requirements specific to their course. Member suggested providing consistency within the syllabus either using “the instructor” or “me”. Member indicated the colored text in the syllabus should be bolded if this a focal point of the syllabus based on previous motions and discussions with DSO.
- **HI 588/488 Family and Community History- Approved with friendly suggestions**
Discussion: Member Megan Cherry presented the course. Member indicated the math is incorrect in the grading; however, if the syllabus and CIM were consistent this could add correctly. Member made the suggestion that banning cell phones may not be reasonable in today’s world. Members discussed that students may not be able to provide genealogy for themselves, guest clarified that students would be allowed to use another person’s genealogy in this instance. Member suggested correcting “you tube” to “YouTube”.

Meeting adjourned at 2:44 pm

Respectfully submitted by Lexi Hergeth

North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:

Peter Fedkin 3/9/18
Head, Department/Program Date

Recommended By:

[Signature] 14 May 18
Chair, College Curriculum Committee Date

Endorsed By:

Jerome P. Lavelle 3/14/18
College Dean Date

Recommended By:

Vice Provost, DELTA (if DE degree/certificate) Date

Recommended By:

Chair, University Courses & Curricula Committee Date

Approved By:

Dean, (DASA or the Graduate School) Date

Recommended By:

Dean's Council Date

Approved By:

Executive Vice Chancellor and Provost Date


Approved By:

Chancellor Date

North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:



Head, Department/Program 3/12/2018

Date


Recommended By:



Chair, College Curriculum Committee 2-23-18

Date

Endorsed By:



College Dean 2/23/2018

Date

Recommended By:

Vice Provost, DELTA (if DE degree/certificate) _____
Date

Recommended By:

Chair, University Courses & Curricula Committee _____
Date

Approved By:

Dean, (DASA or the Graduate School) _____
Date

Recommended By:

Dean's Council _____
Date

Approved By:

Executive Vice Chancellor and Provost _____
Date

Approved By:

Chancellor _____
Date



College of Natural Resources
Department of Forest Biomaterials

Paper Science and Engineering
Sustainable Materials & Technology
Wood Products Extension

<https://cnr.ncsu.edu/fb>

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Email: contactfb@ncsu.edu

February 2, 2018

To: Michael D. Mullen
Vice-Chancellor and Dean
Division of Academic and Student Affairs

From: Med Byrd
Director of Undergraduate Programs
Paper Science and Engineering

Subject: Change to the Dual Major Curriculum in PSE and CHE

By means of this memorandum and the attached documents, the Departments of Chemical and Biomolecular Engineering and Forest Biomaterials (Paper Science & Engineering) propose to update the dual major (15PSEBS-15PSENDM) with the following changes:

Proposed Change	Justification
1. Delete CH 315 (Quantitative Analysis) and CH 316 (Quantitative Analysis Lab) from Semester 5 and replace with Chemistry Elective ⁶ with 4 credits	CHE accepts the following courses (4 credits with lab) for this requirement: BCH 351; BCH 451; BIO 183; CH 315/316; CH 331; CH 335; CH 437; FS 402; FS 403; PCC 461/464; PSE 335
2. Add new footnote 6: Choose from the following: BCH 351; BCH 451; BIO 183; CH 315/316; CH 331; CH 335; CH 437; FS 402; FS 403; PCC 461/464; PSE 335	To support the change noted for #1 above.
3. Change course title of PSE 465 from "Paper Physics and Product Design" to "Process Engineering"	Course title change was approved in Fall 2017
4. Delete CHE 450 (CHE Design I) from Semester 9 and replace with Technical Elective ⁷ with 3 credits.	Prior to 2007, PSE had a single-course design experience (PSE 416). CHE/PSE dual majors were thus required to take the first half of the CHE design sequence (CHE 450) in order to satisfy the CHE need for 2 courses. In 2007, PSE changed to a 2-course design sequence (PSE 415 + PSE 416) with rigorous design content. The CHE program agrees that the rigor is sufficient to the point that taking CHE 450 is no longer warranted. The PSE faculty wants to use the resulting 3 credits for a high-level technical elective that will enhance the students' specialized technical skills just prior to graduation.

5. Add new footnote 7: Consult with your adviser for course options.	To support the change noted for #4 above.
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Impacts/Consultation: With regard to change #1, students are already enrolling in and taking the courses shown, so no consultation or additional resources are required. With regard to change #4, the ABET coordinators and the Course and Curriculum Committees for both departments have reviewed and approved this recommendation. Since CHE 450 is being eliminated as a requirement, there are no additional resources required. The Chemical Engineering ABET coordinator and design instructor(s) will review the PSE project proposals prior to assignment to ensure that there is sufficient chemical engineering content in projects to which CHE students will be assigned. The instructor in PSE 416 will require all dual PSE-CHE students in the course to complete the SACHE safety modules currently required of students taking CHE 450.

Proposed Effective Date: 8/1/2018

CURRENT FORMAT A (Marked-Up Copy)
CURRICULUM IN CHEMICAL ENGINEERING AND PAPER SCIENCE & ENGINEERING
(DEGREES EARNED: B.S. CHEMICAL ENGINEERING and B.S. PAPER SCIENCE & ENGINEERING)

Freshman Year

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science ^{3,5}	3	CH 201 Chemistry, A Quant Science ^{1,5}	3
CH 102 General Chemistry Lab ^{3,5}	1	CH 202 Quantitative Chemistry Lab ⁵	1
E 101 Introduction to Engr & Prob Solv ¹	1	EC 205 Economics (or EC 201 or ARE 201)*	3
E 115 Intro to Computing Environ	1	MA 241 Calculus II ³	4
ENG 101 Academic Writing and Research ¹	4	PY 205 Physics Engr & Scientists I ³	3
MA 141 Calculus I ³	4	PY 206 Physics for Engineers & Scientists I Lab ³	1
HES_*** Health & Exercise Studies Course*	1	PSE 201 Pulping & Papermaking Technology ¹	3 (CP)
	15		18

Sophomore Year

Fall Semester	Credit	Spring Semester	Credit
CH 221 Organic Chemistry I ^{4,1}	3	CH 223 Organic Chemistry II ⁴	3
CH 222 Organic Chemistry I Lab ⁴	1	CH 224 Organic Chemistry II Lab ⁴	1
CHE 205 Chemical Proc Princ ¹	4	CHE 225 Chemical Proc Systems ¹	3
MA 242 Calculus III ¹	4	MA 341 Applied Differential Eq ¹	3
PSE 212 Paper Properties ¹	4 (CP)	PY 208 Physics for Engr & Scientists II	3
HES_*** Health & Exercise Studies Course	1	PY 209 Physics for Engineers & Scientists II Lab	1
		PSE 371 Pulping Process Analysis ¹	3 (CP)
	17		17

Junior Year

Fall Semester	Credit	Spring Semester	Credit
Chemistry Elective ⁶	4	CHE 312 Transport Processes II	3
CH 315 Quantitative Analysis	3	CHE 316 Thermo of Chem & Phase Eq	3
CH 316 Quantitative Analysis Lab	1	PSE 332 Wood & Pulping Chemistry	3
CHE 311 Transport Processes I ¹	3	PSE 360 Pulp & Paper Unit Proc. II	3
CHE 315 Chem Process Thermo ¹	3	GEP Requirement*	3
PSE 211 Pulp & Paper Internship ²	1		
PSE 322 Wet End/Polymer Chemistry	4		
GEP Requirement*	3		
	18		15

Senior Year

Fall Semester	Credit	Spring Semester	Credit
PSE 415 Paper Industry Strat. Proj. Analy.	3	PSE 416 Project Design and Analysis	3
PSE 417 Process Design & Analy. Lab	3	PSE 465 Process Engineering	3
PSE 425 Bioenergy & Biomaterials Engr	3	PSE 465 Paper Physics & Product Design	3
PSE 475 Process Control	3	PSE 472 Paper Process Analysis	3
GEP Requirement*	3	GEP Requirement*	3
GEP Requirement*	3	GEP IP Requirement*	2-3
	18		14-15

Fifth Year

Fall Semester	Credit
CHE 330 CHE Lab I	4
CHE 446 Design & Analysis Chem Reac	3
Technical Elective ⁷	3
CHE 450 CHE Design I	3
ECE 331 Intro Elect Circuits or MSE 201 Intro Material Sci Engr.	3
	13

Minimum Credit Hours Required for Graduation^{*I,J,K}:

145

Major/Program requirements and footnotes

¹ Minimum grade of C- required.

² There is one required internship in industry. PSE 211 should be taken the first semester upon returning from that internship.

³ Grade of C (2.0) or higher required.

⁴ CH 225/226 may substitute for CH 221/222 and CH 227/228 may substitute for CH 223/224.

⁵ CH 103/104 may substitute for CH 101/102 and CH 203/204 may substitute for CH 201/202.

⁶ Choose from the following: BCH 351; BCH 451; BIO 183; CH 315/316; CH 331; CH 335; CH 437; FS 402; FS 403; PCC 461/464; PSE 335

⁷ Consult with your adviser for course options

*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 <https://oucc.dasa.ncsu.edu/general-education-program/>.

A. Mathematical Sciences (6 credit hours – one course with MA or ST prefix)

Fulfilled as part of the Major requirements.

B. Natural Sciences (7 credit hours – include one laboratory course or course with a lab)

Fulfilled as part of the Major requirements.

C. Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list.

D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Social Sciences course list in a discipline other than Economics.

Economics 205 (or EC 201 or ARE 201), taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences Requirement.

E. Health & Exercise Studies (2 credit hours – at least one 100-level Health & Exercise Studies Course)

Choose from the University approved GEP Health & Exercise Studies course list.

F. Additional Breadth – (3 credit hours to be selected from the following checked University approved GEP course lists)

XX Humanities/Social Sciences/Visual and Performing Arts

G. Interdisciplinary Perspectives (5-6 credit hours)

Choose from the University approved GEP Interdisciplinary Perspectives course list.

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.

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.

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:** **Proposed: X** **Proposed Effective Semester: 8/2018**

Degree/Plan Title: Dual Degree in Paper Science & Engineering and Chemical Engineering

Concentration/Subplan Title: N/A

Plan SIS Code: 15PSEBS-15PSENDM

Subplan SIS Code: N/A

New Degree Audit required? (Y or N) Y

Freshman Year

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science ^{3, 5}	3	CH 201 Chemistry, A Quant Science ^{1, 5}	3
CH 102 General Chemistry Lab ^{3, 5}	1	CH 202 Quantitative Chemistry Lab ⁵	1
E 101 Introduction to Engr & Prob Solv ¹	1	EC 205 Economics (or EC 201 or ARE 201)*	3
E 115 Intro to Computing Environ	1	MA 241 Calculus II ³	4
ENG 101 Academic Writing and Research ¹	4	PY 205 Physics Engr & Scientists I ³	3
MA 141 Calculus I ³	4	PY 206 Physics for Engineers & Scientists I Lab ³	1
HES_*** Health & Exercise Studies Course*	1	PSE 201 Pulping & Papermaking Technology ¹	3 (CP)
	15		18

Sophomore Year

Fall Semester	Credit	Spring Semester	Credit
CH 221 Organic Chemistry I ^{4, 1}	3	CH 223 Organic Chemistry II ⁴	3
CH 222 Organic Chemistry I Lab ⁴	1	CH 224 Organic Chemistry II Lab ⁴	1
CHE 205 Chemical Proc Princ ¹	4	CHE 225 Chemical Proc Systems ¹	3
MA 242 Calculus III ¹	4	MA 341 Applied Differential Eq ¹	3
PSE 212 Paper Properties ¹	4 (CP)	PY 208 Physics for Engr & Scientists II	3
HES_*** Health & Exercise Studies Course	1	PY 209 Physics for Engineers & Scientists II Lab	1
	17	PSE 371 Pulping Process Analysis ¹	3 (CP)
			17

Junior Year

Fall Semester	Credit	Spring Semester	Credit
Chemistry Elective ⁶	4	CHE 312 Transport Processes II	3
CHE 311 Transport Processes I ¹	3	CHE 316 Thermo of Chem & Phase Eq	3
CHE 315 Chem Process Thermo ¹	3	PSE 332 Wood & Pulping Chemistry	3
PSE 211 Pulp & Paper Internship ²	1	PSE 360 Pulp & Paper Unit Proc. II	3
PSE 322 Wet End/Polymer Chemistry	4	GEP Requirement*	3
GEP Requirement*	3		
	18		15

Senior Year

Fall Semester	Credit	Spring Semester	Credit
PSE 415 Paper Industry Strat. Proj. Analy.	3	PSE 416 Project Design and Analysis	3
PSE 417 Process Design & Analy. Lab	3	PSE 465 Process Engineering	3
PSE 425 Bioenergy & Biomaterials Engr	3	PSE 472 Paper Process Analysis	3
PSE 475 Process Control	3	GEP Requirement*	3
GEP Requirement*	3	GEP IP Requirement*	2-3
GEP Requirement*	3		
	18		14-15

Fifth Year

Fall Semester	Credit
CHE 330 CHE Lab I	4
CHE 446 Design & Analysis Chem Reac	3
Technical Elective ⁷	3
ECE 331 Intro Elect Circuits or	3
MSE 201 Intro Material Sci Engr.	
	13

Minimum Credit Hours Required for Graduation*^{I,J,K}:

Major/Program requirements and footnotes

¹ Minimum grade of C- required.

² There is one required internship in industry. PSE 211 should be taken the first semester upon returning from that internship.

³ Grade of C (2.0) or higher required.

⁴ CH 225/226 may substitute for CH 221/222 and CH 227/228 may substitute for CH 223/224.

⁵ CH 103/104 may substitute for CH 101/102 and CH 203/204 may substitute for CH 201/202.

⁶ Choose from the following: BCH 351; BCH 451; BIO 183; CH 315/316; CH 331; CH 335; CH 437; FS 402; FS 403; PCC 461/464; PSE 335

⁷ Consult with your adviser for course options

*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 <https://oucc.dasa.ncsu.edu/general-education-program/>.

A. Mathematical Sciences (6 credit hours – one course with MA or ST prefix)

Fulfilled as part of the Major requirements.

B. Natural Sciences (7 credit hours – include one laboratory course or course with a lab)

Fulfilled as part of the Major requirements.

C. Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list.

D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Social Sciences course list in a discipline other than Economics. Economics 205 (or EC 201 or ARE 201), taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences Requirement.

E. Health & Exercise Studies (2 credit hours – at least one 100-level Health & Exercise Studies Course)

Choose from the University approved GEP Health & Exercise Studies course list.

F. Additional Breadth – (3 credit hours to be selected from the following checked University approved GEP course lists)

XX Humanities/Social Sciences/Visual and Performing Arts

G. Interdisciplinary Perspectives (5-6 credit hours)

Choose from the University approved GEP Interdisciplinary Perspectives course list.

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.

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.

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

GEP FORMAT B – CURRICULUM REQUIREMENTS

Degree Title: Dual B.S. in Paper Science and Engineering and Chemical Engineering

Current Degree Key: 15PSE1216D

Effective Date of Revision: 8/2018

MAJOR FIELD OF STUDY REQUIREMENTS:		
Required Courses/Groups/ Electives:	Credit Hours	GEP category, if applicable
Indicate if course or course groupings have a C-wall or MGPA requirement		List GEP category and hours satisfied by a Major requirement
Math		
MA 141 (C), MA 241 (C), MA 242 (C-)	12	Mathematics (6 hours)
MA 341 (C-)	3	
Sciences		
CH 101 (C), CH 102 (C)	4	Natural Sciences (4 hours)
PY 205 (C), PY 206 (C), PY 208, PY 209	8	
CH 201 (C-), CH 202	4	Natural Sciences (3 hours)
CH 221 (C-), CH 222	4	
CH 223, CH 224	4	
Chemistry Elective	4	
PSE Major		
PSE 201 (C-)	3 (CP)	
PSE 211	1	
PSE 212 (C-)	4 (CP)	
PSE 322	4	
PSE 332	3	
PSE 360	3	
PSE 371 (C-)	3 (CP)	
PSE 415	3	
PSE 416	3	
PSE 417	3	
PSE 425	3	
PSE 465	3	
PSE 472	3	
PSE 475	3	
Technical Elective	3	
CHE Major		
CHE 205 (C-)	4	
CHE 225 (C-)	3	
CHE 311 (C-)	3	
CHE 312	3	
CHE 315 (C-)	3	
CHE 316	3	
CHE 330	4	
CHE 446	3	
Other Major		
ECE 331 or MSE 201	3	
Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	117 hours	

COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101 (C-) and E 115	2	E115 satisfies Technology Fluency requirement
Other: (ex: Adv Communication courses) Economics Elective (EC 205 or EC 201 or ARE 201)	3	Social Science
Total credit hours under College Requirements:	5 hours	

<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>		<p>¹Choose course(s) from the University Approved GEP course list for this category.</p> <p>²Minimum requirements are satisfied by Major/College course requirements.</p> <p>³Major/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.</p> <p>⁴Co-requisite is satisfied by a Major/College course requirement.</p> <p>⁵ Choose course(s) from the University Approved GEP course lists for the Humanities, Social Sciences, or Visual & Performing Arts.</p> <p>⁶Choose course(s) from the University Approved GEP course lists for the Natural and Mathematical Sciences.</p>
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 (minimum of 6 credits) (at least one with MA or ST prefix) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
Natural Sciences (minimum of 7 credits) (at least 1 laboratory) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
English 101	4	ENG 101 (Must pass with C-)
Humanities (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	6	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Social Sciences (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	3	<i>Major/College 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.</i>
Additional Breadth (minimum of 3 credits) (Choose AB course list that is different from the approach of the Major) <i>Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge and Diversity co-requisites.</i>	3	<i>Choose course(s) from the University Approved GEP course lists for the Humanities, Social Sciences or Visual and Performing Arts</i>
Interdisciplinary Perspective (minimum of 5-6 credits) <i>Only course(s) in the Major may double-count to satisfy this requirement.</i>	5	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Physical Education/Healthy Living (including one Fitness and Wellness course)	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.	23 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 asterisks as indicated.</i>
U.S. Diversity co-requisite*	n/a	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Global Knowledge co-requisite**	n/a	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Foreign Language Proficiency	n/a	FL_102

The following requirements must be satisfied within the College/Program:		
Advanced Communication	X	Minimum requirements are satisfied by College/Program requirements
Technology Fluency	X	Minimum requirements are satisfied by College/Program requirements

Total credit hours required to complete Degrees:	145	As applicable, indicate here the overall GPA requirement for degree completion including course completion.
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College of Natural Resources
Campus Box 8005
Raleigh, NC 27695-8005
919.515.5807
919.515.6302 (fax)

Paper Science & Engineering	919.515.2888
Sustainable Materials & Technology	919.515.3181
WP Extension	919.515.5637

To: University Courses and Curricula Committee
From: Dr. Marko Hakovirta, Professor and Department Head, Forest Biomaterials
Date: September 22, 2017
Subject: Request for the Revision of the B.S. in Sustainable Materials and Technology Curriculum

The purpose of this memo is to request approval for the revision of the B.S. in Sustainable Materials and Technology (SMT) curriculum. This curriculum change was precipitated mainly by the university's initiative to establish an Environmental First Year program, of which SMT is a participating curriculum, and by the SMT faculty's proposal to develop a Wood Products concentration within the SMT curriculum. The current plan title is Sustainable Materials & Technology – BS, with a SIS code of 15SMTBS, a term date of Fall '13 and a CIP code of 03.0509.

The revisions being proposed are as follows:

1. Make ENV 100 (Student Success in ENVFY, 1 credit hour) and ENV 101 (Exploring the Environment, 2 credit hours) as alternative classes to ES 100 (Introduction to Environmental Science, 3 credit hours).
ENV 100 and ENV 101 are required by the ENVFY program for incoming freshmen of participating curricula. This revision will allow freshmen to take ENV 100/101 while providing upperclass transfer students the flexibility of meeting 3-credit hours of environmental-science related class.
2. Drop SMT 202 (Anatomy and Properties of Biomaterials), and
Increase SMT 200 credit hours from 1 credit (Introduction to Sustainability and Technology) to 3 credits (Introduction to Sustainable Materials Science).
Once the Wood Products concentration is implemented, SMT 202 will be strictly a Wood Products class. Its contents related to the structure of bio-based materials will be taught to SMT students in the revised SMT 200. The original content of the 1-credit SMT 200 will be kept in the 3-credit SMT 200.
3. Add SMT 320 (Industrial Chemical Pollutants).
The course is needed in the curriculum to introduce students to the sources, fates, and analysis of chemical pollutants from industrial sources. Content will focus predominantly on chemicals from industries related to the production and use of bio-based materials such as wood, bamboo, corn, silk, renewable plastics, etc. The course content is not available elsewhere.
4. Add SMT 450 (Sustainable Business and Innovation).
The course is being offered to provide graduates of the SMT curriculum a competitive advantage in the job market by giving them a high-level understanding of sustainable business and innovation in the corporate world.

5. Drop ENG 331.
Technical writing is integrated in various courses within the curriculum. In addition, students are exposed to writing resume and letter of application through the curriculum's professional development program.
6. Make correction to the SMT 301 credit hours.
This reflects the reduction in credit hours for SMT 301 from 4 credits (Lecture + Lab) to 3 credits (Lecture only), which was approved in 2015.
7. Change CH 220 to the CH 220/CH 222 split.
This is in response to the change by the Chemistry Department from the 4-credit CH 220 to the 3-credit CH 220 class + 1-credit CH 222 lab.
8. Increase credit hours for Advised Electives from 9 to 15.
On one hand, this will allow students in the SMT parent plan to choose courses in sustainability science. On the other hand, this will allow students in the Wood Products concentration to choose courses related to wood science and technology.
9. Change footnote for the Technical electives.
This will allow students more flexibility in pursuing a minor that is in line with their career objectives.

These changes will result in an increase in the Minimum Credit Hours Required for Graduation from 126 to 128.

The revision to the SMT curriculum should not impact any other department or undergraduate program on campus. Consultation with other departments is not required.

The curriculum change will not impact students currently enrolled in the SMT program. The classes and revised curriculum will be offered to these enrolled students, and they will be free to enroll in the revised program if it is more aligned with their interests.

Ideally the revised curriculum will be in place for students in the Fall of 2018.

North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:




Head, Department/Program Date 12/13/17

Recommended By:



Chair, College Curriculum Committee Date 1-19-18

Endorsed By:



College Dean Date 2/20/2018

Recommended By:

Vice Provost, DELTA (if DE degree/certificate) Date

Recommended By:

Chair, University Courses & Curricula Committee Date

Approved By:

Dean, (DASA or the Graduate School) Date

Recommended By:

Dean's Council Date

Approved By:

Executive Vice Chancellor and Provost Date

Approved By:

Chancellor Date

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X Proposed Effective Semester: 6/2018

Degree/Plan Title: B.S. in Sustainable Materials and Technology Concentration/Subplan Title:

Plan SIS Code: 15SMTBS 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
ENV 100 Student Success in ENVFY and ES 101 Exploring the Env., or ES 100 Intro to Env. Sci.	3	EC 205 Fund. of Economics*	3
SMT 200 Intro. to Sustainable Materials Science	3	ENG 101 Academic Writing & Research*	4
MA 121 Elements of Calculus* ¹	3 ^{CP}	CH 101 Chemistry – A Molecular Science*	3 ^{CP}
BIO 181 Intro Bio: Ecology, Evol, Biodiv.*	4	CH 102 General Chemistry Lab*	1 ^{CP}
GEP Humanities Requirement*	3	PY 211 General Physics I*	4
		GEP Health and Exercise Studies Requirement*	1
	<i>Total:16</i>		<i>Total:16</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 220 Introductory Organic Chemistry	3 ^{CP}	SMT 201 Sustainable Mat. for Green Housing*	2
CH 222 Organic Chemistry I Lab	1 ^{CP}	SMT 203 Physical Properties of Sust. Mat.	4 ^{CP}
MIE 201 Introduction to Business Processes*	3	SMT 232 Recycling to Create a Sust. Env.*	2
IDS 201 Environmental Ethics*	3	SMT 301 Chem. of Sust. Materials	3 ^{CP}
PS 320 US Environmental Law & Politics or PS 336 Global Environmental Politics or ARE 309 Environ Law & Economic Policy*	3	SMT 302 Processing of Biomaterials	4
Technical Elective ²	3	HESF 1** Fitness & Wellness*	1
	<i>Total:16</i>		<i>Total:16</i>
SUMMER	CREDITS		
SMT 210 Internship	1		
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 310 Intro. to Industrial Ecology*	3	SMT 320 Industrial Chemical Pollutants	2
ISE 311 Engineering Econ. Analysis	3	Com *** Speech Elective ³	3
ST 311 Introduction to Statistics*	3	GEP Additional Breadth Requirement*	3
ET 203 Pollution Prevention	1	Advised Elective ³	3
Technical Elective ²	3	Advised Elective ³	3
Technical Elective ²	3	Technical Elective ²	3
	<i>Total:16</i>		<i>Total:17</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 441 Mech. Properties of Sust. Materials	4	SMT 483 Capstone in SMT	3
SMT 444 Sust. Composites and Biopolymers	3	GEP Humanities Requirement*	3
SMT 450 Sustainable Business and Innovation	2	Technical Elective ²	3
PSE 476 Environmental LCA	3	Advised Elective ³	3
Advised Elective ³	3	Advised Elective ³	3
	<i>Total:15</i>		<i>Total:15</i>
Minimum Credit Hours Required for Graduation*: 128			

Major/Program Footnotes:

¹ Student with appropriate math skills is encouraged to take MA 131 or MA 141

² Technical Electives (15 hours): Student is encouraged to select courses that will fulfill an academic minor. Courses should enhance student's career objectives and must be approved by a faculty advisor.

³ Advised Electives: Student chooses a course in coordination with his/her adviser.

***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 121, ST 311**
- 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, PY 211, BIO 181, SMT 202**
- 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:
- 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 205, PS 320 or PS 336 or ARE 309**
- 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: **ES 100, IDS 201, MIE 201, SMT 201, SMT 232, SMT 310**
- 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:
- 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: **ES 100, IDS 201**
- 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 Sustainable Materials and Technology	<u>Plan SIS Code:</u> 15SMTBS
<u>Concentration/Subplan Title:</u>	<u>Subplan SIS Code:</u>
<u>Indicate requirements status:</u> Current: Proposed: X	<u>Proposed Effective Semester:</u> 06/2018
<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
Departmental Requirements SMT 200, SMT 210, SMT 232, SMT 302, SMT 310 SMT 201 SMT 203 (CP), SMT 301 (CP) SMT 320, SMT 441, SMT 444, SMT 450, SMT 483 PSE 476 MIE 201 EC 205 ISE 311 GRP ___ (PS 320, or PS 336, or ARE 309) GRP ___ (ENV 100 and ENV 101, or ES 100) IDS 201 ET 203	13 2 7 (CP) 14 3 3 3 3 3 3 3 3 1	Interdisciplinary Perspectives (2 hours) Interdisciplinary Perspectives (3 hours) Social Sciences (3 hours) Social Sciences (3 hours)
Mathematical Sciences GRP __ (MA 121, or MA 131, or MA 141) (CP) ST 311	3 (CP) 3	Mathematical Sciences (3 hours) Mathematical Sciences (3 hours)
Natural Sciences CH 101 (CP), CH 102 (CP) CH 220 (CP), CH 222 (CP) GRP 201 (PY 211, or PY 205/PY 206) BIO 181	4 (CP) 4 (CP) 4 4	Natural Sciences (4 hours) Natural Sciences (3 hours)
Writing and Speaking GRP 030 (COM 110, or COM 112, or COM211)	3	Communication in the major
Concentration Courses/Groups/Electives:		
Advised elective	15	
Technical elective (Student is encouraged to select courses that will fulfill an academic minor. Courses should enhance student's career objectives and must be approved by a faculty advisor.)	15	
Free Electives:		

Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	113 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s):		
Other:		
Total credit hours under College Requirements:	0 Hours	

<u>NCSU GENERAL EDUCATION PROGRAM REQUIREMENTS</u>		At least one of the following must be listed:
<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>		1 Choose course(s) from the University Approved GEP course list for this category.
<i>Specific courses should not be listed in any of the fields below other than ENG 101.</i>		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 list for this category.
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>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements
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>	X	<i>(Choose statement 1, 2 or 3)</i> Minimum requirements are satisfied by Major course requirements
Physical Education/Healthy Living (2 credits) <i>(Including one Fitness and Wellness course)</i>	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.	15 hours	
GEP Co-Requisites:		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.
U.S. Diversity co-requisite (USD)	n/a	<i>(Choose statement 1 or 4)</i>

Global Knowledge co-requisite	(GK)	n/a	<i>(Choose statement 1 or 4)</i>
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.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: X Proposed:

Proposed Effective Semester: 6/2013

Degree/Plan Title: B.S. in Sustainable Materials and Technology

Concentration/Subplan Title:

Plan SIS Code: 15SMTBS

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
SMT 200	Intro. to Sustainability & Technology	1	SMT 203 Physical Properties of Sust. Mat.	4 ^{CP}
SMT 201	Sustainable Materials for Green Housing*	2	CH 101 Chemistry – A Molecular Science*	3 ^{CP}
SMT 202	Anatomy and Properties of Biomaterials*	3 ^{CP}	CH 102 General Chemistry Lab*	1 ^{CP}
ENG 101	Academic Writing & Research*	4	BIO 181 Intro Bio: Ecology, Evol, Biodiv.*	4
MA 121	Elements of Calculus* ¹	3 ^{CP}	GEP Humanities Requirement*	3
HESF 1**	Fitness & Wellness*	1	GEP Health and Exercise Studies Requirement*	1
<i>Total:14</i>			<i>Total:16</i>	
SOPHOMORE YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
ES 100	Intro to Environmental Sciences*	3	SMT 232 Recycling to Create a Sust. Env.*	2
CH 220	Introductory Organic Chemistry	4 ^{CP}	SMT 301 Chem. of Sust. Materials	4 ^{CP}
IDS 201	Environmental Ethics*	3	EC 205 Fund. of Economics*	3
MIE 201	Introduction to Business Processes*	3	PY 211 General Physics I*	4
Technical Elective ²		3	ST 311 Introduction to Statistics*	3
<i>Total:16</i>			<i>Total:16</i>	
SUMMER		CREDITS		
SMT 210	Internship	1		
JUNIOR YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
SMT 310	Intro. To Industrial Ecology*	3	SMT 302 Processing of Biomaterials	4
ET 203	Pollution Prevention	1	GEP Additional Breadth Requirement*	3
PS 320	US Environmental Law & Politics or PS 336 Global Environmental Politics or ARE 309 Environ Law & Economic Policy*	3	ISE 311 Engineering Econ. Analysis	3
ENG 331	Comm. Eng. & Tech	3	Com *** Speech Elective ³	3
Technical Elective ²		3	Technical Elective ²	3
Free Elective		3		
<i>Total:16</i>			<i>Total:16</i>	
SENIOR YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
SMT 444	Sustainable Composites and Biopolymers	3	SMT 441 Mechanical Properties of Sust. Materials	4
PSE 476	Environmental LCA	3	SMT 483 Capstone in SMT	3
Advised Elective ³		3	Technical Elective ²	6
Advised Elective ³		3	GEP Humanities Requirement*	3
Advised Elective ³		3		
<i>Total:15</i>			<i>Total:16</i>	
Minimum Credit Hours Required for Graduation* : 126				

Major/Program Footnotes:

¹ Students with appropriate math skills are encouraged to take MA 131 or MA 141

² Technical Electives: Select from ACC ***, BUS 1**, BUS 2**, BUS 3**, CSC ***, FOR 339, GC***, ISE ***, MIE 1**, MIE 2**, MIE 3**, EC *** except EC 205. To enroll in 300-level BUS and MIE courses, student must be admitted to the Business Administration Minor program. To enroll in 400-level ACC courses, student must be admitted to the Accounting Minor program.

³ Advised Electives: Student chooses a course in coordination with his/her adviser.

***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 121, ST 311**
- 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, PY 211, BIO 181, SMT 202**
- 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:
- 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 205, PS 320 or PS 336 or ARE 309**
- 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: **ES 100, IDS 201, MIE 201, SMT 201, SMT 232, SMT 310**
- 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:
- 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: **ES 100, IDS 201**
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

NC STATE UNIVERSITY

College of Natural Resources
Campus Box 8005
Raleigh, NC 27695-8005
919.515.5807
919.515.6302 (fax)

Paper Science & Engineering 919.515.2888
Sustainable Materials & Technology 919.515.3181
WP Extension 919.515.5637

To: University Courses and Curricula Committee
From: Dr. Marko Hakovirta, Professor and Department Head, Forest Biomaterials
Date: September 22, 2017
Subject: Request to establish a Wood Products concentration within the B.S. Sustainable Materials and Technology curriculum

The purpose of this memo is to request approval for establishing a Wood Products concentration within the B.S. in Sustainable Materials and Technology (SMT) curriculum.

The current title for the parent degree is Sustainable Materials & Technology – BS, with a SIS code of 15SMTBS, a term date of Fall '13 and a CIP code of 03.0509. The proposed concentration title is Wood Products, with a suggested SIS code of 15SMTWP.

Statement of Justification: A B.S. Wood Products curriculum existed at NC State University since 1948 until it was discontinued and replaced by the B.S. in Sustainable Materials and Technology (SMT) curriculum in 2013. Some recent SMT graduates who find employment in the forest products industry would like to have a more in-depth understanding of wood properties and processing. Forest products companies are demanding the same. The wood industry contributes significantly to North Carolina's economy and has undergone rapid and significant technological changes in the past few years. Graduates with wood background are in high demand by industry, with graduates of the defunct Wood Products curriculum enjoying 100% job placement. The faculty has reviewed the SMT curriculum and believes that the need by graduates and industry could be met by creating a Wood Products concentration that allows students to take 10 credit hours of wood-specific classes and 15 credit hours of wood-science-related advised electives. The students in the concentration may also do their internships (SMT 210, 1 credit) in forest products companies. The following wood-specific courses will be included in the Wood Products concentration but not in the parent curriculum:

- SMT 202 (Anatomy and Properties of Biomaterials), 3 credit hours
- SMT 206 (Wood Manufacturing Site Visits), 1 credit hour
- SMT 240 (Introduction to the Wood Products Industry), 2 credit hours
- SMT 308 (Wood Processing), 4 credit hours

Consultation Statement: The proposed concentration and associated courses will not impact other programs on campus. Consultation with other departments is not required.

Proposed Implementation Date: Fall 2018

Matriculation Requirements for Internal Transfer Students: The same as the parent curriculum

Enrollment History and Projections:

Number of majors in the parent degree in each of the past 4 years

Fall 2013: 0

Fall 2014: 38

Fall 2015: 77

Number of graduates in the parent degree in each of the past 4 years

2013-2014: 0

2014-2015: 0

2015-2016: 7

2016-2017: 23

Projected enrollment in the Wood Products concentration for a 4-year period: Total enrollment of 15 students. The B.S. Wood Products program had traditionally been relatively small, with 25 to 35 total enrollment. The faculty projects an enrollment at $\frac{1}{2}$ of the historical count.

Budget/Resources:

No additional resources will be required to implement the new concentration. The SMT program gained additional faculty FTE when the College of Natural Resources hired Dr. Yuan Yao in 2016 as part of its strategic initiative and when Dr. Steve Kelley stepped down as department head in 2016. Dr. Ilona Peszlen can also devote more of her time to undergraduate teaching and mentoring now that she is no longer the department's Director of Graduate Program. In addition, the department recently hired a staff member, Yvonne White, as SMT undergraduate services assistant. The Hodges Wood Products Laboratory continues to provide the facilities and equipment for students in both the parent program and the proposed concentration.

Catalog description for the proposed concentration: The wood products industry is of major importance to the economy of North Carolina and the Southeast. The career opportunities for graduates with a strong foundation in wood science and forest products processing are excellent. The Wood Products concentration is a materials science program based on wood, a renewable and natural resource. The properties of the material and the technologies associated with wood conversion to final products are emphasized, and the 15 hours of advised elective plus 15 hours of technical electives allow the student to select courses to meet individual career goals in the forest products industry.

Program objectives:

1. To provide students with the scientific knowledge, technical skills, and insights needed for the processing and manufacture of wood products.
2. To develop in students the ability to apply critical thinking skills and knowledge to solving problems related to the field of wood products.
3. To provide students a broad perspective of the wood industry, its relationship to society and to the environment, and an understanding of their professional responsibility to be good stewards of the wood resource.
4. To develop in students the communication skills needed by practitioners to be successful in the forest products profession.
5. To provide an educational environment that will allow students to acquire skills needed for continued growth and learning in their careers.

The first 3 objectives are unique to the concentration while the last 2 overlap with those of the parent degree.

Format A (8-semester display) for the proposed concentration: see attached


Format B (List of Requirements) for the proposed concentration: see attached

Format A (current 8-semester display) for the parent degree: see attached

North Carolina State University

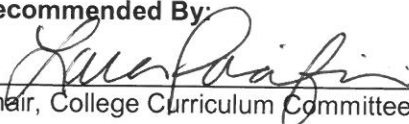
This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:



Head, Department/Program
Date 12/13/17

Recommended By:



Chair, College Curriculum Committee
Date 1-19-18

Endorsed By:



College Dean
Date 2/20/2018

Recommended By:

Vice Provost, DELTA (if DE degree/certificate) Date

Recommended By:

Chair, University Courses & Curricula Committee Date

Approved By:

Dean, (DASA or the Graduate School) Date

Recommended By:

Dean's Council Date

Approved By:

Executive Vice Chancellor and Provost Date

Approved By:

Chancellor Date

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X Proposed Effective Semester: 6/2018

Degree/Plan Title: B.S. in Sustainable Materials and Technology Concentration/Subplan Title: Wood Products

Plan SIS Code: 15SMTBS Subplan SIS Code: 15SMTWP

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
ENV 100 Student Success in ENVFY and ES 101 Exploring the Env., or ES 100 Intro to Env. Sci.	3	EC 205 Fund. of Economics*	3
SMT 200 Intro. to Sustainable Materials Science	3	ENG 101 Academic Writing & Research*	4
MA 121 Elements of Calculus* ¹	3 ^{CP}	CH 101 Chemistry – A Molecular Science*	3 ^{CP}
BIO 181 Intro Bio: Ecology, Evol, Biodiv.*	4	CH 102 General Chemistry Lab*	1 ^{CP}
GEP Humanities Requirement*	3	PY 211 General Physics I*	4
		GEP Health and Exercise Studies Requirement*	1
	<i>Total:16</i>		<i>Total:16</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 202 Anatomy and Properties of Biomaterials	3 ^{CP}	SMT 201 Sustainable Mat. for Green Housing*	2
CH 220 Introductory Organic Chemistry	3 ^{CP}	SMT 203 Physical Properties of Sust. Mat.	4 ^{CP}
CH 222 Organic Chemistry I Lab	1 ^{CP}	SMT 232 Recycling to Create a Sust. Env.*	2
MIE 201 Introduction to Business Processes*	3	SMT 301 Chem. of Sust. Materials	3 ^{CP}
PS 320 US Environmental Law & Politics or PS 336 Global Environmental Politics or ARE 309 Environ Law & Economic Policy*	3	SMT 240 Intro to Wood Products Industry	2
Technical Elective ²	3	Technical Elective ²	3
	<i>Total:16</i>		<i>Total:16</i>
SUMMER	CREDITS		
SMT 206 Wood Manufacturing Site Visits	1		
SMT 210 Internship	1		
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 308 Wood Processing	4	ISE 311 Engineering Econ. Analysis	3
SMT 310 Intro. to Industrial Ecology*	3	Com *** Speech Elective ³	3
ST 311 Introduction to Statistics*	3	GEP Additional Breadth Requirement*	3
Technical Elective ²	3	Advised Elective³	3
Technical Elective ²	3	Advised Elective³	3
	<i>Total:16</i>		<i>Total:15</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 441 Mech. Properties of Sust. Materials	4	SMT 483 Capstone in SMT	3
SMT 444 Sust. Composites and Biopolymers	3	GEP Humanities Requirement*	3
SMT 450 Sustainable Business and Innovation	2	Technical Elective ²	3
PSE 476 Environmental LCA	3	Advised Elective³	3
Advised Elective³	3	Advised Elective³	3
HESF 1** Fitness & Wellness*	1		
	<i>Total:16</i>		<i>Total:15</i>
Minimum Credit Hours Required for Graduation*: 128			

Major/Program Footnotes:

¹ Student with appropriate math skills is encouraged to take MA 131 or MA 141

² Technical Electives (15 hours): Student is encouraged to select courses that will fulfill an academic minor. Courses should enhance student's career objectives and must be approved by a faculty advisor.

³ Advised Electives: Student chooses a course in coordination with his/her adviser.

***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 121, ST 311
- 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, PY 211, BIO 181, SMT 202
- 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:
- 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 205, PS 320 or PS 336 or ARE 309
- 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)
X 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: ES 100, IDS 201, MIE 201, SMT 201, SMT 232, SMT 310
- 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:
- 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: ES 100, IDS 201
- 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 Sustainable Materials and Technology	<u>Plan SIS Code</u> : 15SMTBS
<u>Concentration/Subplan Title</u> : Wood Products	<u>Subplan SIS Code</u> : 15SMTWP
<u>Indicate requirements status</u> : Current:	Proposed: X
<u>Proposed Effective Semester</u> : 06/2018	
<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
Departmental Requirements SMT 200, SMT 210, SMT 232, SMT 310 SMT 201 SMT 203 (CP), SMT 301 (CP) SMT SMT 441, SMT 444, SMT 450, SMT 483 PSE 476 MIE 201 EC 205 ISE 311 GRP ___ (PS 320, or PS 336, or ARE 309) GRP ___ (ENV 100 and ENV 101, or ES 100)	9 2 7 (CP) 12 3 3 3 3 3	Interdisciplinary Perspectives (2 hours)
Mathematical Sciences GRP __ (MA 121, or MA 131, or MA 141) (CP) ST 311	3 (CP) 3	Mathematical Sciences (3 hours) Mathematical Sciences (3 hours)
Natural Sciences CH 101 (CP), CH 102 (CP) CH 220 (CP), CH 222 (CP) GRP 201 (PY 211, or PY 205) BIO 181	4 (CP) 4 (CP) 4 4	Natural Sciences (4 hours) Natural Sciences (3 hours)
Writing and Speaking GRP 030 (COM 110, or COM 112, or COM211)	3	Communication in the major
<u>Concentration Courses/Groups/Electives:</u>		
Concentration Courses SMT 202 (CP), SMT 206, SMT 240, SMT 308, Advised elective	10 15	
Technical elective (Student is encouraged to select courses that will fulfill an academic minor. Courses should enhance student's career objectives and must be approved by a faculty advisor.)	15	

Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	113 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s):		
Other:		
Total credit hours under College Requirements:	0 Hours	

<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"> 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 <input checked="" type="checkbox"/> 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) (At least 1 course with MA or ST prefix) <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	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major course requirements</i>
Natural Sciences (7 credits) (At least 1 lab course or course with a lab) <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	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major course requirements</i>
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) (Courses from two different disciplines) <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	(Choose statement 1, 2 or 3) <i>Choose course(s) from the University Approved GEP course list for this category.</i>
Social Sciences (6 credits) (Courses from two different disciplines) <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	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major course requirements</i>
Additional Breadth (3 credits) (Choose approach that is different from the approach of the Major) <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	(Choose statement 5 or 6) <i>Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts.</i>
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>	X	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major course requirements</i>
Physical Education/Healthy Living (2 credits) (Including one Fitness and Wellness course)	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.	15 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 statement 1 or 4)
Global Knowledge co-requisite	(GK)	n/a	(Choose statement 1 or 4)
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.

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: X Proposed:

Proposed Effective Semester: 6/2013

Degree/Plan Title: B.S. in Sustainable Materials and Technology

Concentration/Subplan Title:

Plan SIS Code: 15SMTBS

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
SMT 200	Intro. to Sustainability & Technology	1	SMT 203 Physical Properties of Sust. Mat.	4 ^{CP}
SMT 201	Sustainable Materials for Green Housing*	2	CH 101 Chemistry – A Molecular Science*	3 ^{CP}
			CH 102 General Chemistry Lab*	1 ^{CP}
SMT 202	Anatomy and Properties of Biomaterials*	3 ^{CP}	BIO 181 Intro Bio: Ecology, Evol, Biodiv.*	4
ENG 101	Academic Writing & Research*	4	GEP Humanities Requirement*	3
MA 121	Elements of Calculus* ¹	3 ^{CP}	GEP Health and Exercise Studies Requirement*	1
HESF 1**	Fitness & Wellness*	1		
		<i>Total:14</i>		<i>Total:16</i>
SOPHOMORE YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
ES 100	Intro to Environmental Sciences*	3	SMT 232 Recycling to Create a Sust. Env.*	2
CH 220	Introductory Organic Chemistry	4 ^{CP}	SMT 301 Chem. of Sust. Materials	4 ^{CP}
IDS 201	Environmental Ethics*	3	EC 205 Fund. of Economics*	3
MIE 201	Introduction to Business Processes*	3	PY 211 General Physics I*	4
	Technical Elective ²	3	ST 311 Introduction to Statistics*	3
		<i>Total:16</i>		<i>Total:16</i>
SUMMER		CREDITS		
SMT 210	Internship	1		
JUNIOR YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
SMT 310	Intro. To Industrial Ecology*	3	SMT 302 Processing of Biomaterials	4
ET 203	Pollution Prevention	1	GEP Additional Breadth Requirement*	3
PS 320	US Environmental Law & Politics or PS 336 Global Environmental Politics or ARE 309 Environ Law & Economic Policy*	3	ISE 311 Engineering Econ. Analysis	3
			Com *** Speech Elective ³	3
ENG 331	Comm. Eng. & Tech	3	Technical Elective ²	3
	Technical Elective ²	3		
	Free Elective	3		
		<i>Total:16</i>		<i>Total:16</i>
SENIOR YEAR				
FALL SEMESTER		CREDITS	SPRING SEMESTER	CREDITS
SMT 444	Sustainable Composites and Biopolymers	3	SMT 441 Mechanical Properties of Sust. Materials	4
PSE 476	Environmental LCA	3	SMT 483 Capstone in SMT	3
	Advised Elective ³	3	Technical Elective ²	6
	Advised Elective ³	3	GEP Humanities Requirement*	3
	Advised Elective ³	3		
		<i>Total:15</i>		<i>Total:16</i>
Minimum Credit Hours Required for Graduation*: 126				

Major/Program Footnotes:

¹ Students with appropriate math skills are encouraged to take MA 131 or MA 141

² Technical Electives: Select from ACC ***, BUS 1**, BUS 2**, BUS 3**, CSC ***, FOR 339, GC***, ISE ***, MIE 1**, MIE 2**, MIE 3**, EC *** except EC 205. To enroll in 300-level BUS and MIE courses, student must be admitted to the Business Administration Minor program. To enroll in 400-level ACC courses, student must be admitted to the Accounting Minor program.

³ Advised Electives: Student chooses a course in coordination with his/her adviser.

***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 121, ST 311**
- 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, PY 211, BIO 181, SMT 202**
- 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:
- 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 205, PS 320 or PS 336 or ARE 309**
- 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: **ES 100, IDS 201, MIE 201, SMT 201, SMT 232, SMT 310**
- 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:
- 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: **ES 100, IDS 201**
- 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: Proposed: X Proposed Effective Semester: 6/2018

Degree/Plan Title: B.S. in Sustainable Materials and Technology Concentration/Subplan Title:

Plan SIS Code: 15SMTBS 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
ENV 101 Exploring the Environment or ES 100 Intro to Environmental Sciences	3	EC 205 Fund. of Economics*	3
SMT 201 Sustainable Mat. for Green Housing*	2	ENG 101 Academic Writing & Research*	4
MA 121 Elements of Calculus* ¹	3 ^{CP}	CH 101 Chemistry – A Molecular Science*	3 ^{CP}
BIO 181 Intro Bio: Ecology, Evol, Biodiv.*	4	CH 102 General Chemistry Lab*	1 ^{CP}
GEP Humanities Requirement*	3	PY 211 General Physics I*	4
HESF 1** Fitness & Wellness*	1	GEP Health and Exercise Studies Requirement*	1
	Total:16		Total:16
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 220 Introductory Organic Chemistry	3 ^{CP}	SMT 200 Intro. to Sustainable Materials Science	3
CH 222 Organic Chemistry I Lab	1 ^{CP}	SMT 203 Physical Properties of Sust. Mat.	4 ^{CP}
MIE 201 Introduction to Business Processes*	3	SMT 232 Recycling to Create a Sust. Env.*	2
IDS 201 Environmental Ethics*	3	SMT 301 Chem. of Sust. Materials	3 ^{CP}
PS 320 US Environmental Law & Politics or PS 336 Global Environmental Politics or ARE 309 Environ Law & Economic Policy*	3	SMT 302 Processing of Biomaterials	4
Technical Elective ²	3		
	Total:16		Total:16
SUMMER			
	CREDITS		
SMT 210 Internship	1		
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 310 Intro. to Industrial Ecology*	3	SMT 320 Industrial Chemical Pollutants	2
ISE 311 Engineering Econ. Analysis	3	Com *** Speech Elective ³	3
ST 311 Introduction to Statistics*	3	GEP Additional Breadth Requirement*	3
ET 203 Pollution Prevention	1	Advised Elective ³	3
Technical Elective ²	3	Advised Elective ³	3
Technical Elective ²	3		
	Total:16		Total:14
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
SMT 441 Mech. Properties of Sust. Materials	4	SMT 450 Sustainable Business and Innovation	2
SMT 444 Sust. Composites and Biopolymers	3	SMT 483 Capstone in SMT	3
PSE 476 Environmental LCA	3	GEP Humanities Requirement*	3
Advised Elective ³	3	Technical Elective ²	3
Technical Elective ²	3	Advised Elective ³	3
		Advised Elective ³	3
	Total:16		Total:17
Minimum Credit Hours Required for Graduation* : 128			

Major/Program Footnotes:

¹ Students with appropriate math skills are encouraged to take MA 131 or MA 141

² Technical Electives (15 hours): Student is encouraged to select courses that will fulfill an academic minor. Courses should enhance student's career objectives and must be approved by a faculty advisor.

³ Advised Electives: Student chooses a course in coordination with his/her adviser.

* **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 121, ST 311
- 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, PY 211, BIO 181, SMT 202
- 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:
- 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 205, PS 320 or PS 336 or ARE 309
- 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)
X 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: ES 100, IDS 201, MIE 201, SMT 201, SMT 232, SMT 310
- 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:
- 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: ES 100, IDS 201
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

NC STATE UNIVERSITY

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MEMORANDUM

Date: February 26, 2018

To: Dr. Michael D. Mullen, Vice Chancellor and Dean for Division of Academic and Student Affairs

From: Dr. Morton Barlaz, Head, Department of Civil, Construction, and Environmental Engineering

Re: Curriculum Action for BS Civil Engineering (14CEBS)

Proposed Revisions:

The proposed changes to this curriculum are required to accommodate two new courses offered by the department, to accurately reflect minor CE course actions recently approved, and to update elective group lists in a way that ensures students obtain the necessary breadth and depth of knowledge in the various civil engineering disciplines while minimizing potential confusion and advising difficulties. Below is an itemized list of each change, which is followed by a detailed justification for each.

1. CSC 111 moved to Sophomore Year, Fall Semester, from Freshman Year, Spring Semester.
2. New course CE 250 in Sophomore Year, Fall Semester.
3. PY 208 moved to Sophomore Year, Spring Semester, from Sophomore Year, Fall Semester.
4. PY 209 dropped from curriculum.
5. CE 313 in Sophomore Year, Spring Semester, changed to new course number, CE 225.
6. CE 382 in Sophomore Year, Spring Semester, changed to new course number, CE 282.
7. CE 390 dropped from curriculum.
8. CE Area Intro Elective group dropped from curriculum and replaced with CE Core Course Elective group and CE Junior Elective group.
9. (COM 110 or ENG 331) group moved from Fall Semester, Senior Year to Junior Year.
10. Engineering Science Elective group added that includes current (MAE 201 or ECE 331) group and adds MAE 208.
11. CE Elective group dropped from curriculum and replaced with CE Senior Elective group and CE Senior Design group.
12. CE/MA/SCI Elective group dropped from curriculum and replaced with Senior Elective group that includes courses from the CE/MA/SCI Elective group and adds new approved courses.
13. GEP Requirement courses moved semesters to help balance total semester credit hours.

Proposed Changes in Format A eight semester display:

See attached Format A display that highlights all of the proposed changes. Deleted or moved courses are identified by red color font with strikethrough, and revised courses are identified by blue color font.

Justification for Change:

1. *CSC 111 Intro to Computing: PYTHON* is moved from the Freshman Year, Spring Semester, to the Sophomore Year, Fall Semester, to be consistent with where the course is shown in other degree audits of the CCEE Department. Further, as this is a CCEE Department specific CSC course very few students

enrolled in the course as Freshman as they are unsure of what department they will CODA in. Hence, it is more appropriate to integrate the course in the curriculum where students will realistically enroll in the course, once CODA'd in 4CEBS.

2. The recently approved new course required by all students in the CCEE Department, *CE 250 Introduction to Sustainable Infrastructure*, is added into the curriculum in the Sophomore Year, Fall Semester. CE 250 addresses a need in the department by introducing students to the civil, construction and environmental engineering profession in the context of the three pillars of sustainability - environmental, social and economic.
3. *PY 208 Physics for Engineers and Scientists II* moved to Sophomore Year, Spring Semester, from Sophomore Year, Fall Semester to balance total semester credit hours.
4. *PY 209 Physics for Engineers and Scientists II Lab* is dropped from the proposed curriculum. There remains sufficient lab intensive experiences in the curriculum by various other CH, PY and CE lab courses. This revision is consistent with a previously approved 14CONBS curriculum revision in the CCEE Department. The same revision is also proposed in an accompanying proposed revision to the 14ENEBS curriculum in the CCEE Department. This will make all degree audits consistent in the CCEE Department.
5. The course number of *Mechanics of Solids* is changed from CE 313 to CE 225 according to a recently approved minor course action to align with the Sophomore level fundamental mechanics nature of the course material. (This is consistent with similar changes made to analogous courses in other departments in the College of Engineering.)
6. The course number of *Hydraulics* is changed from CE 382 to CE 282 according to a recently approved minor course action to align with the Sophomore level fundamental mechanics nature of the course material. (This is consistent with similar changes made to analogous courses in other departments in the College of Engineering.)
7. *CE 390 Engineering Economics* is dropped from the curriculum as the topics are integrated in the new required course in the curriculum, CE 250 (see item 2).
8. **CE Area Intro Elective** group dropped from curriculum and replaced with **CE Core Course Elective** groups and **CE Junior Elective** group. Some courses in the current CE Area Intro Elective group appeared in different elective groups which was often a source of confusion, and students would enroll in these courses as a Senior counter to what was intended. The junior year level CE 3xx courses from the CE Area Intro Elective group are categorized more specifically in the proposed CE Core Course Elective groups and the CE Junior Elective group to ensure students enroll in the appropriate fundamental civil engineering courses in the junior year providing the breadth of knowledge required to make informed decisions for senior year electives and be prepared for the senior design course.
9. (*COM 110 Public Speaking* or *ENG 331 Communication for Engineers and Technicians*) group moved from Fall Semester, Senior Year to Junior Year so that students develop better communication skills earlier in the curriculum. This move also helps balance total semester credit hours.
10. **Engineering Science Elective** group added that includes current (*MAE 201 Engineering Thermodynamics I* or *ECE 331 Principles of Electrical Engineering*) group and adds *MAE 208 Engineering Dynamics*. This elective group provides valuable breadth of knowledge in a complementary engineering discipline.
11. **CE Elective** group dropped from curriculum and replaced with more the more specific **CE Senior Elective** group and **CE Senior Design** group. These groups are designed to allow students to obtain more depth of understanding in one or more civil engineering disciplines building on the breadth of experience obtained from the junior year elective groups (see item 8). The course in the CE Senior Elective group are selected so that they would be taken in the senior year along with the ABET required culminating design experience selected from courses in the CE Senior Design group.
12. **CE/MA/SCI Elective** group dropped from curriculum and replaced with **Senior Elective** group that includes courses from the CE/MA/SCI Elective group and adds new approved courses. The CE/MA/SCI Elective group list of approved courses was vague and students typically enrolled in courses that did not support the curriculum nor their professional preparation. The proposed Senior Elective group is designed to provide students with the opportunity to gain breadth of knowledge in related topics from different disciplines in support of their professional development. Included in this elective group is the recently approved new course, *CE 499 Undergraduate Research Thesis in Civil, Construction and Environmental Engineering*, and approved courses from the Architecture Department (ARC 521, ARC 522, ARC 523,

ARC 590) and the Mechanical and Aerospace Engineering Department (MAE 440). In this elective group students may also enroll in an approved CE 5xx course in consultation with their advisor and with the approval of the CCEE Department.

13. *HES xxx Health & Exercise Studies* course and several *GEP Requirement* courses moved semesters to help balance total semester credit hours.

Consultation with other Departments:

Except for the courses in the new **Engineering Science Elective** group and the **Senior Elective** group, all of the other non-CE courses in the proposed curriculum are already in the current curriculum and required no additional consultation. The *ARC 5xx* courses in the new **Senior Elective** group were identified in consultation with the Head of the Architecture Department, Professor David Hill, and the relevant course instructors. Similarly, the two new *MAE* courses in the **Engineering Science Elective** and **Senior Elective** groups were approved by the MAE Associate Head and Director of Undergraduate Programs, Professor Jack Edwards.

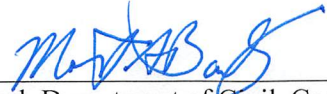
Impact on Other Departments or Programs:

The only impact on other departments is the enrollment of a subset of CE students possibly taking one of the *ARC 5xx* approved courses as a Senior Elective in a group which contains a substantial list of many other courses, most of which are from *CE 4xx*. The Architecture Department welcomes the interaction of engineering students in some of their courses. With respect to the new *MAE* courses added to the **Engineering Science Elective** and the **Senior Elective** groups, it is expected that there will primarily be redistribution of CE students currently enrolling in *MAE 201* to other *MAE* course elective options.

Proposed Effective Date for Revision:

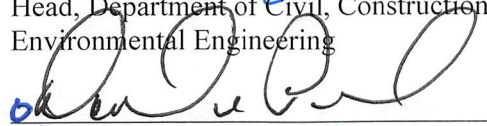
August, 2018

RECOMMENDED BY:



Head, Department of Civil, Construction, and
Environmental Engineering
Date 2/28/19

APPROVED BY:



Chair, College Curriculum Committee
Date 27 Feb 18



College Dean
Date 2/27/18

Chair, University Courses & Curricula Committee
Date

Office of the Provost
Date

APPROVED EFFECTIVE DATE:

FORMAT A (Marked up copy)
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X

Proposed Effective Semester: Fall 2018

Degree/Plan Title: Bachelor of Science in Civil Engineering

Concentration/Subplan Title:

Plan SIS Code: 14CEBS

Subplan SIS Code:

New Degree Audit required? (Y or N) Yes

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	3	EC 205 Economics (GEP Req) ¹	3
CH 102 General Chemistry Laboratory	1	MA 241 Calculus II	4
E 101 Introduction to Engr & Prob. Solving	1	PY 205 Physics for Engineers & Scientists I	3
E 115 Intro to Computing Environments	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing and Research	4	E 102 Engineering in the 21 st Century (GEP Req) ¹	2
MA 141 Calculus I	4	GEP Requirement ¹	3
HESF 1XX Fitness & Wellness Course	1	HES *** Phys. Ed/Healthy Living Course	1
		CSC 111 Intro. to Computing: Python	3
<i>Total:</i>	15	<i>Total:</i>	16 17
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	CE 225 Mechanics of Solids	3 (CP)
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 313 Mechanics of Solids	3 (CP)
CSC 111 Introduction to Computing: Python	3	CE 282 Hydraulics	3 (CP)
TDE 220 Civil Engineering Graphics	3	CE 382 Hydraulics	3 (CP)
MA 242 Calculus III	4	PY 208 Physics for Engineers & Scientists II	3
PY 208 Physics for Engineers & Scientists II	3	MA 341 Applied Differential Eq OR	
PY 209 Physics for Engineers & Scientists II Lab	1	MA 305 Elem Linear Algebra	3
GEP Requirement	3	MSE 200 Mech Prop of Struct Mat	3
		GEP Requirement ¹	3
		HES *** Phys. Ed/Healthy Living Course	1
<i>Total:</i>	16 17	<i>Total:</i>	16 15
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Core Course – Lab Intensive Elective I ²	3/4	CE Core Course – Lab Intensive Elective II ²	4/3
CE Core Course – Elective I ³	3	CE Core Course – Elective II ³	3
CE Junior Elective I ⁴	3	CE Junior Elective II ⁴	3
ST 370 Prob & Stat for Engineers	3	Basic Science Elective ⁷	3
COM 110 Public Speaking OR		Engineering Science Elective ⁸	3
ENG 331 Communication for Engr. & Tech.	3	GEP Requirement ¹	3
CE Area Intro Elective I¹	3	CE Area Intro Elective IV¹	3
CE Area Intro Elective II¹	3	CE Area Intro Elective V¹	3/4
CE Area Intro Elective III¹	3	CE Elective I²	3
CE 390 Engineering Economics	1	CE Lab, if needed (CE 324 or CE 381)	1/0
GEP Requirement	3		
<i>Total:</i>	15/16 16	<i>Total:</i>	16/15 16
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Senior Elective I ⁵	3	CE Senior Elective III ⁵	3
CE Senior Elective II ⁵	3	CE Senior Elective IV ⁵	3
Senior Elective ⁹	3	CE Senior Design ⁶	3
GEP Requirement ¹	3	GEP Requirement ¹	3
GEP Requirement ¹	3	GEP Requirement ¹	3
CE Elective II²	3	CE Elective V²	3
CE Elective III²	3	CE Elective VI²	3
CE Elective IV²	3	CE Elective VII²	3
CE/MA/SCI Elective⁴	3		
COM110 Pub Speak OR ENG331 Comm for Engr	3		
MAE201 Thermo OR ECE331 Prin of Elec Eng I	3		
<i>Total:</i>	15	<i>Total:</i>	15

Major/Program Footnotes:

¹GEP Requirements to be selected from the appropriate lists in consultation with the advisor.

^{2,3}CE Core Courses, ⁴CE Junior Electives, ⁵CE Senior Electives, ⁶CE Senior Design, ⁷Basic Science Elective, ⁸Engineering Science Elective, ⁹Senior Elective: select from lists on worksheet in consultation with advisor.

(CP) Critical Path major course predictive of student success.

~~³CE Area Intro Electives, ²CE Electives, ³Basic Science Elective, ⁴CE/MA/SCI Elective: select from lists on worksheet in consultation with advisor~~

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

¹ 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)
Fulfilled as part of Major requirements.
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Fulfilled as part of Major requirements.
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list.
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
~~*Choose from the University approved GEP Social Sciences course list in a discipline other than Economics.–EC 205 (or EC 201 or ARE 201) taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.*~~
Choose 3 credit hours from University approved GEP Social Sciences course list.
- 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)
E 102 taken as part of the Major requirements satisfies 2 credit hours needed to fulfill the GEP Interdisciplinary perspectives requirement.
Choose 3 credit hours from the University approved GEP Interdisciplinary Perspectives course list.
~~*Choose from the University approved GEP Interdisciplinary Perspectives course list.*~~
- 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.
- J. **Global Knowledge (GK)**
Choose from the University approved GEP Global Knowledge course list.
- 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: Proposed: **X**

Proposed Effective Semester: **Fall 2018**

Degree/Plan Title: **Bachelor of Science in Civil Engineering**

Concentration/Subplan Title:

Plan SIS Code: **14CEBS**

Subplan SIS Code:

New Degree Audit required? (Y or N) **Yes**

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	3	EC 205 Economics (GEP Req) ¹	3
CH 102 General Chemistry Laboratory	1	MA 241 Calculus II	4
E 101 Introduction to Engr & Prob. Solving	1	PY 205 Physics for Engineers & Scientists I	3
E 115 Intro to Computing Environments	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing and Research	4	E 102 Engineering in the 21 st Century (GEP Req) ¹	2
MA 141 Calculus I	4	GEP Requirement ¹	3
HESF 1XX Fitness & Wellness Course	1		
<i>Total:</i>	15	<i>Total:</i>	16
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	CE 225 Mechanics of Solids	3 (CP)
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 282 Hydraulics	3 (CP)
CSC 111 Introduction to Computing: Python	3	PY 208 Physics for Engineers & Scientists II	3
TDE 220 Civil Engineering Graphics	3	MA 341 Applied Differential Eq OR	
MA 242 Calculus III	4	MA 305 Elem Linear Algebra	3
		MSE 200 Mech Prop of Struct Mat	3
		HES *** Phys. Ed/Healthy Living Course	1
<i>Total:</i>	16	<i>Total:</i>	16
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Core Course – Lab Intensive Elective I ²	3/4	CE Core Course – Lab Intensive Elective II ²	4/3
CE Core Course – Elective I ³	3	CE Core Course – Elective II ³	3
CE Junior Elective I ⁴	3	CE Junior Elective II ⁴	3
ST 370 Prob & Stat for Engineers	3	Basic Science Elective ⁷	3
COM 110 Public Speaking OR		Engineering Science Elective ⁸	3
ENG 331 Communication for Engr. & Tech.	3		
<i>Total:</i>	15/16	<i>Total:</i>	16/15
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Senior Elective I ⁵	3	CE Senior Elective III ⁵	3
CE Senior Elective II ⁵	3	CE Senior Elective IV ⁵	3
Senior Elective ⁹	3	CE Senior Design ⁶	3
GEP Requirement ¹	3	GEP Requirement ¹	3
GEP Requirement ¹	3	GEP Requirement ¹	3
<i>Total:</i>	15	<i>Total:</i>	15
Minimum Credit Hours Required for Graduation*: 124			

Major/Program Footnotes:

¹GEP Requirements to be selected from the appropriate lists in consultation with the advisor.

^{2,3}CE Core Courses, ⁴CE Junior Electives, ⁵CE Senior Electives, ⁶CE Senior Design, ⁷Basic Science Elective, ⁸Engineering Science Elective, ⁹Senior Elective: select from lists on worksheet in consultation with advisor.

(CP) Critical Path major course predictive of student success.

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

¹ 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)
Fulfilled as part of Major requirements.
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Fulfilled as part of Major requirements.
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list.
- D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
*EC 205 (or EC 201 or ARE 201) taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.
Choose 3 credit hours from University approved GEP Social Sciences course list.*
- 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.
- E. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)
X Humanities/Social Sciences/Visual and Performing Arts or _____ Mathematical Sciences/Natural Sciences/Engineering
- G. **Interdisciplinary Perspectives** (5-6 credit hours)
*E 102 taken as part of the Major requirements satisfies 2 credit hours needed to fulfill the GEP Interdisciplinary perspectives requirement.
Choose 3 credit hours from the University approved GEP Interdisciplinary Perspectives course list.*
- 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:

- L. **U.S. Diversity** (USD)
Choose from the University approved GEP U.S. Diversity course list.
- J. **Global Knowledge** (GK)
Choose from the University approved GEP Global Knowledge course list.
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	96 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101 and E 115	2	
Other: Economics Elective EC 205 (or EC 201 or ARE 201) E 102	3 2	Social Science (3 hours) Interdisciplinary Perspectives (2 hours)
Total credit hours under College Requirements:	7 hours	

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"> 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>	<i>Credit hours</i>	<i>How will the GEP requirement be met? (Choose applicable statement from 1-6 listed above)</i>
Mathematical Sciences (6 credits) (At least 1 course with MA or ST prefix) <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	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major/College course requirements.</i>
Natural Sciences (7 credits) (At least 1 lab course or course with a lab) <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	(Choose statement 1, 2 or 3) <i>Minimum requirements are satisfied by Major/College course requirements.</i>
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) (Courses from two different disciplines) <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	(Choose statement 1, 2 or 3) <i>Choose course(s) from the University Approved GEP course list for this category.</i>
Social Sciences (6 credits) (Courses from two different disciplines) <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	(Choose statement 1, 2 or 3) <i>Major/College 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.</i>
Additional Breadth (3 credits) (Choose approach that is different from the approach of the Major) <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	(Choose statement 5 or 6) <i>Choose course(s) from the University Approved GEP course list for this category.</i>
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>	3	(Choose statement 1, 2 or 3) <i>Major/College course requirement satisfies 2 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.</i>
Health and Exercise Studies (2 credits) (Including one Fitness and Wellness course)	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.	21 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>
Global Knowledge co-requisite (GK)	n/a	<i>(Choose statement 1 or 4)</i>
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)	n/a	Satisfied by College/Program Requirements
Technology Fluency	n/a	Satisfied by College/Program Requirements
Total credit hours required to complete Degree: Total must be within 120-128 credit hours.	124 Total hours	As applicable, indicate here the overall GPA requirement for degree completion including course completion.

January 28, 2018

To: Michael D. Mullen
Vice-Chancellor and Dean
Division of Academic and Student Affairs

From: Lisa G. Bullard
Director of Undergraduate Studies
Department of Chemical and Biomolecular Engineering

Russell E. Gorga
Director of Undergraduate Programs
Textile Engineering

Subject: Change to the Dual Major Curriculum in CHE and TE

By means of this memorandum and the attached documents, the Departments of Chemical and Biomolecular Engineering and Textile Engineering propose to update the dual major with the following changes:

- The elimination of CHE 450 (Senior Design I) as a required course for dual majors
- PCC 301 (formerly 4 credits) was previously changed to PCC 301 (3 credits)/PCC 304 (1 credit), so the degree audit reflects the update.
- Arrangement of courses has been adjusted to balance semester course loads as a result of the changes above and the recent addition of E102 to the curriculum.

Justification

- CHE/TE dual majors have traditionally taken the year-long TE design sequence (TE 401/402) as well as the first half of the CHE design sequence, CHE 450. In the past CHE 450 instructors have coordinated with the TE 401 instructors to allow the CHE/TE students to be assigned to a project which has chemical engineering features. The project completed in TE 401 has counted as the design project grade for CHE 450. The proposed change reduces the course load by 3 credits for dual majors in the challenging senior year while ensuring that students still complete a rigorous year-long design project.

Impacts/Consultation: The ABET coordinators and the Course and Curriculum Committees for both departments have reviewed and approved this recommendation. Since CHE 450 is being eliminated as a requirement, there are no additional resources required. The Chemical Engineering design instructor(s) and the ABET coordinator will review the TE 401 project proposals prior to assignment to ensure that there is sufficient chemical engineering content in projects to which CHE students will be assigned.

Proposed Effective Date: 8/1/2018

Endorsed By:

Peter Fedkin

2/17/18

Head, Chemical and Biomolecular Engineering

Date

Endorsed By:

Jeffrey A. Jones

2/16/18

Head, Textile Engineering, Chemistry and Science

Date

Recommended By:

[Signature]

22 Feb 18

Chair, COE Curriculum Committee

Date

Endorsed By:

Jerome P. Javelle

2/26/18

College Dean

Date

Recommended By:

Vice Provost, DELTA (if DE degree/certificate)

Date

Recommended By:

Chair, University Courses & Curricula Committee

Date

Approved By:

Dean, (DASA or the Graduate School)

Date

Recommended By:

Dean's Council

Date

Approved By:

Executive Vice Chancellor and Provost

Date

Approved By:

Chancellor

Date

FORMAT A (Marked up copy)
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X Proposed Effective Semester: 8/2018

Degree/Plan Title: Dual Degree in Textile Engineering & Chemical Engineering

Concentration/Subplan Title: N/A

Plan SIS Code: 14CHEBS-14CHETE

Subplan SIS Code: N/A

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 ^{1,6}	3	CH	201	Chemistry – Quantitative Sci. ^{2,6}	3
CH	102	General Chemistry Lab ^{1,6}	1	CH	202	Quantitative Chem Lab ⁶	1
E	101	Introduction to Engr & Prob Solv ²	1	MA	241	Calculus II ¹	4
E	115	Intro to Computing Environ	1	PY	205	Physics for Engr & Sc I ¹	3
ENG	101	Academic Writing and Research ²	4	PY	206	Physics for Engr & Sc I Lab ¹	1
MA	141	Calculus I ¹	4	E	102	Engr in the 21st Century	2
HES_	1**	Fitness & Wellness Course*	1	HES_	***	(100 or 200 level) Elective*	1
				TE	110	Comp Based Model Eng. ²	3
			<i>Total: 15</i>				<i>Total: 1817</i>
SOPHOMORE YEAR							
FALL SEMESTER			CREDITS	SPRING SEMESTER			CREDITS
CH	221	Organic Chemistry I ^{3,2,7}	3	TE	201	Textile Engr. Sci.	4
CH	222	Organic Chemistry I Lab ⁷	1	MAE	206	Engr Statics <u>or</u>	
CHE	205	Chemical Proc Prin ²	4 (CP)	CE	214	Engr Statics	3
MA	242	Calculus III ²	4	MA	341	Applied Differential Eq ²	3
PY	208	Physics Engr & Scientists II	3	CH	223	Organic Chemistry II ⁷	3
PY	209	Physics Engr & Scientists II Lab	1	CH	224	Organic Chemistry II Lab ⁷	1
				CHE	225	Chemical Proc Systems ²	3
			<i>Total: 16</i>				<i>Total: 17</i>
JUNIOR YEAR							
FALL SEMESTER			CREDITS	SPRING SEMESTER			CREDITS
CH	315	Quantitative Analysis	3	TE	302	Textile Mfg Proc II	4
CH	316	Quantitative Analysis Lab	1	ST	370	Prob & Stat for Engineers	3
TE	301	Engr Textile Structures I	3	CHE	312	Transport Processes II	3
GC	120	Found of Graphics	3	CHE	316	Thermo of Chem & Phase Eq	3
CHE	311	Transport Processes I ²	3 (CP)	TE	205	Analog & Digital Circuits	4
CHE	315	Chem Process Thermo ^{2,4}	3 (CP)				
CHE	395	Professional Dev. Seminar	1				
			<i>Total: 1716</i>				<i>Total: 17</i>
SENIOR YEAR							
FALL SEMESTER			CREDITS	SPRING SEMESTER			CREDITS
CHE	446	Des & Analy Chem Reactors	3	TE	402	Textile Engr Des II ^{6,5}	4
CHE	450	CHE Design I	3	TE	404	Six Sigma Quality	3
***	***	GEP Requirement*	3	TE	424	Tex Engr Qual Impr Lab	1
***	***	GEP IP Requirement*	3	***	***	GEP Requirement*	3
TE	401	Textile Engr Des I ⁵	4	***	***	GEP Requirement*	3

EC	205	Economics* <u>or</u>		***	***	GEP Requirement*	3
EC	201	Economics* <u>or</u>		CHE	395	Professional Dev Seminar	1
ARE	201	Economics*					
			3				
			Total: 16				Total: 17 15

SENIOR YEAR

SPRING SEMESTER			CREDITS
CHE	330	Chem Engr Lab I	4
CHE	435	Proc System Analy & Control	3
PCC	301	Tech of Dyeing & Finish	3
PCC	304	Tech of Dyeing & Finish Lab	1
***	***	GEP Requirement*	3
HESx	***	(100 or 200 level) Elective*	1
			Total: 16 15

Minimum Credit Hours Required for Graduation*: ~~147~~144

Major/Program Footnotes:

¹ Grade of C (2.0) or higher required.

² Minimum grade of C- required.

³ CH 221 will replace TE 200 (in the Textile Engineering curriculum)

⁴ CHE 315 will replace TE 303 (in the Textile Engineering curriculum)

⁵ TE 401/402 will replace CHE 450/451 (in the Chemical Engineering curriculum).

⁶ CH 103/104 may substitute for CH 101/102, and CH 203/204 may substitute for CH 201/202.

⁷ CH 225/226 may substitute for CH 221/222, and CH 227/228 may substitute for CH 223/224.

*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)
Fulfilled as part of Major requirements.
- B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)
Fulfilled as part of Major requirements.
- C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list.
- D. **Social Sciences** (3 credit hours selected in a discipline other than economics from the University approved GEP Social Sciences course list. EC 205 (or EC 201 or ARE 201), taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.
- 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 approved Humanities/Social Sciences/Visual and Performing Arts GEP course lists.
- G. **Interdisciplinary Perspectives** (5 credit hours). *E 102 taken as part of the Major requirements satisfies 2 credit hours needed to fulfill the GEP Interdisciplinary perspectives requirement. Choose 3 credit hours from the University approved GEP Interdisciplinary Perspectives course list.*
- 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.
- 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.
- K. **Foreign Language proficiency** - Proficiency at the FL_102 level is required for graduation.

GEP FORMAT B – CURRICULUM REQUIREMENTS

Degree Title: Bachelor of Science in CHE/TE Double Major
Current Degree Key: 14CHEBS-14CHETE
Effective Date of Revision: 8/2018

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		List GEP category and hours satisfied by a Major requirement
Math		
MA 141 (C), MA 241 (C), MA 242	12	Mathematics (6 hours)
GRP 031 Differential Equations (MA 341 or MA 301)	3	
Sciences		
CH 101 (C), CH 102 (C)	4	Natural Sciences (3 hours)
PY 205 (C), PY 206 (C), PY 208, PY 209	8	Natural Sciences (4 hours)
CH 201 (C-), CH 202	4	
GRP 020 Organic Chemistry 1 with Lab (CH 221 (C-) and CH 222)	4	
GRP 025 Organic Chemistry 2 with Lab (CH 223 and CH 224)	4	
CH 315, CH 316	4	
CHE/TE Major		
CHE 205 (C-)	4	
CHE 225 (C-)	3	
CHE 311 (C-)	3	
CHE 312	3	
CHE 315 (C-)	3	
CHE 316	3	
CHE 330	4	
CHE 395	1	
CHE 446	3	
TE 110 (C-)	3	
TE 201	4	
TE 205	4	
TE 301	3	
TE 302	4	
TE 401	4	
TE 402	4	
TE 404	3	
TE 424	1	
TE/CHE 435	3	
Other Major		
GRP 030 (CE 214 or MAE 206)	3	
GC 120	3	
ST 370	3	
PCC 301/PCC 304	4	
Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	116 hours	
COLLEGE REQUIREMENTS:		

Orientation Course(s): E 101 (C-), E 115 (C-), E 102	4	E 115 satisfies Technology Fluency Requirement E 102 satisfies one Interdisciplinary Perspective requirement (2 hours)
Other: (ex: Adv Communication courses) Economics Elective (EC 205, 201; ARE 201)	3	Social Science (3 hours)
Total credit hours under College Requirements:	7 hours	

<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>		<p>¹Choose course(s) from the University Approved GEP course list for this category. ²Minimum requirements are satisfied by Major/College course requirements. ³Major/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. ⁴Co-requisite is satisfied by a Major/College course requirement. ⁵Choose course(s) from the University Approved GEP course lists for the Humanities, Social Sciences, or Visual & Performing Arts. ⁶Choose course(s) from the University Approved GEP course lists for the Natural and Mathematical Sciences.</p>
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 (minimum of 6 credits) (at least one with MA or ST prefix) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
Natural Sciences (minimum of 7 credits) (at least 1 laboratory) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
English 101	4	ENG 101
Humanities (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	6	<i>Required Department course satisfies 3 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.</i>
Social Sciences (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	3	<i>Required College course satisfies 3 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.</i>
Additional Breadth (minimum of 3 credits) (Choose AB course list that is different from the approach of the Major) <i>Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge and Diversity co-requisites.</i>	3	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Interdisciplinary Perspective (minimum of 5-6 credits) <i>Only course(s) in the Major may double-count to satisfy this requirement.</i>	3	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Physical Education/Healthy Living (including one Fitness and Wellness course)	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.	7 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 asterisks as indicated.</i>
U.S. Diversity co-requisite*	n/a	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Global Knowledge co-requisite**	n/a	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Foreign Language Proficiency	n/a	FL_102

<p>The following requirements must be satisfied within the College/Program:</p>		
<p>Advanced Communication</p>	<p>X</p>	<p>Satisfied by College/Program Requirements</p>
<p>Technology Fluency</p>	<p>X</p>	<p>Satisfied by College/Program Requirements</p>
<p>Total credit hours required to complete Degree: 120-128 credit hours.</p>		<p>As applicable, indicate here the overall GPA requirement for degree completion including course completion.</p>

NC STATE UNIVERSITY

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MEMORANDUM

Date: February 26, 2018

To: Dr. Michael D. Mullen, Vice Chancellor and Dean for Division of Academic and Student Affairs

From: Dr. Morton Barlaz, Head, Department of Civil, Construction, and Environmental Engineering

Re: Curriculum Action for BS Environmental Engineering (**14ENEBS**)

Proposed Revisions:

The proposed changes to this curriculum are required to accommodate two new courses offered by the department, to accurately reflect minor CE course actions recently approved, and to update and correct errors in the current curriculum that has not been revised for several years. Below is an itemized list of each change, which is followed by a detailed justification for each.

1. New course CE 250 in Sophomore Year, Fall Semester.
2. CSC 111 moved to Sophomore Year, Fall Semester, from Sophomore Year, Spring Semester.
3. CE 373 moved to Sophomore Year, Spring Semester, from Sophomore Year, Fall Semester.
4. CE 313, CE 342 and CE 390 removed from the curriculum.
5. CE 382 in Junior Year, Fall Semester, changed to new course number, CE 282, and moved to Sophomore Year, Spring Semester.
6. CE 339 moved from Junior Year, Fall Semester, to Junior Year, Spring Semester.
7. GC 120 dropped from group (COM 110 or GC 120) and COM 110 moved from Fall Semester, Sophomore Year to Junior Year.
8. Graphics/Communications Elective group replaced with group (TDE 220 or GIS 280) and moved from Junior Year, Spring Semester, to Fall Semester.
9. MEA 323 moved to new Earth Systems Chemistry Elective group with the addition of SSC 442.
10. PY 209 dropped from curriculum.
11. Environmental Engineering Elective group dropped from curriculum.
12. Three new ENE Elective groups added to Senior Year.
13. GEP Requirement courses moved semesters to help balance total semester credit hours.

Proposed Changes in Format A eight semester display:

See attached Format A display that highlights all of the proposed changes. Deleted or moved courses are identified by red color font with strikethrough, and revised courses are identified by blue color font.

Justification for Change:

1. The recently approved new course required by all students in the CCEE Department, *CE 250 Introduction to Sustainable Infrastructure*, is added into the curriculum in the Sophomore Year, Fall Semester. CE 250 addresses a need in the department by introducing students to the civil, construction and environmental engineering profession in the context of the three pillars of sustainability - environmental, social and economic.

2. *CSC 111 Intro to Computing: PYTHON* is moved from the Spring Semester to the Fall Semester to be consistent with where the course is shown in other degree audits of the CCEE Department, and to help balance total credit hours in the Sophomore Year.
3. *CE 373 Fundamentals of Environmental Engineering* is moved from the Fall Semester to the Spring Semester to balance credit hours in the Sophomore Year with the addition of CE250.
4. *CE 313 Mechanics of Solids* is dropped from the curriculum as it not required by Environmental Engineers. It was in the curriculum to serve as a pre-requisite course for *CE 342 Engineering Behavior of Soils and Foundations*, which is also dropped in the proposed curriculum. While Environmental Engineers require an understanding of the classification of soils, the topics required are sufficiently covered in existing required courses in the curriculum (namely, CE 383, CE 477 and CE 488). Dropping these two courses enables the introduction of two of the three **ENE Elective** groups in the curriculum (see item 12). *CE 390 Engineering Economics* is dropped from the curriculum as the topics are integrated in the new required course in the curriculum, CE 250 (see item 1).
5. The course number of *Hydraulics* is changed from CE 382 to CE 282 according to a recently approved minor course action to align with the Sophomore level fundamental mechanics nature of the course material. (This is consistent with similar changes made to analogous courses in other departments in the College of Engineering.) Consequently, the course is also moved from the Junior Year, Fall Semester, to the Sophomore Year, Spring Semester.
6. *CE 339 Civil Engineering Systems* is moved from Junior Year, Fall Semester, to Junior Year, Spring Semester. This revision corrects an error in the current curriculum as CE 339 is a Spring Semester only offering.
7. *GC 120* dropped from group (COM 110 or GC 120). *COM 110 Public Speaking* (GEP Req) remains and is moved from Fall Semester, Sophomore Year to Junior Year. The description of the recommended combination of courses considering group (COM 110 or GC 120) and the **Graphics/Communications Elective** group (see item 8) was convoluted and was a continuous source of confusion for students and advisors. This revision, along with that of item 8, simplifies the requirements and focuses on the courses required to best prepare students for the profession.
8. **Graphics/Communications Elective** group is replaced with group (*TDE 220 Civil Engineering Graphics* or *GIS 280 Intro to Geographic Information Systems*) and moved from Junior Year, Spring Semester, to Fall Semester.
9. *MEA 323 Earth Systems Chemistry* is moved to a new **Earth Systems Chemistry Elective** group with the addition of *SSC 442 Soil and Environmental Biogeochemistry*. ABET accreditation of the ENE curriculum requires an Earth Systems Chemistry course which has previously been met with MEA 323 alone. However, enrollment of ENE students in MEA 323 was limited in the last two years and alternate course(s) had to be found. The CCEE Department received approval to allow ENE students to enroll in SSC 442 as an alternative. Hence, this revision to the curriculum formalizes this elective option and enables additional courses to be added to the elective group in the future.
10. *PY 209 Physics for Engineers and Scientists II Lab* is dropped from the proposed curriculum. There remains sufficient lab intensive experiences in the curriculum by various other CH, PY and CE lab courses. This revision is consistent with a previously approved 14CONBS curriculum revision in the CCEE Department. The same revision is also proposed in an accompanying proposed revision to the 14CEBS curriculum in the CCEE Department. This will make all degree audits consistent in the CCEE Department.
11. **Environmental Engineering Elective** group is dropped from the proposed curriculum, and is integrated as one of the three **ENE Elective** groups in the Senior Year of the curriculum (see items 12 and 4 for related information).
12. Three new **ENE Elective** groups added to Senior Year, with the credit hours available from dropped courses (see items 4 and 11). The proposed ENE Elective groups allows students to enroll in two more Environmental Engineering specific courses that were previously in the Environmental Engineering Elective group and adds the recently approved new course *CE 499 Undergraduate Research Thesis in Civil, Construction and Environmental Engineering*, and approved **Environmental General Elective** group that includes (ARC 521, ARC 522, ARC 590). This proposed revision allows students to add more depth and breadth in critical environmental engineering related courses and differentiates the curriculum relative to 14CEBS better.

13. HES xxx Health & Exercise Studies Course and one GEP Requirement course are moved to different semesters to help balance total semester credit hours.

Consultation with other Departments:

Except for the courses in the new **Environmental General Elective** group, all of the other non-CE courses in the proposed curriculum are already in the current curriculum and required no additional consultation. The courses in the new **Environmental General Elective** group are all ARC 5xx courses the were determined in consultation with the Head of the Architecture Department, Professor David Hill, and the relevant course instructors.

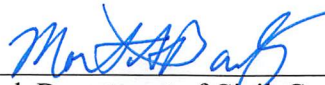
Impact on Other Departments or Programs:

The only impact on other departments is the enrollment of ENE students possibly taking one of the ARC5xx approved courses as an elective. Enrollment in the ARC 5xx courses will represent only be a subset of ENE senior students as the ENE Elective groups also many other CE 4xx courses to choose from. The Architecture Department welcomes the interaction of engineering students in some of their courses.

Proposed Effective Date for Revision:


August, 2018

RECOMMENDED BY:

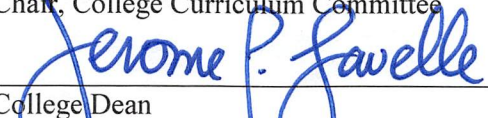


Head, Department of Civil, Construction, and
Environmental Engineering
Date 2/26/18

APPROVED BY:



Chair, College Curriculum Committee
Date 27 Feb 18



College Dean
Date 2/27/18

Chair, University Courses & Curricula Committee
Date

Office of the Provost
Date

APPROVED EFFECTIVE DATE: _____

FORMAT A (Marked-up Copy)

(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X

Proposed Effective Semester: Fall 2018

Degree/Plan Title: Bachelor of Science in Environmental Engineering

Concentration/Subplan Title:

Plan SIS Code: 14ENEBS

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 ¹	3	CH 201 Chemistry – A Quantitative Science	3
CH 102 General Chemistry Laboratory ¹	1	EC 205 Fundamentals of Economics (GEP Req) [*]	3
E 101 Introduction to Engr & Prob. Solving ^{1,2}	1	MA 241 Calculus II ¹	4
E 115 Intro to Computing Environments ^{1,2}	1	PY 205 Physics for Engineers & Scientists I ¹	3
ENG 101 Academic Writing and Research ^{1,2}	4	PY 206 Physics for Engineers & Scientists I Lab ¹	1
MA 141 Calculus I ^{1,2}	4	HES *** Health & Exercise Studies Course	1
HESF 1XX Fitness & Wellness Course [*]	1	E 102 Engineering in the 21 st Century (GEP Req) [*]	2
<i>Total:</i>	15	<i>Total:</i>	16 17

SOPHOMORE YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	BIO 183 Intro. Biology: Cellular and Molecular Bio.	4
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 373 Fundamentals of Environmental Eng	3 (CP)
CE 373 Fundamentals of Envr. Engr	3 (CP)	CE 313 Mechanics of Solids	3 (CP)
CHE 205 Chemical Proc Principles	4	MEA 323 Earth Systems Chemistry	3 (CP)
MA 242 Calculus III	4	Earth Systems Chemistry Elective ³	3
COM 110 (preferred) OR GC 120*	3	CSC 111 Intro to Computing: PYTHON	3
CSC 111 Intro to Computing: PYTHON	3	MA 341 Applied Differential Equations I	3
		CE 282 Hydraulics	3 (CP)
<i>Total:</i>	17	<i>Total:</i>	16

JUNIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 378 Environmental Chemistry & Microbiology	4	CE 381 Hydraulics Sys Meas Lab	1
CE 390 Engineering Economics	1	CE 383 Hydrology & Urban Water Sys	3
TDE 220 Civil Engineering Graphics OR	3	CE 342 Engr Behavior Soils & Found	4
GIS 280 Intro to Geographic Info Systems		CE 339 Civil Engineering Systems	3
CE 339 Civil Engineering Systems	3	Graphics/Communication Elective ⁴	3
CE 382 Hydraulics	3	MAE 201 Engr Thermodynamics I	3
PY 208 Physics for Engineers & Scientists II	3	PS 320 US Environ Law and Politics OR	3
PY 209 Physics for Engineers & Scientists II Lab	1	PS 336 Global Envir Pol (GEP Req) [*]	
ST 370 Probability & Statistics for Engr	3	GEP Requirement [*]	3
COM 110 Public Speaking (GEP Req) [*]	3		
HES XXX Phys Ed/Healthy Living Course	1		
<i>Total:</i>	17	<i>Total:</i>	16

SENIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 488 Water Resource Engineering	3	CE 477 Solid Waste Engineering	3
CE 476 Air Pollution Control OR	3	CE 481 Environmental Engineering Project	3
CE 479 Air Quality		ENE Elective II ⁴	3
ENE Elective I ⁴	3	ENE Elective III ⁴	3
CE 484 Water Supply & Waste Water Sys	3	Environmental Engr Elective⁵	3
GEP Requirement [*]	3	GEP Requirement [*]	3
GEP Requirement[*]	3		
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation^{*}: 127

Major/Program Footnotes:

¹ Courses required for Change of Degree Audit (CODA). CH 101, 102; MA 141, 241; PY 205, 206 must be completed with C or higher.

² Minimum grade of C-, E 115 requires satisfactory completion (S).

³ Select from MEA 323 or SSC 442.

⁴ ENE Elective – three electives in senior year

I. Select one: CE 435, CE 476, CE 478, CE 487, CE 479, or advised elective from CE course list.

II. Select another one course from I., or CE 499.

III. Select another one course from I., or one Environmental General Elective from: ARC 521, ARC 522, or ARC 590

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

*** 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 <https://oucc.dasa.ncsu.edu/general-education-program/>.

A. Mathematical Sciences (6 credit hours – one course with MA or ST prefix)

Fulfilled as part of Major requirements.

B. Natural Sciences (7 credit hours – include one laboratory course or course with a lab)

Fulfilled as part of Major requirements.

C. Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list.

D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

EC205 (or EC201 or ARE201) taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.

PS320 or PS336 taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.

E. Health & Exercise Studies (2 credit hours – at least one 100-level Fitness and Wellness Course)

Choose from the University approved GEP Health & Exercise Studies 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

COM110 taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Additional Breadth - Visual and Performing Arts requirement.

G. Interdisciplinary Perspectives (5 credit hours)

E102 taken as part of the Major requirements satisfies 2 credit hours to fulfill the GEP Interdisciplinary perspectives requirement. Choose 3 credit hours from the University approved GEP Interdisciplinary perspectives course.

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.

J. Global Knowledge (GK)

Choose from the University approved GEP Global Knowledge course list.

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: Proposed: **X**Proposed Effective Semester: **Fall 2018**Degree/Plan Title: **Bachelor of Science in Environmental Engineering**

Concentration/Subplan Title:

Plan SIS Code: **14ENEBS**

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 ¹	3	CH 201 Chemistry – A Quantitative Science	3
CH 102 General Chemistry Laboratory ¹	1	EC 205 Fundamentals of Economics (GEP Req) [*]	3
E 101 Introduction to Engr & Prob. Solving ^{1,2}	1	MA 241 Calculus II ¹	4
E 115 Intro to Computing Environments ^{1,2}	1	PY 205 Physics for Engineers & Scientists I ¹	3
ENG 101 Academic Writing and Research ^{1,2}	4	PY 206 Physics for Engineers & Scientists I Lab ¹	1
MA 141 Calculus I ^{1,2}	4	E 102 Engineering in the 21 st Century (GEP Req) [*]	2
HESF 1XX Fitness & Wellness Course [*]	1		
<i>Total:</i>	15	<i>Total:</i>	16

SOPHOMORE YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	BIO 183 Intro. Biology: Cellular and Molecular Bio.	4
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 373 Fundamentals of Environmental Eng	3 (CP)
CHE 205 Chemical Proc Principles	4	Earth Systems Chemistry Elective ³	3
MA 242 Calculus III	4	MA 341 Applied Differential Equations I	3
CSC 111 Intro to Computing: PYTHON	3	CE 282 Hydraulics	3 (CP)
<i>Total:</i>	17	<i>Total:</i>	16

JUNIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 378 Environmental Chemistry & Microbiology	4	CE 381 Hydraulics Sys Meas Lab	1
TDE 220 Civil Engineering Graphics OR GIS 280 Intro to Geographic Info Systems	3	CE 383 Hydrology & Urban Water Sys	3
PY 208 Physics for Engineers & Scientists II	3	CE 339 Civil Engineering Systems	3
ST 370 Probability & Statistics for Engr	3	MAE 201 Engr Thermodynamics I	3
COM 110 Public Speaking (GEP Req) [*]	3	PS 320 US Environ Law and Politics OR PS 336 Global Envir Pol (GEP Req) [*]	3
HES XXX Phys Ed/Healthy Living Course	1	GEP Requirement [*]	3
<i>Total:</i>	17	<i>Total:</i>	16

SENIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 488 Water Resource Engineering	3	CE 477 Solid Waste Engineering	3
CE 476 Air Pollution Control OR CE 479 Air Quality	3	CE 481 Environmental Engineering Project	3
ENE Elective I ⁴	3	ENE Elective II ⁴	3
CE 484 Water Supply & Waste Water Sys	3	ENE Elective III ⁴	3
GEP Requirement [*]	3	GEP Requirement [*]	3
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation^{*}: 127

Major/Program Footnotes:

¹ Courses required for Change of Degree Audit (CODA). CH 101, 102; MA 141, 241; PY 205, 206 must be completed with C or higher.

² Minimum grade of C-, E 115 requires satisfactory completion (S).

³ Select from MEA 323 or SSC 442

⁴ ENE Elective – three electives in senior year

I. Select one: CE 435, CE 476, CE 478, CE 487, CE 479, or advised elective from CE course list.

II. Select another one course from I., or CE 499.

III. Select another one course from I., or one Environmental General Elective from: ARC 521, ARC 522, or ARC 590

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

*** 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 <https://oucc.dasa.ncsu.edu/general-education-program/>.

A. Mathematical Sciences (6 credit hours – one course with MA or ST prefix)

Fulfilled as part of Major requirements.

B. Natural Sciences (7 credit hours – include one laboratory course or course with a lab)

Fulfilled as part of Major requirements.

C. Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list.

D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

EC205 (or EC201 or ARE201) taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.

PS320 or PS336 taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.

E. Health & Exercise Studies (2 credit hours – at least one 100-level Fitness and Wellness Course)

Choose from the University approved GEP Health & Exercise Studies 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

COM110 taken as part of the Major requirements satisfies 3 credit hours needed to fulfill the GEP Additional Breadth - Visual and Performing Arts requirement.

G. Interdisciplinary Perspectives (5 credit hours)

E102 taken as part of the Major requirements satisfies 2 credit hours to fulfill the GEP Interdisciplinary perspectives requirement. Choose 3 credit hours from the University approved GEP Interdisciplinary perspectives course.

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.

J. Global Knowledge (GK)

Choose from the University approved GEP Global Knowledge course list.

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

CURRICULUM REQUIREMENTS

Format B

Degree/Plan Title: Bachelor of Science in Environmental Engineering	Plan SIS Code: 14ENEBS
Concentration/Subplan Title:	Subplan SIS Code:
Indicate requirements status: Current: Proposed: X	Proposed Effective Semester: Fall 2018
New Degree Audit required? (Y or N) Yes	
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	15	Mathematics (6 hours)
Sciences BIO 183 CH 101, CH 102, CH 201 PY 205, PY 206, PY 208	4 7 7	Natural Sciences (4 hours) Natural Sciences (3 hours)
CE Major CE 214 (C-wall) CE 250 (C-wall) CE 282 (C-wall) CE 339 CE 373 (C-wall) CE 378 CE 381 CE 383 CE 477 CE 481 CE 484 CE 488 GRP xxx (CE 476 or CE 479) GRP xxx ENE Electives (CE 435, CE 476, CE 478, CE479, CE 487, CE 499, advised elective from CE course list, or GRP xxx Environmental General Elective (choose up to one course from: ARC 521, ARC 522 or ARC 590)	3 (CP) 3 (CP) 3 (CP) 3 3 (CP) 4 1 3 3 3 3 3 3 3 3 9	
Other Major CHE 205 COM 110 CSC 111 MAE 201 ST 370 GRP xxx (TDE 200 or GIS 280) GRP xxx (PSE 320 or PSE 336) GRP xxx Earth Systems Chemistry Elective (MEA 323 or SSC 442)	4 3 3 3 3 3 3 3	Additional Breadth-Visual & Perf Arts (3 hours) Social Science (3 hours)

Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	105 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101 and E 115	2	
Other: Economics Elective EC 205 (or EC 201 or ARE 201) E 102	3 2	Social Science (3 hours) Interdisciplinary Perspectives (2 hours)
Total credit hours under College Requirements:	7 hours	

<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 <u>may not be subset</u> to require a specific course from the category list. Required courses must be listed in the Major/College requirements.</i></p> <p>Specific courses should not be listed in any of the fields below other than ENG 101.</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? (Choose applicable statement from 1-6 listed above)
Mathematical Sciences (6 credits) (At least 1 course with MA or ST prefix) <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>Minimum requirements are satisfied by Major/College course requirements.</i>
Natural Sciences (7 credits) (At least 1 lab course or course with a lab) <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>Minimum requirements are satisfied by Major/College course requirements.</i>
English 101 (C- or better required) (4 credits)	4	ENG 101
Humanities (6 credits) (Courses from two different disciplines) <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 course(s) from the University Approved GEP course list for this category.</i>
Social Sciences (6 credits) (Courses from two different disciplines) <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>Minimum requirements are satisfied by Major/College course requirements.</i>
Additional Breadth (3 credits) (Choose approach that is different from the approach of the Major) <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>	X	<i>Minimum requirements are satisfied by Major/College course requirements.</i>
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>	3	<i>Major/College course requirement satisfies 2 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.</i>
Health and Exercise Studies (2 credits) (Including one Fitness and Wellness course)	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.	15 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>
Global Knowledge co-requisite	(GK)	n/a <i>(Choose statement 1 or 4)</i>
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)		n/a Satisfied by College/Program Requirements
Technology Fluency		n/a Satisfied by College/Program Requirements
Total credit hours required to complete Degree: Total must be within 120-128 credit hours.	<u>127 Total hours</u>	As applicable, indicate here the overall GPA requirement for degree completion including course completion.

February 21, 2018

To: Michael D. Mullen
Vice-Chancellor and Dean
Division of Academic and Student Affairs

From: Lisa Marshall
Director of Outreach, Retention & Engagement
Nuclear Engineering Course & Curriculum Representative



Subject: Curriculum Changes

By means of this memorandum and the attached documents, the Department of Nuclear Engineering proposes to update the curriculum display with the following changes –

- Addition of NE 403 as a 2 credit hour course in the spring semester of junior year
Justification: 1 credit hour each from NE 301 & 401 were pulled to constitute this course
- Change MAE 301 to MAE 201 Engr Thermo I in fall semester of junior year
Justification: MAE made numbering changes
- Change CSC 112 FORTRAN to CSC 113 MATLAB⁷ in spring semester of freshman year
Justification: CSC 112 not currently taught, students must enroll in either NE 491 Special Topics: FORTRAN or CSC 113 MATLAB
- Footnote 3 Nuclear Engineering Electives: add NE 541 Nuclear Nonproliferation Technology and Policy
Justification: approved nuclear engineering elective course addition
- Removing MAE 2XX level courses from approved courses of Footnote 5 Engineering Technical Electives. They are MAE 201 (Engr Thermo I), MAE 214 (Solid Mechanics), MAE 252 (Aerodynamics I), MAE 253 (Experimental Aerodynamics I)
Justification: Keeps the integrity of Footnote 5 that reads “Any course from the list of approved NE electives (Footnote 3) or any College of Engineering course at the 300-level or above, except for CSC courses.”

Proposed Effective Date: 7/1/2017

Justification: NE 301 and 401 changed approved and changed earlier. NE 403 was also approved and tied to these two courses.

North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:


Head, Department/Program



02/21/2018
Date

Recommended By:

Chair, College Curriculum Committee



22 Feb 18
Date

Endorsed By:

College Dean



2/22/18
Date

Recommended By:

Vice Provost, DELTA (if DE degree/certificate)

Date

Recommended By:

Chair, University Courses & Curricula Committee

Date

Approved By:

Dean, (DASA or the Graduate School)

Date

Recommended By:

Dean's Council

Date

Approved By:

Executive Vice Chancellor and Provost

Date

Approved By:

Chancellor

Date

FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Indicate display status: Current: Proposed: X Proposed Effective Semester: Spring 2017

Degree/Plan Title: Nuclear Engineering

Concentration/Subplan Title:

Plan SIS Code: 14NEBS

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 ⁶	3	CSC 113 Intro Comp: MATLAB⁷	3
CH 102 General Chemistry Lab ⁶	1	MA 241 Calculus II ⁶	4
E 101 Intro to Engr & Prob Solving ¹	1	PY 205 Physics for Engineers & Scientists I ⁶	3
E 115 Intro to Computing Environ	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing & Research ¹	4	EC 205 Economics (or EC 201 or ARE 201)*	3
MA 141 Calculus I ⁶	4	E 102 Engineering in the 21st Century (GEP-IP)	2
HES_ *** Health & Exercise Studies Course*	1		
	<i>Total: 15</i>		<i>Total: 16</i>
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
MAE 206 Engineering Statics	3	MAE 208 Engineering Dynamics	3
MA 242 Calculus III	4	MA 341 Appl Differential Eq	3
NE 201 Intro to Nuclear Engr	2	NE 202 Rad. Sources Interact & Detect ¹	4
PY 208 Physics for Engineers & Scientists II	3	GEP Requirement*	3
PY 209 Physics for Engineers & Scientists II Lab	1	GEP Requirement*	3
Advanced Comm Elective ²	3		
	<i>Total: 16</i>		<i>Total: 16</i>
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
MAE 201 Engr Thermo I	3	MAE 308 Fluid Mechanics	3
MA 401 Appl Diff Equations II	3	MSE 201 Struct Prop of Engr Mat	3
NE 301 Fund of Nuclear Engr¹	3	NE 400 Nuclear React Ener Conver	4
ISE 311 Engr Ec Analysis	3	NE 401 React Analysis & DES	3
GEP Requirement*	3	HES_ *** Health & Exercise Studies Course*	1
		NE 403 Nuclear Reactor Laboratory	2
	<i>Total: 15</i>		<i>Total: 16</i>
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
NE 402 Reactor Engr	4	NE 405 Reactor Systems	3
NE 404 Rad Safety & Shielding	3	NE 408 Nucl Engr Des Proj	3
NE 406 Nuclear Engr Senior Design Prep	1	ENGR Tech Elective ⁵	3
NE Elective ³	3	GEP Requirement*	3
Tech Elective ⁴	3	GEP Requirement*	3
	<i>Total: 14</i>		<i>Total: 15</i>
Minimum Credit Hours Required for Graduation* : 123			

Major/Program Footnotes:

- Minimum grade of C- required.
- Advanced Communication Elective: COM 110, COM 112, COM 146, COM 211, ENG 215, ENG 288, ENG 289, ENG 322, ENG 331, ENG 332, ENG 333, FLA 201, FLA 202, FLC 201, FLC 202, FLF 201, FLF 202, FLF 208, FLG 201, FLG 202, FLI 201, FLI 202, FLJ 201, FLJ 202, FLJ 203, FLJ 204, FLJ 205, FLK 201, FLK 202, FLN 201, FLN 202, FLP 201, FLR 201, FLR 202, FLS 201, FLS 202, FLS 208, GRK 201, GRK 202, LAT 201, LAT 202, PER 201, PER 202. If any of the listed courses are taken to satisfy this requirement, must take another course for any of the GEP requirements.
- Nuclear Engineering Electives: NE 409, NE 412, NE 418, NE 509, NE 512, NE 528, **NE 541**
- Technical Electives: CSC 302; CH 315, 331; MA 405, 427; PY 341, 411, 414, 415, 525; ST 361, 370, 371.
- Engineering Technical Electives: Any course from the list of approved NE electives (Footnote 3) or any College of Engineering course at the 300-level or above, except for CSC courses.

6. Grade of C (2.0) or higher required.
7. CSC 113 Introduction to Computing – Matlab or NE 491 Special Topics - FORTRAN

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

GEP FORMAT B – CURRICULUM REQUIREMENTS

Degree Title: Bachelor of Science in Nuclear Engineering**Current Degree Key:** 14NE 076**Effective Date of Revision:** 7/2017

MAJOR FIELD OF STUDY REQUIREMENTS:		
Required Courses/Groups/ Electives:	Credit Hours	GEP category, if applicable
Indicate if course or course groupings have a C-wall or MGPA requirement		List GEP category and hours satisfied by a Major requirement
Math		
MA 141, MA 241, MA 242 (MA 141 & MA 241 must be completed with a grade of C- or higher)	12	Mathematics (6 hours)
MA 341	3	
MA 401	3	
Sciences		
CH 101 (grade of C or higher), CH 102 (C)	4	Natural Sciences (4 hours)
PY 205 (C), PY 208 (C)	8	Natural Sciences (4 hours)
NE Major		
NE 201	2	
NE 202 (must be completed with a grade of C- or higher)	4	
NE 301 (must be completed with a grade of C- or higher)	3	
NE 400	4	
NE 401	3	
NE 402	4	
NE 403	2	
NE 404	3	
NE 406	1	
NE 405	3	
NE 408	3	
Other Major		
MAE 206	3	
MAE 208	3	
MAE 201	3	
MAE 308	3	
Advanced Communication Elective (COM 110, COM 112, COM 146, COM 211, ENG 215, ENG 288, ENG 289, ENG 322, ENG 331, ENG 332, ENG 333, FLF 201, FLF 202, FLF 208, FLJ 201, FLJ 202, FLJ 203, FLJ 203, FLJ 204, FLJ 205, FLK 201, FLK 202, FLR 201, FLR 202, FLS 201, FLS 202, FLS 208, GRK 201, GRK 202, LAT 201, LAT 202). Course taken to satisfy this requirement cannot satisfy any of the GEP requirements.	3	
ISE 311	3	
CSC 113 Matlab or NE 491 Fortran	3	
MSE 201	3	
GRP 036 (NE 409, NE 412, NE 418, NE 509, NE 512, NE 528 or NE 541)	3	
GRP 037 Technical Elective (BUS 370, BUS 420, CH 315, CH 331, CSC 302, ECE 331, ECE 421, MA 405, MA 427, MAE 302, MAE 310, MAE 316, MAE 410, MAE 421, MSE 301, PY 341, PY 341, PY 411, PY 414, PY 415, PY 525, PY 528, ST 361, ST 371)	3	
	3	

GRP 038 Engineering Technical Elective (BME 3**, CE 3**, CHE 3**, CSC 3**, ECE 3**, EH 3**, IE 3**, MAE 3**, MAT 3**, OR 3**, or GRP 036)	3	
Concentration Courses/Groups/Electives:		
Free Electives:		
Total credit hours under Major Field of Study: <i>Minimum 27 hours required in program area.</i>	95 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): E 101 (C-) and E 115 (C-)	2	E115 satisfies Technology Fluency requirement
Other: (ex: Adv Communication courses) EC 205 (EC 201; ARE 201)	3	Social Science
Total credit hours under College Requirements:	5 hours	

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>		<p>¹Choose course(s) from the University Approved GEP course list for this category.</p> <p>²Minimum requirements are satisfied by Major/College course requirements.</p> <p>³Major/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.</p> <p>⁴Co-requisite is satisfied by a Major/College course requirement.</p> <p>⁵Choose course(s) from the University Approved GEP course lists for the Humanities, Social Sciences, or Visual & Performing Arts.</p> <p>⁶Choose course(s) from the University Approved GEP course lists for the Natural and Mathematical Sciences.</p>
General Education Program Requirements: <i>Minimum 39-40 hrs</i>	<i>Credit hours</i>	<i>How will the GEP requirement be met?</i> (choose applicable statement from 1-6 listed above)
Mathematical Sciences (minimum of 6 credits) (at least one with MA or ST prefix) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
Natural Sciences (minimum of 7 credits) (at least 1 laboratory) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites.</i>	X	<i>Minimum requirements are satisfied by Major course requirements</i>
English 101 (must be completed with a grade of C- or higher)	4	ENG 101
Humanities (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites. Exception, course used for Advanced Communication cannot be double-counted.</i>	6	<i>Choose course(s) from the University Approved GEP course list for this category</i>
Social Sciences (minimum of 6 credits) (from two different disciplines) <i>Course(s) in the Major may double-count to satisfy this requirement and also satisfy both the Global Knowledge and Diversity co-requisites. Exception, course used for Advanced Communication cannot be double-counted.</i>	3	<i>Required College course satisfies 3 credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.</i>
Additional Breadth (minimum of 3 credits) (Choose AB course list that is different from the approach of the Major) <i>Major/College requirements cannot satisfy this requirement and an AB course cannot be double-counted except in satisfying the Global Knowledge and Diversity co-requisites.</i>	3	<i>Choose course(s) from the University Approved GEP course lists for the Humanities, Social Sciences or Visual and Performing Arts</i>
Interdisciplinary Perspective (minimum of 5-6 credits) <i>Only course(s) in the Major may double-count to satisfy this requirement. Exception, course used for Advanced Communication cannot be double-counted.</i>	5	<i>E 102 (2 credit hours) and choose a course from the University Approved GEP course list for this category.</i>

Physical Education/Healthy Living (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.	23 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 asterisks as indicated.</i>
U.S. Diversity co-requisite*	n/a	Choose course(s) from the University Approved GEP course list for this category
Global Knowledge co-requisite**	n/a	Choose course(s) from the University Approved GEP course list for this category
Foreign Language Proficiency	n/a	FL_102
The following requirements must be satisfied within the College/Program:		
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.	123 Total Hours	As applicable, indicate here the overall GPA requirement for degree completion including course completion.
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Nuclear Engineering (BS) (14NEBS)

Freshman Year

*** Please note that this program is undergoing some updates. Please be sure to contact your advisor for Spring enrollment questions and planning. ***

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science ¹	3	CSC 112 Intro to Computing -FORTRAN	3
CH 102 General Chemistry Lab ¹	1	MA 241 Calculus II ¹	4
E 101 Intro to Engr & Prob Solving ^{1,2}	1	PY 205 Physics for Engineers & Scientists I ¹	3
E 115 Intro to Computing Environ ^{1,2}	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing & Research ^{1,2}	4	EC 205 Economics (or EC 201 or ARE 201)*	3
MA 141 Calculus I ¹	4	E 102 Engineering in the 21st Century (GEP-IP)	2
HES_*** Health & Exercise Studies Course*	1		
	15		16

Sophomore Year

Fall Semester	Credit	Spring Semester	Credit
MAE 206 Engineering Statics	3	MAE 208 Engineering Dynamics	3
MA 242 Calculus III	4	MA 341 Appl Differential Eq	3
NE 201 Intro to Nuclear Engr	2	NE 202 Rad. Sources Interact & Detect ²	4
PY 208 Physics for Engineers & Scientists II	3	GEP Requirement*	3
PY 209 Physics for Engineers & Scientists II Lab	1	GEP Requirement*	3
Advanced Comm Elective ³	3		
	16		16

Junior Year

Fall Semester	Credit	Spring Semester	Credit
MAE 301 Engr Thermo I	3	MAE 308 Fluid Mechanics	3
MA 401 Appl Diff Equations II	3	MSE 201 Struct Prop of Engr Mat	3
NE 301 Fund of Nuclear Engr ²	3	NE 400 Nuclear React Ener Conver	4
ISE 311 Engr Ec Analysis	3	NE 401 React Analysis & DES	3
GEP Requirement*	3	HES_*** Health & Exercise Studies Course*	1
	15		14

Senior Year

Fall Semester	Credit	Spring Semester	Credit
NE 402 Reactor Engr	4	NE 405 Reactor Systems	3
NE 404 Rad Safety & Shielding	3	NE 408 Nucl Engr Des Proj	3
NE 406 Nuclear Engr Senior Design Prep	1	ENGR Tech Elective ⁵	3
NE Elective ⁴	3	GEP Requirement*	3
Tech Elective ⁵	3	GEP Requirement*	3
	14		15

Minimum Credit Hours Required for Graduation*:

121

Major/Program requirements and footnotes

1. Courses required for Change of Degree Audit (CODA). CH 101, 102; MA 141, 241; PY 205, 206 must be completed with a C or higher.
2. Grade of a C- or better required, E 115 requires satisfactory completion (S).
3. Advanced Communication Elective: COM 110, COM 112, COM 211, ENG 288, ENG 289, ENG 316, ENG 331, ENG 332, ENG 333, FLA 201, FLA 202, FLF 201, FLF 202, FLJ 201, FLJ 202, FLJ 203, FLJ 204, FLR 201, FLR 202, FLS 201, FLS 202, GRK 201, GRK 202, LAT 201, LAT 202. If any of the listed courses are taken to satisfy this requirement, must take another course for any of the GEP requirements.
4. Nuclear Engineering Electives: NE 409, NE 412, NE 418, NE 509, NE 512, NE 528.
5. Technical Electives: CSC 302; CH 315, 331; MA 405, 427; PY 341, 411, 414, 415, 525; ST 361, 370, 371.
6. Engineering Technical Electives: Any course from (4) or any College of Engineering course at the 300-level or above, except for CSC courses.

*General Education Program (GEP) requirements

To complete the requirements for graduation and the General Education Program, the following credit hours and co-requisites must be satisfied. University approved GEP course lists for each category can be found at <https://oucc.dasa.ncsu.edu/general-education-program/>.

Health & Exercise Studies – 2 hours to be selected from the approved GEP Health & Exercise Studies list.

- a. One fitness and wellness course (any Health & Exercise Studies 100-level course).
- b. One additional credit hour of Health & Exercise Studies activity courses above 100 level.

Humanities – 6 credits to be selected in two different disciplines from the approved GEP Humanities list.

Social Sciences – 3 credits to be selected in a discipline other than economics from the approved GEP Social Sciences list. EC 205 (or EC201 or ARE 201) taken as part of the Major requirements satisfies 3 credit hours of the 6 credit hours needed to fulfill the GEP Social Sciences requirement.

Additional Breadth – 3 credits to be selected from the approved GEP Humanities, Social Sciences or Visual and Performing Arts lists.

Interdisciplinary Perspectives – 5-6 credits to be selected from the approved GEP Interdisciplinary Perspectives list.

Co-requisites

U.S. Diversity and Global Knowledge co-requisites must be satisfied to complete the General Education requirements. Choose course(s) that are identified on the approved GEP course lists as meeting the U.S. Diversity and Global Knowledge co-requisites.

Foreign Language proficiency at the FL_102 level will be required for graduation.



College of Engineering
Office of Academic Affairs
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Course and Curriculum Committee

February 22, 2018
EB 2 3002
10:00 AM -11:00AM

CALL TO ORDER

- Welcome and Instructions, Chair David Parish
- Approval of CCC November 9, 2017 Minutes
- Approval of CCC February 8, 2017 Minutes

COURSE ACTIONS

- ECE 309: Data Structures and Object-Oriented Programming for Electrical and Computer Engineers
- ISE 489: Special Topics in Industrial and Systems Engineering
- CE250 Introduction to Sustainable Infrastructure
- CE499 Undergraduate Research Thesis in Civil, Construction, and Environmental Engineering
- CE214 Engineering Mechanics - Statics
- CE225 Mechanics of Solids (new course number for CE313)
- CE263 Introduction to Construction Engineering
- CE282 Hydraulics (new course number for CE382)
- CE301 Civil Engineering Surveying and Geomatics
- CE305 Traffic Engineering
- CE325 Structural Analysis I (incl. revised Catalog Description)
- CE327 Reinforced Concrete Design
- CE332 Materials of Construction
- CE339 Civil Engineering Systems
- CE342 Engineering Behavior of Soils and Foundations
- CE367 Mechanical and Electrical Systems in Buildings
- CE373 Fundamentals of Environmental Engineering
- CE378 Environmental Chemistry and Microbiology
- CE381 Hydraulics Systems Measurements Lab
- CE383 Hydrology and Urban Water Systems
- CE413 Principles of Pavement Design
- CE420 Structural Engineering Project
- CE426 Structural Steel Design
- CE437 Civil Engineering Computing
- CE443 Seepage, Earth Embankment and Retaining Structures
- CE444 An Introduction to Foundation Engineering
- CE450 Civil Engineering Project
- CE476 Air Pollution Control
- CE477 Principles of Solid Waste Engineering
- CE478 Energy and Climate
- CE479 Air Quality
- CE484 Water Supply and Waste Water Systems
- CE487 Introduction to Coastal Engineering and Ocean Engineering
- CE488 Water Resources Engineering

over →

CURRICULUM ACTIONS

- NE
- 14CEBS
- 14CONBS
- 14ENEBS

DISCUSSION

Nuclear Engineering [14NEBS Req Term Spring 13]

		Freshman Year			
<i>Fall Semester</i>		<i>Credits</i>	<i>Spring Semester</i>		<i>Credits</i>
CH	101 Chemistry, A Molecular Science ¹	3	CSC	112 Intro to Computing - FORTRAN	3
CH	102 General Chemistry Lab ¹	1	MA	241 Calculus II ¹	4
E	101 Introduction to Engr & Prob Solv ^{1,2}	1	PY	205 Physics for Engr & Sc I ¹	3
E	115 Intro to Computing Environ ^{1,2}	1	PY	206 Physics for Engr & Sc I Lab ¹	1
ENG	101 Academic Writing and Research ^{1,2}	4	EC	205 Economics (for EC 201 or ARE201)*	3
MA	141 Calculus I ¹	4	***	*** GEP Requirement*	3
HESF	10* Fitness & Wellness Course*	1			
Semester Total		15	Semester Total		17

		Sophomore Year			
<i>Fall Semester</i>		<i>Credits</i>	<i>Spring Semester</i>		<i>Credits</i>
MAE	206 Engineering Statics	3	MAE	208 Engineering Dynamics	3
MA	242 Calculus III	4	MA	341 Appl Differential Eq	3
NE	201 Intro to Nuclear Engr	2	NE	202 Rad. Sources, Interact & Detect ¹	4
PY	208 Physics for Engr & Sc II	3	***	*** GEP Requirement*	3
PY	209 Physics for Engr & Sc II Lab	1	***	*** GEP Requirement*	3
***	*** Advanced Communication Elect ³	3			
Semester Total		16	Semester Total		16

		Junior Year			
<i>Fall Semester</i>		<i>Credits</i>	<i>Spring Semester</i>		<i>Credits</i>
MAE	301 Engr Thermo I	3	MAE	308 Fluid Mechanics	3
MA	401 Appl Diff Equations II	3	MSE	201 Struct Prop of Engr Mat	3
NE	301 Fund of Nuclear Engr ¹	4	NE	400 Nuclear React Engr Conver	4
ISE	311 Engr Ec Analysis	3	NE	401 React Analysis & Des	4
***	*** GEP Requirement*	3	HES*	*** Health & Exercise Studies	1
Semester Total		16	Semester Total		15

		Senior Year			
<i>Fall Semester</i>		<i>Credits</i>	<i>Spring Semester</i>		<i>Credits</i>
NE	402 Reactor Engr	4	NE	405 Reactor Systems	3
NE	404 Rad Safety & Shielding	3	NE	408 Nucl Engr Des Proj	3
NE	406 Nuclear Engr Senior Design Prep	1	***	*** Engr Tech Elective ¹	3
NE	*** NE Elective ⁴	3	***	*** GEP Requirement*	3
***	*** Tech Elective ⁴	3	***	*** GEP Requirement*	2-3
Semester Total		14	Semester Total		14-15

Minimum Total Credit Hours Required for Graduation 123

Major/Program requirements and footnotes:

¹Courses required for Change of Degree Audit (CODA): CH 101, 102, MA 141, 241, PY 205, 206 must be completed with C- or higher.

²Grade of C- or better required. E 115 requires satisfactory completion (S).

³Advanced Communication Elective: COM 110, COM 112, COM 211, ENG 288, ENG 289, ENG 316, ENG 331, ENG 332, ENG 333, FLA 201, FLA 202, FLF 201, FLF 202, FLJ 201, FLJ 202, FLJ 203, FLJ 204, FLR 201, FLR 202, FLS 201, FLS 202, GRK 201, GRK 202, LAT 201, LAT 202. If any of the listed courses are taken to satisfy this requirement, must take another course for any of the GEP requirements.

⁴Nuclear Engineering Electives: NE 409, NE 412, NE 418, NE 509, NE 512, NE 528.

⁵Technical Electives: BUS 370, 420; CSC 302; CH 315, 331; ECE 331, 421; MA 405, 427, ~~MAE 301~~; 310, 316, 410, 421; MSE 301, PY 341, 411, 414, 415, 525, 528, ST 361, 371.

⁶Engineering Technical Electives: Any course from (2) or any College of Engineering course at the 300-level or above.

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://ouce.ncsu.edu/gep-courses>.

Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list.

Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

Choose 3 credits from the University approved GEP Social Sciences course list in a discipline other than Economics. Economics 205 (or EC 201 or ARE 201), taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.

Health and Exercise Studies (2 credit hours - must include one HESF 100-level course and one additional HES course)

Choose from the University approved GEP Health and Exercise Studies course list.

Additional Breadth - (3 credit hours to be selected from the following University approved GEP course lists)

Choose from the Humanities, Social Sciences, Visual and Performing Arts.

Interdisciplinary Perspectives (5-6 credit hours)

Choose from the University approved GEP Interdisciplinary Perspectives course list.

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.

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.

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