Division of Academic and Student Affairs
Office of Undergraduate Courses & Curricula
oucc.dasa.ncsu.edu
courses-curricula@ncsu.edu

Campus Box 7105
211A Park Shops
Raleigh, NC 27695-7105
P: 919.515.5627

University Courses & Curricula Committee 2015-2016

April 27th, 2016
Talley Student Union 4140
12:30pm-2:30pm

Lunch for UCCC Members 12:00pm Call to Order 12:30pm

- Welcome and Instructions, Chair Dr. Scott Despain
- Remarks from Associate Vice Provost, Dr. Barbara Kirby
- Remarks from Vice Chancellor and Dean for DASA, Dr. Mike Mullen
- Approval of UCCC April 13th, 2016 Minutes
- Course and Curricular Business

New Business

- Review of the Consent Agenda

Action	Type	Notes
ANT 429 Advanced Methods in Forensic Anthropology	DROP	Drop Course
CSC 214 Programming Concepts	DROP	Drop Course
Engineering: Mechatronics 14EGRBS—14EGRJEM	Minor Revision	8 Semester Display Mismatch; Joint Degree UNCA
General Anthropology 16ANTHBA	Minor Revision	8 Semester Display—Elective addition
Psychology 16PYCHBA	Minor Revision	8 Semester Display—Delete footnote
Paper Science and Engineering 15PSEBS	Minor Revision	8 Semester Display—Typos/ Updated Displays
14BMEBS Memo	Minor	Add approved curriculum to all websites
Biomedical Engineering 14BMEBS	Minor Revisions	Update Display
Electrical and Computer Engineering Display Updates	Minor Revisions	Update Displays
Biological Sciences Memo	Minor Revisions	Update Displays
PS 236 Issues in Global Politics	Minor Revision	Term Offering
PS 310 Public Policy	Minor Revision	Revision: term offering
PS 331 US Foreign Policy	Minor Revision	Revision: term offering
PSY 376 Developmental Psychology	Minor Revision	Revision: Pre requisites
14NEBS Memo	Minor Revision	Addition of NE 521 to approved elective list
FLG 315 Germanic Civilization and Culture	Minor Revision	Term Offering
BS in Economics 20ECONBS	Minor Revision	Revision: move course to Junior Spring
Minor Adjustment to Course Catalog Listing Memo	Minor Revision	Revision: Adjust planned course offerings

College of Engineering

Presenter	Reviewers	Action	Type
Ferguson	Hessling, Tarpy, Plummer	ECE 463 Microprocessor Architecture	Title, abbrv. title, repeatable, dual level cat.dscr.

College of Sciences

Presenter	Reviewers	Action	Type
Black	Trivedi, Peretti, Fath	BIO 325 Paleontological Field Methods	New Course
	Tarpy, Auerbach, Wu	COS 100 Science of Change	Revision: Title, abbrev. title, grading method, credit hours, component, cat. dscr.
	Peretti, Wu, Currie	ST 308 Introduction to Statistical Programming--R	New Course
	Beller, Rieder, Trivedi	ST 114 Statistical Programming	New Course
	Hessling, Tarpy, Peretti	ST 491 Statistics in Practice	New Course

Humanities & Social Sciences

Presenter	Reviewers	Action	Type
Driscoll	Beller, Hessling, Nowel	FL 424 Linguistics for ESL Professionals	Revision: Pre Req, catalog description, make dual level with FL 524
	Trivedi, Peretti, Ferguson	FL 425 Methods and Materials in Teaching English as a Second Language	Revision: Dual level with FL 525, pre-requisites
	Rieder, Lindsay, Hergeth	FLG 318 New German Cinema and Beyond	Revision: Course title, catalog description
	Banks, Wu, Nowel	HI 462 Southern History since the Civil War	Revision: Dual level, term offering, cat. description
	Swanson, Trivedi, Banks	IDS 220 Science and the Art of Happiness	New Course

University College			
Presenter	**Reviewers**	**Action**	**Type**
Beller	Banks, Hessling, Wu	SLC 101 Community Leadership	New Course
	Nowel, Plummer, Fath	THE 433 Period Styles in Acting	Revision: Term Offering, Component Type, Pre Reqs
	Nowel, Plummer, Black	USC 203 Professional Development for Career Ambassadors	New Course

Discussion: Evaluation of Teaching Item - Course Information

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.

NC STATE UNIVERSITY

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University Courses and Curricula Committee – April 13th, 2016

Talley Student Union 4140
Call to Order: 12:33 PM

Members Present: Chair, Scott Despain, Peter Hessling, Scott Ferguson, Rebecca Swanson, Andy Nowel, Jamie Plummer, David Tarpy, Maria Oliver-Hoyo, Schweta Trivedi, Kathleen Rieder, Scott Despain, Betty Black, Amanda Beller, Catherine Driscoll, Edwin Lindsay.
Ex-Officio Members Present: Li Marcus, Sarah Howard, Barbara Kirby, John Harrington, Kevin Burge, Charles Clift
Guests: David Parish, Allison Medlin, Sabrina Robertson

Welcome and Introductions

- **Remarks from Chair Dr. Scott Despain—The Chair remarked that the committee was at quorum, and that he had no new announcements, turning it over to Dr. Kirby.**
- **Dr. Kirby—Dr. Kirby indicated that we have a short agenda and could finish early, which would leave ample time for Li Marcus to present and explain new updates in CIM.**

- **Approval of UCCC March 30th, 2016 Minutes**
  - The minutes were approved, pending the revision of "Kent State" to "Kansas State." Members from the College of Agricultural and Life Sciences also noted that more such courses would be coming through the committee soon.

New Business:

- **Consent Agenda—Approved Unanimously**
  - **Discussion:** The consent agenda was presented and approved without further discussion.
- **Course and Curricular Business**
  - **BIT 477 Metagenomics -- Approved Pending**
    - **Discussion:** One member wondered if the difference between the Graduate and Undergraduate levels is enough. Guest Sabrina Robertson explained that there are multiple questions on the final exam for graduate student, and that it requires graduate students to solve a large problem with data analysis and trouble-shooting for 25% of the final exam. This helps them achieve the final learning outcome. The additional resources are covered and no new resources are needed. There was a question concerning the attendance policy and the effect on the grading scale, which Robertson said she could revise. The committee gave the friendly suggestion to clarify the specific differences between the levels in a comment. The course was approved without further discussion.
  - **BIT 478 Mapping the Brain – Approved Unanimously**
    - **Discussion:** The course was presented and approved without further discussion.
  - **FS 435 Food Safety Management Systems—Approved Unanimously**
    - **Discussion**: Members expressed support for this course is being made available online. The committee gave the friendly suggestion to edit out the html coding that appeared, and also to

correct the 115% for the graduate school. One member offered to email the instructor to make the change to the syllabus. The course was approved without further discussion.

- **CSC 216 Programing Concepts-- JAVA—Approved Unanimously**
    - **Discussion**: The course was presented an approved without further discussion.
- **MAE 426 Fundamentals of Product Design—Approved Unanimously**
    - **Discussion**: One member noted the three optional textbooks and made a friendly suggestion to clarify which books are important for the students to purchase. Another member asked for clarification about the projects. The member from the College of Engineering explained that there are no products; the class is a traditional lecture hall about production. The committee also suggested specifying what constitutes as a "compelling reason for being late." The course was approved without further discussion.
- **GSP 250 Goodnight Scholars First Year Seminar—Approved Pending**
    - **Discussion**: Members offered the friendly suggestion to explain what constitutes a pass versus a fail, and to specify the breakdown of assignments—particularly the difference between presentations and reports in GSP 251. Members also suggested exchanging "participate" in Learning Outcome #3 for "engage," which is more measurable.
    - **GSP 251 Goodnight Scholars First Year Seminar—Approved Pending**
      Discussion: Members offered the friendly suggestion to explain if there is a fee, or if transportation will be provided, and to add sequential numbering for these courses. OUCC will check with the instructor if she would be opposed to adding those for clarification.
- **PSY 200 Introduction to Psychology—Approved Pending**
    - **Discussion**: Members offered the friendly suggestion to list the cost for the textbook, add decimals or inequalities to the grading scale, clarify the extra credit Clicker points, and add a "subject to change" disclaimer to the schedule. Members expressed some concern over the tone of the syllabus, which would be mentioned to the instructor.
- **16SOCWB Social Work B—Approved Unanimously**
    - **Discussion**: The curriculum was presented and approved without further discussion.
- **ACC 420 Cost Accounting for Effective Management—Approved Unanimously**
    - **Discussion**: The course was presented and approved without further discussion.

CIM Training/ Requests for testing:

Editing a course now gives the option to make a minor change instead of a major change. The minor form narrows the fields to be minor edits rather than major revisions. The form does default to Major. Li Marcus is working on the documentation to explain the definition of a minor action. The OUCC reviews and verifies between minor and major actions. Please let Li know if there is any oddness with this form, since it is brand new.

The goal for committee members is to have our Service Learning in by May 4th.

Meeting Adjourned at: 1:46 PM

Respectfully Submitted by Sarah Howard

North Carolina State University is a land-grant university and a constituent institution of the University of North Carolina

College of Engineering

NC STATE UNIVERSITY

Engineering Programs
University of North Carolina
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April 8, 2016

To: Dr. Mike Mullen
Vice Chancellor and Dean of DASA (Division of Academic and Student Affairs)

From: Cheryl Alderman, Assoc. Director, Joint BSE – Mechatronics Concentration

Subject: Minor changes to 8-semester displays

By means of this memorandum, the Joint NC State – UNC Asheville BSE – Mechatronics Concentration degree proposes to make minor corrections and formatting adjustments to the 8-semester display for the undergraduate curriculum, including all concentrations and dual majors (none). Those changes are annotated in the attached marked up curricula.

Justification: Since the last update in 2013, there have been multiple actions approved through UCCC which were never posted to the 8-semester displays.

ENDORSED BY:

(Keith Krumpe) 4/8/16
Interim Director, NC State Engineering Programs at UNC Asheville — Date

8 April 16
Chair, COE Courses & Curricula Committee — Date

Jerome P. Lavelle 04/08/16
College of Engineering Dean — Date

Chair, University Courses & Curricula Committee — Date

Chair, Dean of Undergraduate Academic Programs — Date

APPROVED:

Provost's Office — Date

Printer friendly version of coe-14egrbs-14egrjem-2161

Engineering (BS): Mechatronics (Joint NCSU-UNCA) (14EGRBS-14EGRJEM)

Semester Display Effective Date: 8.2015

Foundations of Academic Writing

FRESHMAN YEAR

Fall Semester	Credit	Spring Semester	Credit
MATH 191 Calculus I	*4* (CP C)	*MATH 192 Calculus II*	*4* (CP C)
LANG 120 ~~Academic Writing and Critical Inquiry~~	*4* (CP C-)	*PHYS 221 Physics ~~II~~* I	*4* (CP C)
CHEM 132 General Chemistry	*3* (CP C)	*HUM 124 The Ancient World*	*4*
CHEM 111 General Chemistry Lab	*1* (CP C)	ECE 109 Intro to Computer Systems	3 (CP C-)
E 101 Intro to Engr & Prob Solving	1 (CP C-)	JEM 180 Intro to Mechatronics Lab	2
JEM 123 Intro to CAD for Mec Engr	1		
Dept 178 LAC: First Year ~~College~~ Colloquium	*3*		**17**
	17		

SOPHOMORE YEAR

Fall Semester	Credit	Spring Semester	Credit
MATH 291 Calculus III	*4*	*ECON 102 Microeconomics*	*3*
PHYS 222 Physics II	*4*	ECE 211 Electric Circuits	*4* (CP C-)
ECE 200 Intro to Signals, Circuits & Systems	4 (CP C-)	ECE 212 Fundamentals of Logic Design	*3* (CP C-)
ECE 209 Computer Sys Programming	3 (CP C-)	ECE 220 Analy Foundations of ECE	*3* (CP C-)
MAE 206 Engineering Statics	3 (CP C-)	MAE 208 Engineering Dynamics	*3* (CP C-)
	18		**16**

JUNIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 306 Intro to Embedded Systems	3	ECE 310 Design of Complex Digital Sys	3
JEM 360 Adv Mechatronics Design Lab	2	ECE 456 Mechatronics	3
MAE ~~301~~ Engr Thermodynamics I	3 (CP C-)	MAE ~~314~~ Solid Mechanics	3
MAE 315 Dynamics of Machines	3	MAE 435 Principles of Automatic Control	3 (CP C-) see note 2)
ARTS 310 Arts and Ideas	*3*	*HUM 214 The Medieval and Renaissance*	*4*
201	**14**	214	**16**

SENIOR YEAR

Senior

Fall Semester	Credit	Spring Semester	Credit
MAE 310 Heat Transfer Fundamentals	3	JEM 485 ~~Sr~~ Design Mechatronic Engr II	3
Approved Elective[2]	3	MAE 316 Strength of Mech Components	3
JEM 484 Senior Design Mechatronic ~~Enr~~ Engr I	3	*LA 478 Liberal Arts Senior Capstone*	*4*
HUM 324 The Modern World	*4*		*4*

MAE 308 Fluid ~~Dynamics~~ Mechanics	3	*STAT 225 Intro to Calc-based Statistics*	14
	16		
Minimum Credit Hours Required for Graduation:			128

Major/Program Footnotes:

Approximately half of the credits in this degree are courses of UNC Asheville. These are shown in italics. Courses originating from NC State are shown in normal text.

[1] LAC 178 is not required for transfer students with 25 credits or more. For such students, MIN. Credit Hours Required is 125.

[2] ECE 455, JEM 420, MSE 201 or Advised Elective approved by Director.

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

The joint Mechatronics degree utilizes the ~~Integrated~~ Liberal ~~Studies~~ Arts program of UNC Asheville to satisfy GEP requirements.

Notes

1) On website, credits do not line up with courses.
On printer-friendly version, everything lines up

2) MAE 435 is not a (CP C-) course
MAE 214 is a (CP C-) course

Source: C. Alderman 4/8/16
calderma@unca.edu
828/251-6943

https://oucc.dasa.ncsu.edu/coe-14egrbs-14egrgen-2161/

5554

SIGNATURE PAGE

CURRICULA ACTION FOR 16ANTHBA

RECOMMENDED BY:

William R Smith — Feb. 23, 2016

HEAD, DEPARTMENT/PROGRAM — DATE

ENDORSED BY:

[signature] — 4/4/16

CHAIR, COLLEGE COURSES & CURRICULA COMMITTEE — DATE

[signature] — 4/5/16

COLLEGE DEAN — DATE

APPROVED BY:

CHAIR, UNIVERSITY COURSES & CURRICULA COMMITTEE — DATE

CHAIR, COUNCIL ON UNDERGRADUATE EDUCATION — DATE

DEAN, DIVISION OF ACADEMIC AND STUDENT AFFAIRS (DASA) — DATE

APPROVED EFFECTIVE DATE _____

Humanities and Social Sciences
Sociology & Anthropology

http://socant.chass.ncsu.edu/sociology

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Curriculum Action Memorandum
Adding or Dropping Elective or Option Courses from a Curriculum

To: University Courses and Curriculum Committee
From: Tim Wallace

Affected Plans:

Anthropology-BA (16ANTHBA), term date of the plan: Sum2, 09

Revisions:

Students in the Anthropology major are currently required to take a 300 level ANT elective as part of their curriculum plans. The original intent was that the 300 level course would be an ethnographic study of a culture. As our program has grown, several 300 level courses have been added which are not considered ethnographic studies and so we wish to define this requirement more narrowly so that students will be exposed to at least 1 ethnographic course as a part of their curriculum.

Justification:

These changes . . .

- Make it more obvious on the degree plan that students must take an ethnographic course in order to graduate. This is currently true by default because an ethnographic course is a pre-req for theory and methods offerings, so this change will make that requirement more evident on the degree audit.

Impact on other programs:

This change should not impact any other academic department

Specific changes:

Changes to the ANT Curriculum Form, format A (semester-by-semester display):

- ANT Elective (3xx) in the spring of sophomore year would become ANT Ethnography Elective. The course options listed in the footnote would be limited to: ANT 310, 325, 330, 345, 346, 351, & 354.

Changes to the ANT Curriculum Form, format B (grid display):

- ANT Elective 300 Level under Concentration Requirements would become ANT Ethnography Elective.
- 300 level courses which are not considered ethnographic would be removed from the list. This includes ANT 370, 371, 374, and 389.
- A recently approved ANT ethnography course, ANT 345, should be added to the list.

Proposed effective date for revision:

July 1, 2016

Signature:

Anthropology (BA): General Anthropology (16ANTHBA-16ANTHGEN)

Semester Display Effective Date: 6.2012

FRESHMAN YEAR

Fall Semester	Credit		Spring Semester	Credit
ANT 251 Intro Physical Anthropology	3		ANT 252 Intro Cultural Anthropology [J]	3
ENG 101 Academic Writing & Research [H]	4		History [2]	3
FLx 201 Foreign Language [K,I]	3		Mathematics [A,3]	3
History [C,2]	3		Social Science [D,4]	3
Mathematics [A,3]	3		HES_*** Health & Exercise Studies Course [E]	1
HES_*** Health & Exercise Studies Course [E]	1			13
	17			

SOPHOMORE YEAR

Fall Semester	Credit		Spring Semester	Credit
ANT 253 Intro World Arch or	3		~~ANT Elective (3XX)~~ [8]	3
ANT 254 Language & Culture			Literature II [5]	3
Literature I [5]	3		Natural Science [B]	4
Social Science [D,4]	3		Philosophy [C,6]	3
Free Elective [13]	3		Free Elective [13]	3
Free Elective [13]	3			16
	15			

ANT Ethnography Elective

JUNIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
ANT 411 Anthropological Theory <u>or</u> ANT 483	3		ANT Elective (3XX/4XX) [10]	3
Archaeological Method and Theory	3		ANT Elective (4XX) [9]	3
Natural Science [B]	3		Arts and Letters Elective [7]	3
Social Science [4]	3		Social Science [4]	3
Free Elective [13]	3		Free Elective [13]	3
Free Elective [13]				
	15			15

SENIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
ANT 389 or 416 or 429	3-4		ANT Elective (3XX/4XX) [10]	3
ANT Elective (3XX/4XX)[10]	3		GEP Interdisciplinary Perspectives Requirement [G]	2-3
GEP Additional Breadth Requirement (Math Sci/Nat Sci/Engineering) [F]	3		Free Elective [13]	5
GEP Interdisciplinary Perspectives Requirement [G]	3		Free Elective [13]	3
Free Elective [13]	3		Free Elective [13]	3
	15-16			16-17

Minimum Credit Hours Required for Graduation [*1,11,12]:	122

Major/Program Footnotes:

1. a. Students with high school credit or other knowledge of French, German, Latin, or Spanish must take a placement test to determine the appropriate level for their first course. b. Students who place into FL _ 202 or above have met the language requirement and are eligible to receive 3 hours of advanced placement credit by enrolling in the course into which they are placed and earning a grade of "C-" or better on the first attempt. c. FL 202 is recommended. NOTE: FL 101 will not count towards graduation unless in a language other than the one used to fill the University's FL 102 proficiency requirement.

2. Two 200-level courses are required in History, one each from Groups I and II. Group I: HI 207, 215, 216, 232, 233, 263, 264, 270, AFS/HI 275, AFS/HI 276. Group II: HI 205, 208, 209, 210, 221, 222, 251, 252.

3. Credit for graduation is not given for MA 101.

4. Twelve credit hours in social science are required. At least 3 disciplines must be represented and at least 9 hours must be outside the student's major field of study. Choose 6 hours from the GEP Social Science list.

5. Six credits in Literature taken from the following lists. Literature I: (ENG 219, 220, 221 or 222; ENG 251*, 261*, or 262*; FL 219, 220, or 222; FLF 301, 340, 341, 342, 351, 352; FLG 300, 316; FLR 303; FLS 340, HON 202** or 293**; Literature II: (AFS 248, ENG 207, 208, 209, 219, 220, 221, 222, 223, 224, 232, 233, 246, 248, 249, 251, 252, 261, 262, 265, 266, 305, 349, 351, 362, 363, 369, 370, 371, 372, 373, 376, 377, 380, 382, 383, 385, 390, 392, 393, 394, 398, 399, 406, 407, 420, 439, 448, 449, 451, 452, 453, 460, 462, 463, 464, 465, 468, 469, 470, 471, 476, 486, 487, FL 219, 220, 221, 222, 223, 224, 246, 392, 393, 394, 406, 407, FLF 301, 302, 340, 341, 342, 351, 352, 414, 492, FLG 300, 316, 323, FLN 301, 302, 401, FLR 303, 304, FLS 300, 302, 304, 323, 341, 342, 343, 351, 352, 353, 403, 404, 492, GRK 320, HON 202, or 293

* Credit is not allowed for both ENG 251 and either of ENG 261 or ENG 262.
** Honors courses may satisfy the Literature I requirement if more than half of the literature covered is outside the U.S. and prior to the twentieth century.

6. Three hours are required in Philosophy. Choose from PHI courses on the GEP Humanities list.

7. Arts and Letters requirement includes any 3-credit course chosen among the following: all HA courses, MUS 180, 200, 201, 202, 205, 206, 230, 260, 306, 310, 315, 320, 330, 335, 350, 360, all 200 and above REL courses, ADN 111, 112, 202, 212, 219, 231, 272, 273, 281, 311, 384, 386, 414, or 454, AFS 340 or 375, ARC 140, 141, or 142, ARS 251, 252, 259, 306, 351, or 353, COM 103, 203, 213, 233, 243, 303, 321, 323, 333, 340, 364, 374, or 411, DAN 272 or 295, ENG 282, 283, 321, 364, 374, 411, or 492, FL 216, FLF 318, FLG 318, FLS 318, GD 200 or 342, GRK 310, IDS 496, LAR 444, LAT 310

8. Anthropology elective selected from ANT 310, 325, 330, 346, 351, 354, ~~370, 371, 373, 374, 385, 389, 412, 416, 419, 424, 429, 431, 433, 444, 450, 460, 475, 529, WGS 444~~. add ANT 345

9. Anthropology elective selected from ANT 412, 416, 419, 421, 424, 429, 431, 433, 444, 450, 460, 464, 475, 529, WGS 444.

10. Any course listed in notes #8 and 9 will fulfill this requirement.

11. Residency requirement: Minimum of 15 hours of anthropology at NC State. At least 9 of these hours at 300 level or above with a

minimum of 3 hours at the 400 level or above completed at NC State.

12. Grade point average requirements: All students must have a 2.0 overall GPA and a 2.0 GPA in all ANT courses to be eligible for graduation.

13. Only 12 hours of free electives can be taken for credit only (S/U grading). For more information regarding credit only courses see http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.15.php

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

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 103, 105, 107, 114, 121, 131, LOG 201, ST 101, ST 311, ST 350**
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.
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: **History Group I (AFS 275 or 276, HI 207, 215, 216, 233, 263, 264, 270, 275, 276); any PHI on the GEP Humanities course list (Philosophy requirement)**
D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list.
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)
X Mathematical Sciences/Natural Sciences/Engineering
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 . The following course(s) completed as part of the Major requirements may fulfill this requirement: **ANT 252**
K. Foreign Language proficiency - Proficiency at the FL_102 level.

SIGNATURE PAGE

CURRICULA ACTION FOR 16PSYCHBA

RECOMMENDED BY:

HEAD, DEPARTMENT/PROGRAM — DATE 3/28/16

ENDORSED BY:

CHAIR, COLLEGE COURSES & CURRICULA COMMITTEE — DATE 4/9/16

COLLEGE DEAN — DATE 4/5/16

APPROVED BY:

CHAIR, UNIVERSITY COURSES & CURRICULA COMMITTEE — DATE

CHAIR, COUNCIL ON UNDERGRADUATE EDUCATION — DATE

DEAN, DIVISION OF ACADEMIC AND STUDENT AFFAIRS (DASA) — DATE

APPROVED EFFECTIVE DATE _____

North Carolina State University is a land - grant university and a constituent institution of The University of North Carolina

Department of Psychology

NC STATE UNIVERSITY

College of Humanities and Social Sciences
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919.515.1716 (fax)

MEMORANDUM

TO: University Courses and Curricula Committee

FROM: Dr. Samuel Pond, Director, Undergraduate Program, Psychology

SUBJECT: 16PSY097 & 16PSY148 Minor Curriculum Revision

DATE: March 4, 2016

Degree Title: Psychology BA Degree
SIS code: 16PSYCHBA Psychology-BA
Proposed effective date for revision: Spring 2016

Proposal

Change the grade requirement pertaining to BIO 105/106 in 16PSY097 and 16PSY148 from "C" to "C-".

Present Version:

In GEP Format A of 16PSY148 and 16PSY097 there is a Major/Program Footnote (#13 referring to BIO 105/106) that states: "C or better required, not C- or better." -

Proposed Revision:

DELETE the Major/Program Footnote #13 referring to BIO 105/106 in GEP Format A of both 16PSY097 and 16PSY148.

Rationale for Curriculum Revision

The proposed revision will allow PSY majors presently in the 16PSY097 or 16PSY148 curricula to take advantage of a lower course grade requirement that is being allowed in the current curriculum (16PSY167) -. This revision will be fairer to all current PSY majors and will allow PSY advisors to administer the curriculum requirements more effectively and efficiently.

Statement on how the revision will impact current students in the program. If no impact, please state.

The proposed curriculum change will have no impact on students who are presently in the 16PSY167. Students who are currently in 16PSY097 or 16PSY148 will benefit from curriculum requirements consistent with 16PSY167.

GEP FORMAT A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

16PSY097

DEGREE TITLE: B. A of Psychology

CONCENTRATION TITLE: General Option

CURRENT DEGREE KEY: 16PSY097

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY 200 Introduction to Psychology	3	ST 311 Introduction to Statistics ST	3
PSY 220 Orientation to Psychology	1	History Elective (Group I) [C,2]	3
BIO 105/106 Bio in Modern World/ and Bio Lab[13,B]	4	Social Science Elective[D,3]	3
ENG 101 Academic Writing and Research11	4	Literature Elective (Group I) [C4]	3
Mathematics Elective[A,1]	3	Foreign Language 201[K,5]	3
	Total: 15		*Total:* 15
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY 230 Introduction to Behavioral Research	3	PSY Group 1 Requirement Course[8]	3
Philosophy Elective[6]	3	History Elective (Group II)[2]	3
Literature Elective (Group 2)[4]	3	Social Science Elective3	3
Social Science Elective[D,3]	3	Natural Science Elective[7]	4
Natural Science Elective[B,7]	3	GEP Additional Breadth Requirement[F] (Math	
PE 1XX Fitness and Wellness Course[E]	1	Sci/Nat Sci/Engineering)	3
		PE GEP Healthy Living Elective[E]	1
	Total:16		*Total:*17
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY Group 1 Requirement Course[8]	3	PSY Group 2a Requirement Course[9]	3
PSY Group 2a Requirement Course[9]	3	PSY Group 2b Requirement Course[9]	3
GEP Interdisciplinary Perspectives Requirement[G]	3	GEP Interdisciplinary Perspectives Requirement[G]	2-3
Arts and Letters Elective[12]	3	Psychology Elective[10]	3
Social Science Elective[3]	3	Free Elective[11]	3
	Total:15		*Total:*14-15
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY Group 2b Requirement Course[9]	3	Psychology Elective[10]	3
Psychology Elective[10]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
	Total:15		*Total:15*
Minimum Credit Hours Required for Graduation[*I,J]: 122			

Major/Program Footnotes:

1. Choose from MA 107, 111, 114, 121, 131, 141, 231, 141, 231, 241, and MA/LOG 335. Credit will not be given for MA 100, 101, 103, 105.
2. Two 200-lcvcl courses are required in History; one each from Groups I & II. Group 1: History I, AFS 275 or 276, HI 207, 215. 216. 233. 263, 264, 270, 275 or 276 Group II: HI 205, 208,209, 210, 221,222,251,252.

3 Four 3-crcdtt courses from3 different disciplines including: ANT, ARC, EC, PS, SOC. Also ENG 210, GEO 220. IDS 401, or STS 402. Six of the twelve social science credits must be chosen from the GEP Socinl Sciences course list. Psychology courses may not be taken to satisfy the Social Science course requirements.

4 Six credits in Literature, one course from each list. Literature I: Please see Degree Audit for Literature I course selections. Literature II: Please see Degree Audit for Literature II course selections. Credit is not allowed for both ENG 251 and either of ENG 261 or ENG 262.Honors courses may satisfy the Literature I requirement if more than half of the literature covered is outside the U.S. and prior to the twentieth century.

5. a. Student with high school credit or other knowledge of French, German, Latin. or Spanish must take a placement test to determine the appropriate level for their first course.
   b. Students who place in FL 202 or above have met the language requirement and are eligible to receive 3 hours of advanced placement credit by enrolling in the course into which they are placed and earning a grade of "C-" or better on the first attempt.
   c. FL 20 I is required for graduation. Note: FL 101 will not count towards graduation unless in a language other than the one used to fill the University's FL 102 proficiency requirement.
6. Three hours are required in Philosophy. Choose from PHI courses on the GEP Humanities course list.
7. One course from Group I (Basic Natural Sciences) and one course from Group 2 (Additional Natural Science) are required with a grade of C- or better. The following courses can be used to satisfy this requirement. Group I.CH 101/102, 111, 201/202; FOR 221; HON 292; MEA 100, 101/110, 120/121, 130/135, 150, 200/210, PY 123/125, 123/126, 124/125, 124/126, 131, 133, 201, 202, 205, 208, 211, 212, SSC 200. Group 2. Any of the courses included in Group I above or any of the following: ANS 105, 110, 215,301, 322, 324; BCH 150, BIO 183; BO 200, 213, 220, 222, 277, 360/365, 400, 405; CS 210, 213,230, 312; ENT 201,203,401, 425; FOR 212, 252, 402; FS 201, 301, 322, 324, FW 221, 403 GN 301, 411, HON 321, HS 100, 201, 211, 212, 301; MB 200, 351; MEA 220, 250, NTR 301; PCC 203; PO 201, 322: PP 315, 318; PY 203; SSC 361; TC 203; TMS 211; TOX 201; WGS 210; BIO 221,260.
8. Two courses (6 credit hours) must be taken from the following list to meet the Psychology Group I requirement: PSY 400, 410, 420, 430, 475, or 591. Courses must be passed with a grade of C- or better.
9. Two courses (6 credit hours) must be taken from each of the following two groups (12 cr hours total). Courses must be passed with a grade of C-or better: Group 2A (applied psychology): PSY 307, 312, 340, 360, 436, 470. Group 2B (social psychology): PSY 311, 345, 370, 376, 406/506, 558.
10. Nine hours of psychology course elective selected from any Psychology course in the NCSU course catalog or on the approved transfer list.
11. Students may elect to take 12 hours of Free Elective courses S/U.
12. Three hours of Arts and Letters from the following category: All HA courses, MUS 180, 200, 20 I, 202, 205, 206, 230, 260, 306, 31 0, 31 *S*, 320, 330, 335, 350, 360, all 200-level and above REL courses; ADN111, 112, 202, 212, 219, 231, 272, 273, 281, 311, 384, 386, 414, or 454; AFS 340 or 375; ARC 140, 141, or 142; ARS 251, 259, 306, 351, or 353; COM 103, 203, 213, 233, 243, 303, 321, 323, 333, 340, 364, 374, or 411; DAN 272 or 295; ENG 282, 283, 321, 364, 374, 411, or 492; FL 216, FLF 318, FLG 318, FLS 318, GD 200 or 342; GRK 310; IDS 496; LAR 444; LAT 310.
13. C or better required, not C- or better. ***[Delete footnote 13. Note, however, that the 16PSY097 degree audit is already configured to do what we want it to be doing.]***

***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 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[7]

C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Fulfilled as part of the Major requirements[2,6]

D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Fulfilled as part of the Major 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)
_X_ Mathematical Sciences/Natural Sciences/Engineering

G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from 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 A
(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

16PSY148

DEGREE TITLE: B. A of Psychology

CONCENTRATION TITLE: General Option

CURRENT DEGREE KEY: 16PSY097

FRESHMAN YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY 200 Introduction to Psychology	3	ST 311 Introduction to Statistics ST	3
BIO 105/106 Bio in Modern World/ and Bio Lab[13,B]	4	History Elective (Group I) [C,2]	3
ENG 101 Academic Writing and Research11	4	Social Science Elective[D,3]	3
Mathematics Elective[A,1]	3	Literature Elective (Group I) [C4]	3
		Foreign Language 201[K,5]	3
	Total: 14		*Total:* 15
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY 230 Introduction to Behavioral Research	3	PSY Group 1 Requirement Course[8]	3
Philosophy Elective[6]	3	History Elective (Group II)[2]	3
Literature Elective (Group 2)[4]	3	Social Science Elective3	3
Social Science Elective[D,3]	3	Natural Science Elective[7]	4
Natural Science Elective[B,7]	3	GEP Additional Breadth Requirement[F] (Math	
PE 1XX Fitness and Wellness Course[E]	1	Sci/Nat Sci/Engineering)	3
		PE GEP Healthy Living Elective[E]	1
	Total:16		*Total:*17
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY Group 1 Requirement Course[8]	3	PSY Group 2a Requirement Course[9]	3
PSY Group 2a Requirement Course[9]	3	PSY Group 2b Requirement Course[9]	3
GEP Interdisciplinary Perspectives Requirement[G]	3	GEP Interdisciplinary Perspectives Requirement[G]	2-3
Arts and Letters Elective[12]	3	Psychology Elective[10]	3
Social Science Elective[3]	3	Free Elective[11]	3
	Total:15		*Total:*14-15
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY Group 2b Requirement Course[9]	3	Psychology Elective[10]	3
Psychology Elective[10]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
Free Elective[11]	3	Free Elective[11]	3
	Total:15		*Total:15*
Minimum Credit Hours Required for Graduation[*I,J]: 121			

Major/Program Footnotes:

1. Choose from MA 107, 111, 114, 121, 131, 141, 231, 141, 231, 241, and MA/LOG 335. Credit will not be given for MA 100, 101, 103, 105.
2. Two 200-lcvcl courses are required in History; one each from Groups I & II. Group 1: History I, AFS 275 or 276, HI 207, 215. 216. 233. 263, 264, 270, 275 or 276 Group II: HI 205, 208,209, 210, 221,222,251,252.
3. Four 3-crcdtt courses from3 different disciplines including: ANT, ARC, EC, PS, SOC. Also ENG 210, GEO 220. IDS 401, or STS 402. Six of the twelve social science credits must be chosen from the GEP Socinl Sciences course list. Psychology courses may not be taken to satisfy the Social Science course requirements.
4. Six credits in Literature, one course from each list. Literature I: Please see Degree Audit for Literature I course selections. Literature II: Please see Degree Audit for Literature II course selections. Credit is not allowed for both ENG 251 and either of ENG 261 or ENG 262.Honors courses may satisfy the Literature I requirement if more than half of the literature covered is outside the U.S. and prior to the twentieth century.

5. a. Student with high school credit or other knowledge of French, German, Latin. or Spanish must take a placement test to determine the appropriate level for their first course.
   b. Students who place in FL 202 or above have met the language requirement and are eligible to receive 3 hours of advanced placement credit by enrolling in the course into which they are placed and earning a grade of "C-" or better on the first attempt.
   c. FL 20 I is required for graduation. Note: FL 101 will not count towards graduation unless in a language other than the one used to fill the University's FL 102 proficiency requirement.
6. Three hours are required in Philosophy. Choose from PHI courses on the GEP Humanities course list.
7. One course from Group I (Basic Natural Sciences) and one course from Group 2 (Additional Natural Science) are required with a grade of C- or better. The following courses can be used to satisfy this requirement. Group I.CH 101/102, 111, 201/202; FOR 221; HON 292; MEA 100, 101/110, 120/121, 130/135, 150, 200/210, PY 123/125, 123/126, 124/125, 124/126, 131, 133, 201, 202, 205, 208, 211, 212, SSC 200. Group 2. Any of the courses included in Group I above or any of the following: ANS 105, 110, 215,301, 322, 324; BCH 150, BIO 183; BO 200, 213, 220, 222, 277, 360/365, 400, 405; CS 210, 213,230, 312; ENT 201,203,401, 425; FOR 212, 252, 402; FS 201, 301, 322, 324, FW 221, 403 GN 301, 411, HON 321, HS 100, 201, 211, 212, 301; MB 200, 351; MEA 220, 250, NTR 301; PCC 203; PO 201, 322: PP 315, 318; PY 203; SSC 361; TC 203; TMS 211; TOX 201; WGS 210; BIO 221,260.
8. Two courses (6 credit hours) must be taken from the following list to meet the Psychology Group I requirement: PSY 400, 410, 420, 430, 475, or 591. Courses must be passed with a grade of C- or better.
9. Two courses (6 credit hours) must be taken from each of the following two groups (12 cr hours total). Courses must be passed with a grade of C-or better: Group 2A (applied psychology): PSY 307, 312, 340, 360, 436, 470. Group 2B (social psychology): PSY 311, 345, 370, 376, 406/506, 558.
10. Nine hours of psychology course elective selected from any Psychology course in the NCSU course catalog or on the approved transfer list.
11. Students may elect to take 12 hours of Free Elective courses S/U.
12. Three hours of Arts and Letters from the following category: All HA courses, MUS 180, 200, 20 I, 202, 205, 206, 230, 260, 306, 31 0, 31 *S,* 320, 330, 335, 350, 360, all 200-level and above REL courses; ADN111, 112, 202, 212, 219, 231, 272, 273, 281, 311, 384, 386, 414, or 454; AFS 340 or 375; ARC 140, 141, or 142; ARS 251, 259, 306, 351, or 353; COM 103, 203, 213, 233, 243, 303, 321, 323, 333, 340, 364, 374, or 411; DAN 272 or 295; ENG 282, 283, 321, 364, 374, 411, or 492; FL 216, FLF 318, FLG 318, FLS 318, GD 200 or 342; GRK 310; IDS 496; LAR 444; LAT 310.
13. C or better required, not C- or better. ***[DELETE footnote 13.]***

***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 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[7]

C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)
Fulfilled as part of the Major requirements[2,6]

D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)
Fulfilled as part of the Major 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)
_X_ Mathematical Sciences/Natural Sciences/Engineering

G. **Interdisciplinary Perspectives** (5-6 credit hours)
Choose from 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)

16PSY161

Degree/Plan Title: B. A of Psychology

Concentration/Subplan Title:

Plan SIS Code: 16PSYCHBA

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
PSY 200 Introduction to Psychology BIO 105/106 Bio in Modern World/ and Bio Lab[B] Mathematics Elective[A,1] Foreign Language 102[K,5] / Free Elective[10] HSS 120 (GEP Interdisciplinary Perspective Requ.) [G]	3 (CP) 4 (CP) 3 3 2	PSY 230 Introduction to Behavioral Research Social Science Elective[D,3] ENG 101 Academic Writing and Research[H] Foreign Language 201[K,5] PE 1XX Fitness and Wellness Course[E]	3 (CP) 3 4 (CP) 3 1
	Total: 15		*Total:* 14
SOPHOMORE YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
ST 311 Introduction to Statistics ST [A] History Elective (Group II)[2] Natural Science Elective[B,7] Free Elective[10] PSY Core Course[8] (finish up foreign language if not completed in previous semester: + 3 credits)	3 (CP) 3 3 3 3	PSY Core Course[8] History Elective (Group I) [C,2] Natural Science Elective and lab[7] Social Science Elective[D,3] Free Elective[10] PE GEP Healthy Living Elective[E]	3 3 4 3 3 1
	Total: 15		*Total:* 17
JUNIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
PSY Core Course[8] PSY Core Course[8] Literature Elective (Group I) [C,4] GEP Additional Breadth Requirement[F] (Math Sci/Nat Sci/Engineering) Free Elective[10]	3 3 3 3 3	Psychology Elective[9] Psychology Elective[9] Philosophy Elective[6] GEP Interdisciplinary Perspective Requirement[G] Free Elective[10]	3 3 3 3 3
	Total: 15		*Total:* 15
SENIOR YEAR			
FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
Psychology Elective[9] Psychology Elective[9] Literature Elective (Group II) [C4] Social Science Elective[3] Free Elective[10]	3 3 3 3 3	Psychology Elective[9] Social Science Elective[3] Arts and Letters Elective[11] Free Elective[10] Free Elective[10]	3 3 3 3 3
	Total: 15		*Total: 15*
Minimum Credit Hours Required for Graduation[* I,J]: 121			

Major/Program Footnotes:

1. Choose from MA 107, 111, 114, 121, 131, 141, 231, 141, 231, 241, and MA/LOG 335. Credit will not be given for MA 100, 101, 103, 105.

2. One 3-credit course required from the college-approved History I course list (a 200-level survey course covering a culture significantly different from our own, i.e., pre-industrial or non-Western), and one 3-credit course required from the college-approved History II course list (a 200-level survey course covering our own or a similar culture).
3 Four 3-credit courses from3 different disciplines including: ANT, ARC, EC, PS, SOC. Also ENG 210, GEO 220. IDS 401, or STS 402. Six of the twelve social science credits must be chosen from the GEP Social Sciences course list. Psychology courses may not be taken to satisfy the Social Science course requirements.
4 One 3-credit course required from the college-approved Literature I list (a survey course covering literature outside the U.S. and prior to the 20th century), and one course required from the college-approved Literature II list (any course that meets the Literature I requirement, or a course in American or Twentieth Century Literature, or an upper division survey course or literature course in a period, genre, or major figure in English, a foreign language in English translation, or the original foreign language).
5. a. Student with high school credit or other knowledge of French, German, Latin. or Spanish must take a placement test to determine the appropriate level for their first course.
   b. Students who place in FL 202 or above have met the language requirement and are eligible to receive 3 hours of advanced placement credit by enrolling in the course into which they are placed and earning a grade of "C-" or better on the first attempt.
   c. FL 20 I is required for graduation. Note: FL 101 will not count towards graduation unless in a language other than the one used to fill the University's FL 102 proficiency requirement.
6. Three hours are required in Philosophy. Choose from PHI courses on the GEP Humanities course list.
7. Two courses from the GEP Natural Sciences list. One of the two courses must have a lab.
8. Four courses (12 credit hours) must be taken from the following list to meet the PSY Core Course requirement: PSY 311, 376, 420, 430. Courses must be passed with a grade of C- or better.
9. Fifteen hours of psychology course electives selected from any Psychology course in the NCSU course catalog or on the approved transfer list. At least two courses must be at the 400- or 500-level. Courses must be passed with a grade of C-or better. Only 6 credits of PSY 499 may be used towards the 15 hours of PSY electives.
10. Students may elect to take 12 hours of Free Elective courses S/U.
11. Arts and Letters: One 3-credit course required from the college-approved Arts & Letters course list.

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: **Satisfied by major requirements**

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: **Satisfied by major requirements**

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: **Satisfied by college requirements**

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: **Satisfied by college requirements**

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 **X** 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.

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.

NC STATE UNIVERSITY

College of Natural Resources
Department of Forest Biomaterials

Paper Science and Engineering
Sustainable Materials & Technology
Wood Products Extension

https://cnr.ncsu.edu/fb

Campus Box 8005
2820 Faucette Drive
Raleigh, NC 27695-8005

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MEMORANDUM

April 4, 2016

To: Dr. Mike Mullen
Vice Chancellor and Dean of DASA (Division of Academic and Student Affairs)

From: David Tilotta, Acting Head, Forest Biomaterials / Paper Science & Engineering

Subject: Minor changes to 8-semester displays

By means of this memorandum, the Department of Forest Biomaterials proposes to make minor corrections to the 8-semester display for the undergraduate curriculum Paper Science & Engineering, 15PSEBS (Effective Date 1.2013). Those changes are described and explained in the attached table and annotated in the attached marked-up display sheet.

Note: Corrections for the dual degree with Chemical Engineering (15PSEBS-15PSENDM) have been submitted by Dr. Lisa Bullard.

Justification: A) Typographical or title/number errors; B) Since the last update in 2013, there have been multiple actions approved through UCCC which were never posted to the 8-semester displays.

ENDORSED BY:

Department Head, Forest Biomaterials / Paper Science & Engineering — Date: April 6 2016

Chair, COE Courses & Curricula Committee — Date: 6 April 16

College of Engineering Dean — Date: 4/07/16

Chair, University Courses & Curricula Committee — Date

Chair, Dean of Undergraduate Academic Programs — Date

APPROVED:

Provost's Office — Date

Paper Science & Engineering
Description of Minor Corrections to 8-Semester Display

Degree: 15PSEBS (Effective date 1.2013)

Semester / Footnote	Correction	Justification
Semester 2	Remove superscript 2 after the CH 202 course title	This was an error. The Chemistry Department does not have a C wall or C-minus wall for the lab association with CH 201
Semester 3	Add superscript 2 after CH 221	The Chemistry Department installed a C-minimum in 221 to move on to 223 (but not for the associated lab 222)
Semester 5	Change course number for MAE 301 to MAE 201	This course re-numbering has already been approved
Semester 7	Change title for PSE 415 to "Paper Industry Strat Proj Analy"	The current title (Senior Research Projects) is from an old display and is not accurate; the course title is correct in the undergraduate catalog and the degree audit
Footnote 1	Delete "Matriculation course."	Redundant for the intended purpose.
Footnote 4	Delete BAE 311	The course is no longer offered, and no equivalent suitable course is available.
Footnote 4	Change MSE 202 to MSE 201	This is a typographical error; the correct course has always been MSE 201

Paper Science & Engineering (BS) (15PSEBS)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR

Fall Semester	Credit		Spring Semester	Credit
CH 101 Chemistry A Molecular Science[1]	3		CH 201 Chemistry, A Quant Sci [2]	3
CH 102 General Chemistry Lab[1]	1		CH 202 Quantitative Chemistry Lab	1
E 101 Introduction to Engr & Prob Solv [2]	1		EC 205 Economics (or EC 201 or ARE 201)*	3
E 115 Intro to Computing Envir	1		MA 241 Calculus II[1]	4
ENG 101 Academic Writing & Research[2]	4		PY 205 Physics Engr & Scientists I[1]	3
MA 141 Calculus I[1]	4		PY 206 Physics for Engineers & Scientists I Lab[1]	1
Health & Exercise Studies Elective (HESF 1xx course)*	1		PSE 201 Pulping & Papermaking Technology[2]	3
	15			18

SOPHOMORE YEAR

Fall Semester	Credit		Spring Semester	Credit
CH 221 Organic Chemistry I 2	3		CH 223 Organic Chemistry II	3
CH 222 Organic Chemistr I Lab	1		CH 224 Organic Chemistr II Lab	1
CHE 205 Chemical Proc Prin	4		PY 208 Physics for Engr & Scientists II	3
MA 242 Calculus III	4		PY 209 Physics for Engineers & Scientists II Lab	1
PSE 212 Paper Properties[2]	4		PSE 371 Pulping Process Analysis [2]	3
			Advised Elective[3]	3
	16		Health & Exercise Studies Elective*	1
				15

JUNIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
201				
MAE 301 Engineering Thermodynamics I	3		PSE 332 Wood & Pulping Chemistry	3
Engineering Elective [4]	3		PSE 360 Pulp & Paper Unit Proc II	3
PSE 211 Pulp & Paper Internship[5]	1		Advised Elective [3]	3
PSE 322 Wet End/Polymer Chemistry	4		GEP Requirement*	3
PSE 355 Pulp & Paper Unit Proc. I[2]	3		GEP Requirement*	3
GEP Requirment*	3			
	17			15

SENIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
Paper Industry Strat. Proj. Analy.				
PSE 415 ~~Senior Research Projects~~	3		PSE 416 Project Design & Analysis	3
PSE 417 Process Design & Analy Lab	3		PSE 465 Paper Physics & Product Design	3
PSE 425 Bioenergy & Biomaterials Engr.	3		PSE 472 Paper Process Analysis	3
PSE 475 Process Control	3		Advised Elective [3]	3
GEP Requirement*	3		GEP Requirement*	3
			GEP IP Requirement*	2-3
	15			17-18

Minimum Credit Hours Required for Graduation*[1,3,4,5]:	128

Major/Program Footnotes:

201

1. ~~Matriculation course~~. Minimum grade of C (2.0).
2. Minimum grade of C minus (C-).
3. Advised Electives: See the online degree audit (http://ncsu.edu/registrar/curricula/index.html) for a list or consult your advisor.
4. Engineering Electives: ~~BAE 311~~, CE 214, CHE 225, ECE 331, MAE 206, MSE ~~202~~, or TE 200.
5. There is one required internship in industry. PSE 211 should be taken the first semester upon returning from that internship.

***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://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 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.
E. Health and Exercise Studies (2 credit hours – at least one 100-level HESF (Fitness and Wellness) course. *Choose from the University approved GEP Health and 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 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.

Joint Department of Biomedical Engineering
The University of North Carolina at Chapel Hill and
North Carolina State University

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March 31, 2016

To: Dr. Mike Mullen
Vice Chancellor and Dean of DASA (Division of Academic and Student Affairs)

From: Lianne Cartee, Chair Undergraduate Affairs Committee, Biomedical Engineering

Subject: Addition of Biomedical and Health Sciences Engineering to R&R display

By means of this memorandum, the Department of Biomedical Engineering requests the addition of the approved curriculum for the Joint Program in Biomedical and Health Sciences Engineering to all websites that list engineering programs. The eight semester display for the curriculum is attached. Please let me know if you need any additional information.

Justification: The curriculum has been approved by the UNC General Administration, and students currently enrolled in the program are registered students at both UNC-CH and NC State. Their program should be reflected on the website.

ENDORSED BY:

Department Head, Biomedical Engineering — Date 4/1/16

Chair, COE Courses & Curricula Committee — Date 6 April 16

College of Engineering Dean — Date 4/07/16

Chair, University Courses & Curricula Committee — Date

Chair, Dean of Undergraduate Academic Programs — Date

APPROVED:

Provost's Office — Date

Biomedical and Health Sciences Engineering

General

(SEMESTER-BY-SEMESTER CURRICULUM DISPLAY)

Current: X Proposed: Effective Semester: **8/2015**

DEGREE TITLE: **B. S. in Biomedical Engineering**

CONCENTRATION TITLE: **N/A**

Freshman Year

		Fall Semester	*Credits*			*Spring Semester*	*Credits*
BMME	101	Frontiers of BME (recommended)	(1)	CHEM	102/L	General Descriptive Chem and Lab [C]	4
CHEM	101/L	General Chemistry I and Lab [C]	4	MATH	232	Calculus of Funcs. of One Variable II	3
MATH	231	Calculus of Functions of One Variable [C]	3	PHYS	116	[C] ***or***	4
ENGL	105	English Comp. and Rhetoric [C-]	3	PHYS	118	Mechanics [C]	
		Foreign Language	3			Approaches (2)	3
						Lifetime Fitness	1
		Semester Total	**13**			**Semester Total**	**15**

Sophomore Year

		Fall Semester	*Credits*			*Spring Semester*	*Credits*
PHYS	117	***or***	4	BMME	150	Intro to Mat. Sciences	3
PHYS	119	Electromagnetism and Optics		MATH	383/L	Linear Algebra and Diff. EQ	3
MATH	233	Calculus of Funcs. of Several Variables	3	BIOL	202	Molecular Biology and Genetics	3
BMME	160	Statics	3	BMME	210	BME Design and Manufacturing I	2
BIOL	101/L	Principles of Biology with Lab	4	COMP	116	Intro to Scientific Programming ***or***	3
				BMME	201	MATLAB for Scientists and Engineers	
		Semester Total	**14**			**Semester Total**	**14**

Junior Year

		Fall Semester	*Credits*			*Spring Semester*	*Credits*
BMME	350	Fundamentals of Biomedical Electronics	4	BMME	351	Human Physiology and Biol. Meas.	4
BIOL	252	Fund. Of Hum. Anatomy and Physiolgy	4	BMME	465	Biomedical Instrumentation	4
MATH	528	Math. Models for the Physical Sci. with Lab	4	BMME	410	Signals and Systems	3
		BME Elective 1	3	BMME	310	BME Design and Manufacturing II	2
STOR	435	Intro to Probability ***or***	3			Approaches 2	3
STOR	455	Statistical Methods I ***or***					
BIOS	600	Principles of Statistical Inference					
		Semester Total	**18**			**Semester Total**	**16**

Senior Year

		Fall Semester	*Credits*			*Spring Semester*	*Credits*
BMME	697	Senior Design Project	3	BMME	698	Senior Design Project	3
BMME	341	Thermodynamics ***or***	3			BME Elective 3	3
BMME	455	BioFluid Mechanics ***or***				BME Elective 4	3
BMME	475	Transport Processes				Approaches 5	3
		BME Elective 2	3			Approaches 6	3
		Approaches 3	3				
		Approaches 4	3				
		Semester Total	**15**			**Semester Total**	**15**

Minimum Total Credit Hours Required for Graduation 120

Joint Department of Biomedical Engineering
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March 31, 2016

To: Dr. Mike Mullen
Vice Chancellor and Dean of DASA (Division of Academic and Student Affairs)

From: Lianne Cartee, Chair Undergraduate Affairs Committee, Biomedical Engineering

Subject: Minor changes to 8-semester displays

By means of this memorandum, the Department of Biomedical Engineering proposes to make minor corrections and formatting adjustments to the 8-semester displays for the undergraduate curricula. Those changes are annotated in the attached marked up curricula.

Justification: Since the last update in 2009, there have been multiple actions approved through UCCC which were never posted to the 8-semester displays.

ENDORSED BY:

Department Head, Biomedical Engineering — Date 4/1/16

Chair, COE Courses & Curricula Committee — Date 6 April 16

College of Engineering Dean — Date 4/07/16

Chair, University Courses & Curricula Committee — Date

Chair, Dean of Undergraduate Academic Programs — Date

APPROVED:

Provost's Office — Date

Biomedical Engineering (BS) (14BMEBS)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR

Fall Semester	Credit		Spring Semester	Credit
CH 101 Chemistry, A Molecular Science[3]	3		CH 221 Organic Chem I	3
CH 102 General Chemistry Lab[3]	1		CH 222 Organic Chem I Lab	1
E 101 Introduction to Engr & Prob Solv [4]	1		MA 241 Calculus II[3]	4
E 115 Intro to Computing Environ	1		PY 205 Physics for Engineers & Scientists I[3]	3
ENG 101 Academic Writing and Research[4]	4		PY 206 Physics for Engineers & Scientists I Lab	1
MA 141 Calculus I[3]	4		EC 205 Economics (GEP Soc Sci Req*)[1]	3
HES_*** Health & Exercise Studies Course*	1		HES_*** Health & Exercise Studies Course*	1
	15			**16**

SOPHOMORE YEAR

Fall Semester	Credit		Spring Semester	Credit
BME 201 Comp Meth in BME	3		BIO 183 Intro Biol: Cellular & Molecular	4
BME 204 Biomedical Measurements	3		BME 203 Intro Mat Sci of Biomaterials	3
MAE 206 Engineering Statics ***or***	3		BME 252 Engineering Design I	1
CE 214 Engineering Mech -Statics	~~3~~		BME 210 Analog & Digital Circuits	4
MA 242 Calculus III	4		MAE 208 Engineering Dynamics	3
PY 208 Physics for Engineers & Scientists II	~~4~~ 3			
PY 209 Physics for Engineers & Scientists II Lab	1			**15**
	17			

JUNIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
BME 301 Human Physiology for Engineers I	3		BME 302 Human Physiology for Engineers II	3
BME 311 Linear Systems in BME	3		BME Elective B[2]	3
MA 341 Applied Diff Equations	3		BME Elective C[2]	3
BME Elective A[2]	3		BME 352 Engineering Design II	2
ST 370 Prob and Statistics for Engrs	3		ENG 331 Comm.Engr.& Tech. ***or***	3
			ENG 333 Comm. Sci. & Res.	
	15		GEP Requirement*	3
				17

SENIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
BME 451 BME Senior Design I	3		BME 452 BME Senior Design II	3
BME Elective D[2]	3		BME Elective F[2]	3

BME Elective E[2]	3		GEP Requirement*	2-3
MAE 301 Thermodynamics I *or*	3		GEP Requirement*	3
MSE 301 Equilibrium and Rate Processes			GEP Requirement*	3
GEP Requirement*	3		GEP Requirement*	3
	15			**17-18**

Minimum Credit Hours Required for Graduation*[I,J,K]:	127

Major/Program requirements and footnotes:

[1] Choose from EC 201 or 205, or ARE 201.
[2] Choose from an appropriate sequence of electives. These must include at least 15 hours of engineering topics.
[3] Grade of C (2.0) or higher required.
[4] Minimum grade of C- required.

No specific emphasis: Students will work out a plan of study with their advisor that includes at least two 300- or 400-level BME electives and any other courses listed for the emphasis areas. There must be a sequence of at least three related upper-level BME electives to demonstrate an area of depth. One course can be an appropriate non-engineering course.

Biomechanics: (A) MAE 314 or CE 313: Solid Mechanics; (B) MAE 308 or CE 382: Fluid Mechanics; (C) BME 342: Experimental & Analytical Methods in Biomechanical Engineering Analysis; (D) BME 441: Biomechanics; (E) and (F) Any BME elective or appropriate course approved by the student's advisor.

Biomaterials : (A) MAE 314 or CE 313: Solid Mechanics; (B) TE 463: Polymer Engineering; (C) PCC 471:Chemistry of Biopolymers (no engineering topics) (D) TE 466: Polymeric Biomaterials; (E) Any BME elective or appropriate course approved by the student's advisor; and (F) TE/BME 467: Mechanics of Tissues and Implants. Students following this emphasis area should take MAE 301 or MSE 301 in the fall of their junior year and the technical writing course in the spring of their junior year.

Biomedical Instrumentation: (A) Any BME elective or appropriate course approved by the student's advisor; (B) BME 422: Fundamentals of Biomedical Instrumentation; (C) BME 412: Biomedical Signal Processing; (D) BME 425: Bioelectricity; (E) and (F) Take two from BME 480: Biomedical Microcontroller Applications; ECE 435: Elements of Control; ECE 436: Digital Control Systems; ECE 455: Computer Control of Robots; ECE 456: Mechatronics; ECE 561: Embedded Systems; and BME 522: Medical Instrumentation. Students following this emphasis area may choose to take a GEP course in the fall semester of the junior year and BME Elective A in the spring semester of the senior year.

~~3 Grade of C (2.0) or higher.~~

~~4 Minimum grade of C-~~

***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://oucc.dasa.ncsu.edu/general-education-program-gep/.

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 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 Science 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.

BME 201: Computer Methods in Biomedical Engineering

Units: 3

Students develop computer-based problem solving techniques using Excel and MATLAB to solve introductory problems in Biomedical Engineering. Emphasis is on developing solution algorithms, implementing these with spreadsheets and computer programming, and presenting results in a clear and concise manner. Students registered for BME 201 who fail to matriculate into BME will be dropped from the course.

Prerequisite: BME matriculated students

Offered in Fall Only

BME 203: Introduction to the Materials Science of Biomaterials

Units: 3

This course introduces fundamental physical principles governing the structure, processing, properties and performance of metallic, ceramic and polymeric materials. Relationships are developed defining how mechanical, physical and chemical properties are controlled by microstructure and chemistry. Material failure modes are develped with an emphasis on biocompatibility and the applications/performance of materials in the human body. Basic aspects of material biocompatibility are presented, leading into studies of the current and future applications of biomaterials.

Prerequisite: C- or better in CH 101, CH 102 and PY 205

Offered in Fall and Spring

BME 204: Biomedical Measurements

Units: 3

This course will introduce students to modern topics in biomedical engineering and areas of emphasis in the biomedical engineering curriculum through the study and use of biomedical measurement tools. The course will include a lecture and a laboratory component.

Prerequisite: BME Majors

Offered in Fall ~~Only~~ and Spring

BME 210: Biomedical Electronics

Units: 4

Fundamentals of analog and digital circuit analysis and design as applied to biomedical instrumentation and measurement of biological potentials. Passive circuit components, node and mesh analysis, transient behavior, operational amplifiers, frequency response, analog filter design, diode, transistors, biological signal acquisition, binary math and logical operators, digital circuit design, circuit simulation tools and techniques. Laboratory exercises supplement the topics presented in class lectures.

Prerequisite: MA 242, PY 208. For BME Majors only.

Offered in Spring Only

BME 252: Biomedical Engineering Design and Manufacturing I

Units: 1

Students will learn the basic tools of design such as solid modeling by means of web-based tutorials and a series of small CAD project assignments. Students will learn to use current software for design, analysis, and computer-aided manufacturing [CAM]. Students will also be introduced to modern manufacturing through the transition from CAD [Computer-Aided Design] to CAM using modern rapid manufacturing equipment to carry out one small, well-defined design and manufacturing project.

Prerequisite: BME Majors

Offered in Fall and Spring

BME 301: Human Physiology for Engineers I

Units: 3

This course includes a quantitative approach to human physiology from the biomedical engineering perspective with an emphasis on neural, sensory, muscle, and cardiac physiology. Autonomic neural and somatic motor control will be discussed. Engineering applications, including neural stimulators, functional imaging, cochlear implants, artificial noses, vestibular implants, visual implants, artificial larynges, pacemakers and defibrillators will be discussed. Assignments include computer-based exercises using MATLAB.

Prerequisite: BME 201 and ~~either ZO 160 or~~ BIO 183, BME Majors, Corequisite: BME 311

Offered in Fall Only

BME 302: Human Physiology for Engineers II

Units: 3

This course explores a quantitative approach to human physiology from the biomedical engineering perspective with an emphasis on systems physiology described using mechanical properties. Topics include the physiological and mechanical behavior of the blood vessels, lungs, kidney muscles and larynx. In the course lab exercises, students investigate mechanical properties of fluids, electrolyte exchange in dialysis, spirometry and blood pressure measurement among other topics. The course culminates with the design of a novel laboratory experiment.

Prerequisite: BME 301. For BME Majors only.

Offered in Spring Only

BME 311: Linear Systems in Biomedical Engineering

Units: 3

Fundamentals of linear systems analysis as applied to problems in biomedical modeling and instrumentation. Properties of biomedical systems and signals. Representation of continuous- and discrete-time signals and system response. Convolution. Fourier analysis in continuous and discrete domains. Laplace transform. Frequency response and its application in biomedical systems. Filter design. Circuit analogs to mechanical and thermodynamics systems and their applications in modeling biomedical systems. Applications in biomedical instrumentation. Students use MATLAB to simulate and analyze biomedical linear systems. BME majors only.

Prerequisite: BME 201 and [ECE 331 or BME 210]. Corequisite: BME 301 and MA 341. For BME Majors only.

Offered in Fall Only

BME 312: Analog and Digital Circuits Laboratory

Units: 1

Laboratory in analog and digital circuit analysis. Electrical safety; Exercises in resistor networks, capacitors and inductors, steady-state and dynamic circuit behavior, active circuits, amplifiers,

logic gates, combinatorial and sequential circuits, elementary digital system design, A/D conversion, biomedical applications.

Prerequisite: ECE 331, BME Majors

Offered in ~~Fall~~ Spring Only

BME 342: Analytical and Experimental Methods for Biomedical Engineers

Units: 3

Experimental and analytic tools are developed and used to solve problems in biomedical engineering. Techniques include kinematic analysis, closed form and finite element analysis of stresses and strains in a body, and failure analysis. Transducersnecessary for experimental analysis and testing are introduced. Students learn advanced software packages such as the finite element program ANSYS and the dynamic analysis program ADAMS to assist in their analyses.

Prerequisite: BME 201; MAE 208 or CE 215; MAE 314 or CE 313; MA 341

Offered in Spring Only

BME 352: Biomedical Engineering Design and Manufacturing II

Units: 2

Students will be required to continue their use of the tools learned in Biomedical Design and Manufacturing I in the context of modern design practices and manufacturing processes. The organizational and project management tools of moderm design will be introduced, and a technical discussion of a modern manufacturing technology will be introduced each week.

Prerequisite: BME 252; BME majors

Offered in Spring Only

BME 362: Biomaterials Characterization

Units: 3

Introductory laboratory experience focused on integrating engineering and biological principles by exploring key topics in biomaterials. Topics include evaluation and interpretation of

experimental results, modeling and testing of tissues and cells, and biomaterial/tissue, cell interactions. BME and MSE Majors only; Juniors and Seniors.

Prerequisite: [CH 220 or 221 or 225] and [BME 203 or MSE 200 or MSE 201]

Offered in Spring Only

BME 412: Biomedical Signal Processing

Units: 3

Fundamentals of continuous- and discrete-time signal processing as applied to problems in biomedical instrumentation. Properties of biomedical signals and instruments. Descriptions of random noise and signal processes. Interactions between randombiomedical signals and systems. Wiener filtering. Sampling theory. Discrete-time signal analysis. Applications of Z-transform and discrete Fourier transform. Digital filter design methods for biomedical instruments. BME or MS or PHD; credit not allowed for both BME 412 and BME 512.

Prerequisite: BME 311, ST 370

Offered in Spring Only

BME 422: Fundamentals of Biomedical Instrumentation

Units: 3

Fundamentals of biomedical instrument design and implementation. Sensing mechanisms, sensor microfabrication methods, sensor interfacing circuits, analog-to-digital conversion, biosignal capture and storage, embedded microprocessors, data compression methods, system integration and prototyping. Laboratory exercises using LabVIEW and MATLAB, supplement the topics presented in class lectures. Students build a sensor using cleanroom facilities in the BME department as part of a semester-long design project.

Prerequisite: BME 210 or BME 312

Offered in Spring Only

BME 425: Bioelectricity

Units: 3

Quantitative analysis of excitable membranes and their signals, including plasma membrane characteristics, origin of electrical membrane potentials, action potentials, voltage clamp experiments, the Hodgkin-Huxley equations, propagation, subthresholdstimuli, extracellular fields, membrane biophysics, and electrophysiology of the heart. Design and development of an electrocardiogram analysis system.

Prerequisite: BME 302 or [~~ZO~~ BIO 421 and a course in electrical circuits]

Offered in Spring Only

BME 441: Biomechanics

Units: 3

Students study human body kinematics, force analysis of joints, and the structure and composition of biological materials. Emphasis is placed on the measurement of mechanical properties and the development and understanding of models of biological material mechanical behavior.

Prerequisite: ~~ZO 160 or~~ BIO 183; BME 342; ST 370

Offered in Fall Only

BME 451: Biomedical Engineering Senior Design I

Units: 3

This course encompasses the project proposal and design concepts, including: individual pre-proposals, team proposals, project planning, scheduling, needs assessment, product requirements, competitive landscape and patent review, business risks, design concepts, and phase reviews. BME majors only.

Prerequisite: BME 302, BME 352, ~~and either ENG 331 or ENG 333,~~ and completion of two of the suggested BME electives for their area of emphasis ; BME majors

Co-requisit: ENG 331 or ENG 333

Offered in Fall Only

BME 452: Biomedical Engineering Senior Design II

Units: 3

This course is a continuation of BME 451 moving from proposal and concepts into manufacturing, prototyping, and testing. The deliverables in this course include: detailed manufacturing specifications, biomaterials review, supplier identification, product feasibility, issues tracking, manufacturing planning, bill of materials, product risks, qualification protocol, IP disclosure, process validation planning, regulatory review, design history file audit, lessons learned, and phase reviews.

Prerequisite: BME 451, BME Majors

Offered in Spring Only

BME 466: Polymeric Biomaterials Engineering

Units: 3

In-depth study of the engineering design of biomedical polymers and implants. Polymeric biomaterials, including polymer synthesis and structure, polymer properties as related to designing orthopedic and vascular grafts. Designing textile products as biomaterials including surface modification and characterization techniques. Bioresorbable polymers.

Prerequisite: PY 208 and [TE 200 or CH 220 or CH 221 or CH 225] and [MAE 206 or CE 214]

Offered in Fall Only

BME 467: Mechanics of Tissues & Implants Requirements

Units: 3

Application of engineering and biological principles to understand the structure and performance of tendons, ligaments, skin, and bone; bone mechanics; viscoelasticity of soft biological tissues; models of soft biological tissues; mechanics of skeletal muscle; and tissue-derived devices as well as interfaces between native tissues and synthetic devices.

Prerequisite: ~~[ZO 160 or~~ BIO 183]/and [MAE 314 or CE 313]

Offered in Spring Only

BME 480: Biomedical Microcontroller Applications

Units: 3

Overview of microcontroller-based systems, including applications, architecture, number systems, and languages. Students gain experience using a PIC-based microcontroller to input information from a user and output information using LEDs and LCD displays. Student will learn capabilities of the PIC through in class exercises and weekly programming assignments. Both assembly language and PIC-based C are used. Students develop a PIC-based heart rate monitor and work in pairs on a BME-related project of their choice.

Prerequisite: BME 422. BME Majors only

Offered in Fall Only

BME 481: Human Factors Engineering and Quality Management Systems for Engineers

Units: 3

This course is designed for biomedical engineering students who plan to work in industry. The course covers industry related topics including team work, conflict resolution, manufacturing and specifications, gap analysis, and root cause of analysis. Design topics including design of experiment, human factors, and standards and regulations relevant to the biomedical engineering profession are also covered. Lean and six sigma are taught with an option to test for a six sigma green belt if a six sigma project is completed in the following semester.

Co-requisite: BME 451

Offered in Fall Only

BME 483: Tissue Engineering Technologies

Units: 2

In this half-semester laboratory module, students will gain practical experience with two key elements of tissue engineering: tissue building and angiogenesis. Using advanced culture techniques, students will construct a complex living tissue that closely resembles its natural counterpart, then assess its ability to support ingrowth of capillaries [angiogenesis]. The effects of different biomaterials and angiogenic factors will be evaluated. The engineered tissue will be embedded, sectioned and stained for histological analysis.

Prerequisite: BIT 466/566 or permission of instructor

Offered in Fall Only

BME 484: Tissue Engineering Fundamentals

Units: 3

This course covers essential concepts of organ and tissue design and engineering using living components, including cell-based systems and cells/tissues in combination with biomaterials, synthetic materials and/or devices. Topics include: In vivo tissue structure and function; Isolation and culture of primary cells and stem cells; Principles of cellular differentiation; Mass transport processes in cell culture systems; Design, production and seeding of scaffolds for 3D culture; Design of bioreactors to support high-density cell growth; State-of-the-art engineered tissue systems; Clinical translation; and Ethics.

Prerequisite: [~~ZO 160 or~~ BIO 183], CH 221, and [MAE 301 or MSE 301 or CHE 315 or TE 303]

Offered in Spring Only

BME 495: Special Topics in Biomedical Engineering

Units: 1 - 4

Offered as needed for presenting material not normally available in regular BME Department courses or for new BME courses on a trial basis.

Offered in Fall Spring Summer

BME 498: Undergraduate Research in Biomedical Engineering

Units: 3

Opportunity for hands-on faculty mentored research project in biomedical engineering. Course may be a stand-alone project completed in one semester/summer or serve as part of a two-semester project. Approved plan of work required with significant independent research culminating in a final paper and presentation at the NC State Undergraduate Research Symposium or other appropriate venue. Students must identify an advisor from within the BME faculty with whom to work on a regular basis. The advisor must approve the student prior to the student registering for the course. The BME Undergraduate Coordinator must approve the use of the course as a restricted elective for the BME degree. Departmental Approval Required

Offered in Fall Spring Summer

North Carolina State University is a land-grant university and a constituent institution of the University of North Carolina

Department of Electrical and Computer Engineering

NC STATE UNIVERSITY

March 31, 2016

To: Dr. Mike Mullen
Vice Chancellor and Dean of DASA (Division of Academic and Student Affairs)

From: Daniel Stancil, Head, Electrical and Computer Engineering

Subject: Minor changes to 8-semester displays

By means of this memorandum, the Department of Electrical and Computer Engineering proposes to make minor corrections and formatting adjustments to the 8-semester displays for the undergraduate curricula, including the REES concentration. Those changes are annotated in the attached marked up curricula.

Justification: Since the last update in 2013, there have been multiple actions approved through UCCC which were never posted to the 8-semester displays.

ENDORSED BY:

Greg Byrd (assoc. head) 3/31/16
Department Head, Electrical and Computer Engineering Date

6 April 16
Chair, COE Courses & Curricula Committee Date

Jerome P. Lavelle 4/07/16
College of Engineering Dean Date

Chair, University Courses & Curricula Committee Date

Chair, Dean of Undergraduate Academic Programs Date

APPROVED:

Provost's Office Date

Electrical Engineering (BS) (14EEBS)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science[1]	3	ECE 109 Intro to Computer Systems[2]	3
CH 102 General Chemistry Lab[1]	1	MA 241 Calculus II[1]	4
E 101 Intro to Engr & Prob Solving[2]	1	PY 205 Physics for Engineers & Scientists I[1]	3
E 115 Intro to Computing Environ[2]	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing & Research[2]	4	Economics (EC 201/205, ARE 201)	3
MA 141 Calculus I[1]	4	HESF 10* HES Fitness Elective*	1
GEP Requirement*	3		15
	17		

SOPHOMORE YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 200 Intro to ECE Laboratory[2]	4	COM 110 Public Speaking	3
ECE 209 Computer Systems Programming[2]	3	ECE 211 Electric Circuits[2]	4
MA 242 Calculus III	4	ECE 212 Fund of Logic Des[2]	3
PY 208 Physics for Engineers & Scientists II	3	ECE 220 Analytical Found of ECE[2]	3
PY 209 Physics for Engineers & Scientists II Lab	1	GEP Requirement*	3
	15		16

JUNIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 301 Linear Systems	3	ECE 303 Electromagnetic Fields	3
ECE 302 Intro to Microelectronics	4	ECE 380 or 381 or 383[4]	1
ECE 3xx ECE Foundation Elective[3]	3	ECE 3xx ECE Foundation Elective[3]	3
ST 371 Intro to Prob & Dist Theory	3	Open/Technical Elective[7]	3
HES_***Health & Exercise Studies Course	1	ENG 331 Comm for Engr & Tech	3
		GEP Requirement*	3
	14		16

SENIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 484 ECC Senior Design Project I	3	ECE 485 ECE Senior Design Project II	3
ECE 4xx EE Elective[5]	3	ECE 4xx Elective[6]	3
ECE 4xx EE Elective[5]	3	ECE 4xx Elective[6]	3
Open/Technical Elective[7]	3	GEP Requirement*	3
GEP Requirement*	3	GEP Requirement*	2-3
	15		**14-15**

Minimum Credit Hours Required for Graduation*,I,J,K: 122

Major/Program requirements and footnotes:

1. Must be completed with a grade of C or higher.
2. Must be completed with a grade of C- or higher.
3. ECE 3xx foundation electives: See the degree audit for list of course options for fulfilling this requirement.
4. Students in the entrepreneurs program should take ECE 383 / ECE 482 / ECE 483, instead of ECE 380 / ECE 484, ECE 485.
5. ~~EE 4xx electives~~ (Choose 2 courses): See the degree audit for the list of course options for fulfilling this requirement.
6. ECE 4xx electives (Choose 2 courses): See the degree audit for the list of course options for fulfilling this requirement. Students with major GPAs greater than 3.2 can also take 5xx courses.
7. Open/Technical electives (Choose 2 courses) See the degree audit for the list of course options for fulfilling this requirement.

***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 http://oucc.dasa.ncsu.edu/general-education-program-gep/.

Health and Exercise Studies - 2 hours to be selected from the approved GEP Health and Exercise Studies list.

a. One fitness and wellness course (any HESF 100-level course).

b. One additional credit hour of HES courses.

HUMANITIES-6 credits to be selected from two different disciplines from the approved GEP Humanities course list.

SOCIAL SCIENCES - 3 credits to be selected in a discipline other than economics from the approved GEP Social Sciences list. EC 205 (EC 201 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 course 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.

Computer Engineering (BS) (14CPEBS)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science[1]	3	ECE 109 Intro to Computer Systems[2]	3
CH 102 General Chemistry Lab[1]	1	MA 241 Calculus II[1]	4
E 101 Intro to Engr & Prob Solving[2]	1	PY 205 Physics for Engineers & Scientists I[1]	3
E 115 Intro to Computing Environ[2]	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing & Research[2]	4	Economics (EC 201/205, ARE 201)	3
MA 141 Calculus I[1]	4	HES_***Health & Exercise Studies Course*	1
GEP Requirement*	3		
	17		**15**

SOPHOMORE YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 200 Intro to ECE Laboratory[2]	4	COM 110 Public Speaking	3
ECE 209 Computer Systems Programming[2]	3	CSC 226 Discrete Mathematics[2]	3
MA 242 Calculus III	4	ECE 211 Electric Circuits[2]	4
PY 208 Physics for Engineers & Scientists II	3	ECE 212 Fund of Logic Des[2]	3
PY 209 Physics for Engineers & Scientists II Lab	1	ECE 220 Analytical Found of ECE [2]	3
	15		**16**

JUNIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 301 Linear Systems	3	ECE 309 Object-Oriented Programming	3
ECE 302 Intro to Microelectronics	4	ECE 380 or 381 or 383[3]	1
ECE 306 Intro to Embedded Systems	3	ECE 310 Design of Complex Digital Sys	3
GEP Requirement*	3	Open/Technical Elective[6]	3
ST 371 Intro to Prob and Dist Theory	3	ENG 331 Comm for EWngr & Tech	3
		HES_***Health & Exercise Studies Course*	1
	16		**14**

SENIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 484 ECE Senior Design Project I	3	ECE 485 Senior Design Project II	3
ECE 4xx CPE Elective[4]	3	ECE 4xx ECE Elective[5]	3
ECE 4xx CPE Elective[4]	3	ECE 4xx ECE Elective[5]	3
GEP Requirement*	3	GEP Requirement*	2-3
GEP Requirement*	3	GEP Requirement*	3
	15		**14-15**

Minimum Credit Hours Required for Graduation[*I,J,K]: 122

Major/Program requirements and footnotes:

[1] Must be completed with a grade of C or higher.
[2] Must be completed with a grade of C- or higher. courses in the same area.

[3] Students in the entrepreneurs program should take ECE 383/ECE 482/ECE 483 instead of ECE 380/ECE 484/ECE485
[4] ~~CPE 4xx electives~~ (Choose two): See the degree audit for list of course options for fulfilling the CPE Electives requirement.
[5] ECE 4xx electives: See the degree audit for list of course options for fulfilling the ECE Electives requirement. Students with major GPAs greater than 3.2 can also take ECE 5xx courses.
[6] Open/Technical electives: See the degree audit for list of course options for fulfilling the CPE Electives requirement.

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 http://oucc.dasa.ncsu.edu/general-education-program-gep/.

HEALTH EXERCISE STUDIES - 2 hours to be selected from the approved GEP Health Exercise Studies list.
a. One fitness and wellness course (any HESF 100-level course).
b. One additional credit hour of HES courses.
HUMANITIES- 6 credits to be selected in two different disciplines from the approved GEP Humanities course list.
SOCIAL SCIENCES - 3 credits to be selected in a discipline other than economics from the approved GEP Social Sciences list. EC 205 (EC 201 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.

Electrical Engineering (BS): Renewable Electric Energy Systems (14EEBS-14EEREN)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry A Molecular Science [7]	3	ECE 109 Intro to Computer Systems[1]	3
CH 102 General Chemistry Lab[7]	1	MA 241 Calculus II[7]	4
E 101 Introd. to Engr & Prob. Solv[1]	1	PY 205 Physics for Engineers & Scientists I[7]	3
E 115 Intro to Computing Environments	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing & Research[1]	4	EC 205 Economics (EC 201, ARE 201 alternatives)	3
MA 141 Calculus I[7]	4	HES_***Health & Exercise Studies Course*	1
GEP Requirement*	3		
	17		15

SOPHOMORE YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 200 Intro to ECE Laboratory[1]	4	COM 110 Public Speaking	3
ECE 209 Computer Systems Programming[1]	3	ECE 211 Electric Circuits[1]	4
MA 242 Calculus III	4	ECE 212 Fund of Logic Des[1]	3
PY 208 Physics for Engineers & Scientists II	~~4~~ 3	ECE 220 Analytical Found. of ECE[1]	3
PY 209 Physics for Engineers & Scientists II Lab	1	GEP Requirement*	3
	15		16

JUNIOR YEAR

Fall Semester	Credit	Spring Semester	Credit
ECE 301 Linear Systems	3	ECE 303 Electromagnetic Fields	3
ECE 302 Intro to Microelectronics	4	ECE 380 Engr Profession for EE[6]	1
ST 371 Intro to Prob & Dist Theory	3	ECE 305 Int. Power Systems	3
GEP Requirement*	3	~~ECE Foundational Elective~~[8]	3
HES_***Health & Exercise Studies Course*	1	ENG 331 Comm for Engr & Tech	3
	14	GEP Requirement*	3
			16

SENIOR YEAR

8
ECE 3xx ECE Foundation Elective

Fall Semester	Credit	Spring Semester	Credit
ECE 484 Senior Design Project I	3	ECE 485 Senior Design Project II[6]	3
ECE ~~Level I~~ Elective[2] 4	3	ECE REES Elective [3]	3
ECE 452 Renew Elec Energy Syst	3	ECE Elective [4]	3
Open/Technical Elective [9]	3	Open/Technical Elective [9]	3
GEP Requirement*	3	GEP IP Requirement*	2-3
	15		**14-15**

Minimum Credit Hours Required for Graduation*[I,J,K]: 122

Major/Program requirements and footnotes:

1 Minimum grade of C- required.

~~**2** ECE Level I electives: ECE 306 or 406, ECE 402 or 421, ECE 403 or 422, ECE 404, ECE 407, ECE 435 or 456.~~ N/A

3 REES electives: ~~ECE 451, ECE 453, ECE434, ECE(MAE) 535.~~ see Degree Audit

4 ECE electives: ~~ECE 402, ECE 403, ECE 404, ECE 407, ECE 420, ECE 421, ECE 422, ECE 435, ECE 436, ECE 437, ECE 442, ECE 451, ECE 453, ECE 455, ECE 456, ECE 460, ECE 463, ECE 464, ECE 465, ECE 466, ECE 470, ECE 506, ECE 511, ECE 513, ECE 520, ECE 521, ECE 523, ECE 531, ECE 532, ECE 540, ECE 550, ECE 561, ECE 566, ECE 582, ECE 492 (Special Topics Courses). All students with a GPA greater than 3.2 may take ECE 5xx courses.~~ see Degree Audit.

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5 Technical electives: CE 214, 215; ISE 311; MAE 206, 208, 301, 302, 308; MSE 201; NE 418, 419.

6 Students in the entrepreneurs program should take ECE 383/ECE 482/ECE 483 ~~instead of ECE 380/ECE 480.~~

7 Grade of C (2.0) or higher required.

8. E 304, ECE 308, ECE 306, ECE 310

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9. These include any ECE 3xx or ECE 4xx; CE 214 or MAE 206; ISE 311; MAE 208; MAE 301; MAE 302; MSE 302; MSE 200 or MSE 201.

***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://oucc.dasa.ncsu.edu/general-education-program-gep/.

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. 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 or
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.

Class		Correct	Incorrect Listings			
			MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 109	Course Description	This course introduces you to the fundamentals of computer engineering from both the hardware and software points of view. It serves as a roadmap for the rest of the computer courses that you will take here. After taking this course, you will have a better understanding of how a program is translated into commands for execution on hardware, and how the hardware executes those commands using, ultimately, electrons to do the work.	Introduction to key concepts in computer systems. Number representations, switching circuits, logic design, microprocessor design, assembly language programming, input/output, interrupts and traps.	Introduction to key concepts in computer systems. Number representations, switching circuits, logic design, microprocessor design, assembly language programming, input/output, interrupts and traps.	Introduction to key concepts in computer systems. Number representations, switching circuits, logic design, microprocessor design, assembly language programming, input/output, interrupts and traps.	Introduction to key concepts in computer systems. Number representations, switching circuits, logic design, microprocessor design, assembly language programming, input/output, interrupts and traps.
ECE 109	Prerequisites	E 115	none	none	none	none
ECE 200	Course Description	Laboratory with experiments designed to provide fundamental concepts and an overview of Electrical and Computer Engineering specialization areas including Analog Electronic Circuits, Electric Power, Communication Systems, and Signal Processing. Introduction to standard laboratory equipment including power supply, multimeter, function generator, oscilloscope and spectrum analyzer.	Ohm's law and Kirchoff's laws; circuits with resistors, photocells, diodes and LEDs; rectifier circuits; first order RC circuits; periodic signals in time and frequency domains, instantaneous, real and apparent power; DC and RMS value; magnitude andpower spectra, dB, dBW, operational amplifier circuits, analog signal processing systems including amplification, clipping, filtering, addition, multiplication, AM modulation sampling and reconstruction. Weekly hardware laboratory utilizing multimeter, function generator, oscilloscope and spectrum analyzer and custom hardware for experiments on various circuits and systems.	Ohm's law and Kirchoff's laws; circuits with resistors, photocells, diodes and LEDs; rectifier circuits; first order RC circuits; periodic signals in time and frequency domains, instantaneous, real and apparent power; DC and RMS value; magnitude andpower spectra, dB, dBW, operational amplifier circuits, analog signal processing systems including amplification, clipping, filtering, addition, multiplication, AM modulation sampling and reconstruction. Weekly hardware laboratory utilizing multimeter, function generator, oscilloscope and spectrum analyzer and custom hardware for experiments on various circuits and systems.	Ohm's law and Kirchoff's laws; circuits with resistors, photocells, diodes and LEDs; rectifier circuits; first order RC circuits; periodic signals in time and frequency domains, instantaneous, real and apparent power; DC and RMS value; magnitude andpower spectra, dB, dBW, operational amplifier circuits, analog signal processing systems including amplification, clipping, filtering, addition, multiplication, AM modulation sampling and reconstruction. Weekly hardware laboratory utilizing multimeter, function generator, oscilloscope and spectrum analyzer and custom hardware for experiments on various circuits and systems.	Ohm's law and Kirchoff's laws; circuits with resistors, photocells, diodes and LEDs; rectifier circuits; first order RC circuits; periodic signals in time and frequency domains, instantaneous, real and apparent power; DC and RMS value; magnitude andpower spectra, dB, dBW, operational amplifier circuits, analog signal processing systems including amplification, clipping, filtering, addition, multiplication, AM modulation sampling and reconstruction. Weekly hardware laboratory utilizing multimeter, function generator, oscilloscope and spectrum analyzer and custom hardware for experiments on various circuits and systems.
ECE 200	Prerequisites	C- or better in MA 241 and PY 205; Co-Requisite: MA 242 & PY 208	Cum GPA 2.5 or above, C or	Cum GPA 2.5 or above [or NTR] , C or better in MA 241 and PY 205	Cum GPA 2.5 or above [or NTR] , C or better in MA 241 and PY 205	Cum GPA 2.5 or above [or NTR] , C or better in MA 241 and PY 205
ECE 209	Course Description	This course continues the introduction to computing systems by focusing on programming. In particular, students will learn more about the C programming language, how its features can be implemented using a processor s instruction set, and how to use data structures in C to write programs to solve complex problems.	Computer systems programming using the C language. Translation of C into assembly language. Introduction to fundamental data structures: array, list, tree, hash table.	Computer systems programming using the C language. Translation of C into assembly language. Introduction to fundamental data structures: array, list, tree, hash table.	Computer systems programming using the C language. Translation of C into assembly language. Introduction to fundamental data structures: array, list, tree, hash table.	Computer systems programming using the C language. Translation of C into assembly language. Introduction to fundamental data structures: array, list, tree, hash table.
ECE 211	Prerequisites	Grade of C- or better in ECE 200	C- or better in ECE 200 and Corequisite: ECE 220.	C- or better in ECE 200 and Corequisite: ECE 220.	C- or better in ECE 200 and Corequisite: ECE 220.	C- or better in ECE 200 and Corequisite: ECE 220.

Class		Correct	Incorrect Listings: MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 212	Course Description	Introduction to digital logic design. Boolean algebra, switching functions, Karnaugh maps, modular combinational circuit design, programmable logic, latches, flip-flops, finite state machines, synchronous sequential circuit design, datapaths, memory technologies, caches, and memory hierarchies. Use of several CAD tools for simulation, logic minimization, synthesis, state assignment, and technology mapping.	Introduction to digital logic design. Boolean algebra, switching functions, Karnaugh maps, modular combinational circuit design, latches, flip-flops, finite state machines, synchronous sequential circuit design, datapaths, memory technologies, caches, and memory hierarchies. Use of several CAD tools for simulation, logic minimization, synthesis, state assignment, and technology mapping.	Introduction to digital logic design. Boolean algebra, switching functions, Karnaugh maps, modular combinational circuit design, latches, flip-flops, finite state machines, synchronous sequential circuit design, datapaths, memory technologies, caches, and memory hierarchies. Use of several CAD tools for simulation, logic minimization, synthesis, state assignment, and technology mapping.	Introduction to digital logic design. Boolean algebra, switching functions, Karnaugh maps, modular combinational circuit design, latches, flip-flops, finite state machines, synchronous sequential circuit design, datapaths, memory technologies, caches, and memory hierarchies. Use of several CAD tools for simulation, logic minimization, synthesis, state assignment, and technology mapping.	Introduction to digital logic design. Boolean algebra, switching functions, Karnaugh maps, modular combinational circuit design, latches, flip-flops, finite state machines, synchronous sequential circuit design, datapaths, memory technologies, caches, and memory hierarchies. Use of several CAD tools for simulation, logic minimization, synthesis, state assignment, and technology mapping.
ECE 220	Course Description	This course is designed to acquaint the student with the basic mathematical tools used in Electrical and Computer Engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, Laplace transforms used for solving linear differential equations, Fourier Series and their uses in solving ECE problems.	This course is designed to acquaint you with the basic mathematical tools used in electrical and computer engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, laplace transforms used for solving linear differential equations, fourier series and transforms and their uses in solving ECE problems. EE and CPE Majors Only.	This course is designed to acquaint you with the basic mathematical tools used in electrical and computer engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, laplace transforms used for solving linear differential equations, fourier series and transforms and their uses in solving ECE problems. EE and CPE Majors Only.	This course is designed to acquaint you with the basic mathematical tools used in electrical and computer engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, laplace transforms used for solving linear differential equations, fourier series and transforms and their uses in solving ECE problems. EE and CPE Majors Only.	This course is designed to acquaint you with the basic mathematical tools used in electrical and computer engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, laplace transforms used for solving linear differential equations, fourier series and transforms and their uses in solving ECE problems. EE and CPE Majors Only.
ECE 301	Course Description	Representation and analysis of linear systems using differential equations: Impulse response and convolution, Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady state response. Digital Signal Processing.	Representation and analysis of linear systems using differential equations: impulse response and convolution, Fourier series, and Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady-state response. Digital signal processing.	Representation and analysis of linear systems using differential equations: impulse response and convolution, Fourier series, and Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady-state response. Digital signal processing.	Representation and analysis of linear systems using differential equations: impulse response and convolution, Fourier series, and Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady-state response. Digital signal processing.	Representation and analysis of linear systems using differential equations: impulse response and convolution, Fourier series, and Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady-state response. Digital signal processing.
ECE 301	Credit Hours	4	3	3	3	3

Class		Correct	Incorrect Listings			
			MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE	Course Description	Introduction to the physics of semiconductors, PN junctions, BJT and MOS field effect transistors: Physics of operation, IV characteristics, circuit models, SPICE analysis; simple diode circuits; Single Stage BJT amplifiers: Common Emitter, Common Collector and Common Base configurations. Single Stage MOSFET Amplifiers: Common Source, Common Drain and Common Gate configurations. Determination of amplifier operating points, calculation of small signal voltage gain, current gain, input resistance and output resistance. Examples of graphic frequency response of single stage amplifiers.	Introduction to the physics of semiconductors, PN Junctions, BJT and MOS field Effect Transistors: Physics of operation, IV characteristics, load line, quiescent point of operation, PSPICE analysis; diode circuit analysis; voltage regulation; Single Stage Transistor Amplifiers: Common Emitter and Common Source configurations, biasing, inverting and non-inverting amplifiers; follower circuits; calculation of small signal voltage gain, current gain, coupling and bypass capacitors; Multistage ac-coupled amplifiers; small signal modeling; input resistance and output resistance; logic inverters.	Introduction to the physics of semiconductors, PN Junctions, BJT and MOS field Effect Transistors: Physics of operation, IV characteristics, load line, quiescent point of operation, PSPICE analysis; diode circuit analysis; voltage regulation; Single Stage Transistor Amplifiers: Common Emitter and Common Source configurations, biasing, inverting and non-inverting amplifiers; follower circuits; calculation of small signal voltage gain, current gain, coupling and bypass capacitors; Multistage ac-coupled amplifiers; small signal modeling; input resistance and output resistance; logic inverters.	Introduction to the physics of semiconductors, PN Junctions, BJT and MOS field Effect Transistors: Physics of operation, IV characteristics, load line, quiescent point of operation, PSPICE analysis; diode circuit analysis; voltage regulation; Single Stage Transistor Amplifiers: Common Emitter and Common Source configurations, biasing, inverting and non-inverting amplifiers; follower circuits; calculation of small signal voltage gain, current gain, coupling and bypass capacitors; Multistage ac-coupled amplifiers; small signal modeling; input resistance and output resistance; logic inverters.	
ECE 302	Prerequisites	ECE 211	A grade of C- or better in ECE 211.	A grade of C- or better in ECE 211.	A grade of C- or better in ECE 211.	A grade of C- or better in ECE 211.
ECE 303	Course Description	This course prepares you to formulate and solve electromagnetic problems relevant to all fields of Electrical and Computer Engineering and that will find application in subsequent courses in RF circuits, photonics, microwaves, wireless, computers, bioengineering, and nanoelectronics. Primary topics include static electric and magnetic fields, Maxwell's equations and force laws, wave propagation, reflection and refraction of plane waves, transient and steady-state behavior of waves on transmission lines.	This course prepared the students to formulate and solve electromagnetic problems relevant to all fields of electrical and computer engineering and that will find application in subsequent courses in RF circuits, photonics, microwaves, wireless networks, computers, bioengineering, and nanoelectronics. Primary topics include static electric and magnetic fields, Maxwell's equations and force laws, wave propagation, reflection and refraction of plane waves, transient and steady-state behavior of waves on transmission lines. Restriction: EE and CPE Majors Only.	This course prepared the students to formulate and solve electromagnetic problems relevant to all fields of electrical and computer engineering and that will find application in subsequent courses in RF circuits, photonics, microwaves, wireless networks, computers, bioengineering, and nanoelectronics. Primary topics include static electric and magnetic fields, Maxwell's equations and force laws, wave propagation, reflection and refraction of plane waves, transient and steady-state behavior of waves on transmission lines. Restriction: EE and CPE Majors Only.	This course prepared the students to formulate and solve electromagnetic problems relevant to all fields of electrical and computer engineering and that will find application in subsequent courses in RF circuits, photonics, microwaves, wireless networks, computers, bioengineering, and nanoelectronics. Primary topics include static electric and magnetic fields, Maxwell's equations and force laws, wave propagation, reflection and refraction of plane waves, transient and steady-state behavior of waves on transmission lines. Restriction: EE and CPE Majors Only.	This course prepared the students to formulate and solve electromagnetic problems relevant to all fields of electrical and computer engineering and that will find application in subsequent courses in RF circuits, photonics, microwaves, wireless networks, computers, bioengineering, and nanoelectronics. Primary topics include static electric and magnetic fields, Maxwell's equations and force laws, wave propagation, reflection and refraction of plane waves, transient and steady-state behavior of waves on transmission lines. Restriction: EE and CPE Majors Only.
ECE 305	Prerequisites	A grade of C- or better in ECE 211 and ECE 220	C- or better in ECE 211 or ECE 331.	C- or better in ECE 211 or ECE 331.	C- or better in ECE 211 or ECE 331.	C- or better in ECE 211 or ECE 331.
ECE 306	Prerequisites	ECE 200, ECE 212, ECE 209	C- or better in ECE 209 and ECE 212.	C- or better in ECE 209 and ECE 212.	C- or better in ECE 209 and ECE 212.	C- or better in ECE 209 and ECE 212.
ECE 308	Prerequisites	ECE220, ECE211 or BME 311	(ECE 220 and ECE 211) or BME 311; Co-requisite: ECE 301.	(ECE 220 and ECE 211) or BME 311; Co-requisite: ECE 301.	(ECE 220 and ECE 211) or BME 311; Co-requisite: ECE 301.	(ECE 220 and ECE 211) or BME 311; Co-requisite: ECE 301.

Class		Correct	Incorrect Listings MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 308	Course Description	Analog system dynamics, open and closed loop control, block diagrams and signal flow graphs, input-output relationships, stability analyses using Routh-Hurwitz, root-locus and Nyquist, time and frequency domain analysis and design of analog control systems. Use of computer-aided analysis and design tools. Class project.	Analog system dynamics, open and closed loop control, block diagrams and signal flow graphs, input-output relationships, stability analyses using Routh-Hurwitz, root-locus and Nyquist, time and frequency domain analysis and design of analog control systems. Use of computer-aided analysis and design tools. Class project. EE, CPE, BME majors only.	Analog system dynamics, open and closed loop control, block diagrams and signal flow graphs, input-output relationships, stability analyses using Routh-Hurwitz, root-locus and Nyquist, time and frequency domain analysis and design of analog control systems. Use of computer-aided analysis and design tools. Class project. EE, CPE, BME majors only.	Analog system dynamics, open and closed loop control, block diagrams and signal flow graphs, input-output relationships, stability analyses using Routh-Hurwitz, root-locus and Nyquist, time and frequency domain analysis and design of analog control systems. Use of computer-aided analysis and design tools. Class project. EE, CPE, BME majors only.	Analog system dynamics, open and closed loop control, block diagrams and signal flow graphs, input-output relationships, stability analyses using Routh-Hurwitz, root-locus and Nyquist, time and frequency domain analysis and design of analog control systems. Use of computer-aided analysis and design tools. Class project. EE, CPE, BME majors only.
ECE 309	Prerequisites	Grade of C- or better in ECE 209. CPE or EE majors	C- or better in ECE 209.	C- or better in ECE 209.	C- or better in ECE 209.	C- or better in ECE 209.
ECE 310	Course Description	Design principles for complex digital systems. Decomposition of functional and interface specifications into block-diagrams with data-path and control logic. Analysis of behavior using timing diagrams and simulation with hardware description languages. Synthesis of gate-level descriptions from register-transfer level descriptions. Design and test of increasingly complex systems.	Design principles for complex digital systems. Decomposition of functional and interface specifications into block-diagrams and simulation with hardware description languages. Synthesis of gate-level descriptions from register-transfer level descriptions. Design and test of increasingly complex systems.	Design principles for complex digital systems. Decomposition of functional and interface specifications into block-diagrams and simulation with hardware description languages. Synthesis of gate-level descriptions from register-transfer level descriptions. Design and test of increasingly complex systems.	Design principles for complex digital systems. Decomposition of functional and interface specifications into block-diagrams and simulation with hardware description languages. Synthesis of gate-level descriptions from register-transfer level descriptions. Design and test of increasingly complex systems.	Design principles for complex digital systems. Decomposition of functional and interface specifications into block-diagrams and simulation with hardware description languages. Synthesis of gate-level descriptions from register-transfer level descriptions. Design and test of increasingly complex systems.
ECE 331	Course Description	Concepts, units and methods of analysis in electrical engineering. Analysis of d-c and a-c circuits, characteristics of linear and non-linear electrical devices; principles of Operational Amplifiers; transformers; motors; and filters.	Concepts, units and methods of analysis in electrical engineering. Analysis of d-c and a-c circuits, characteristics of linear and non-linear electrical devices; principles of operational amplifiers; transformers; motors; and filters.	Concepts, units and methods of analysis in electrical engineering. Analysis of d-c and a-c circuits, characteristics of linear and non-linear electrical devices; principles of operational amplifiers; transformers; motors; and filters.	Concepts, units and methods of analysis in electrical engineering. Analysis of d-c and a-c circuits, characteristics of linear and non-linear electrical devices; principles of operational amplifiers; transformers; motors; and filters.	
ECE 331	Prerequisites	MA 241, PY 208		Grade of C or better MA 241, PY 208.	Grade of C or better MA 241, PY 208.	Grade of C or better MA 241, PY 208.
ECE 380	Prerequisites	ECE 212, ECE301, ENG 302, COM 110; EE Major	ECE 212, ECE 301, and ECE 302.	ECE 212, ECE 301, and ECE 302.	ECE 212, ECE 301, and ECE 302.	ECE 212, ECE 301, and ECE 302.

Class		Correct	Incorrect Listings			
			MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 383	Course Description	Introduction to Entrepreneurship and New Product Development (ECE383) is a 1-credit course that is taught in conjunction with the Engineering Entrepreneurs Program (EEP) sections of Senior Design, ECE482 and ECE483. This course is a full immersion engineering experience and has been holistically designed to integrate the skills and knowledge that students have learned in their engineering studies. Students serve as eTeam (entrepreneurship team) members on EEP Senior Design eTeams that are led by seniors completing their senior capstone design requirement. The eTeam members serve in capacities commensurate with their knowledge and skills. This methodology provides the students a more in-depth exposure to new product development and the engineering profession.	This course is part of the Engineering Entrepreneurs Program. Students work as team members on projects being led by seniors completing their senior capstone design. Students will be exposed to many areas of product development and will assist in the design and implementation of the prototype product.	This course is part of the Engineering Entrepreneurs Program. Students work as team members on projects being led by seniors completing their senior capstone design. Students will be exposed to many areas of product development and will assist in the design and implementation of the prototype product.	This course is part of the Engineering Entrepreneurs Program. Students work as team members on projects being led by seniors completing their senior capstone design. Students will be exposed to many areas of product development and will assist in the design and implementation of the prototype product.	
ECE 402	Prerequisites	ECE 301 and a course on probability or statistics (ST 371)	ECE 301 and ST 371; R: EE and CPE Majors Only.	ECE 301 and ST 371; R: EE and CPE Majors Only.	ECE 301 and ST 371; R: EE and CPE Majors Only.	ECE 301 and ST 371; R: EE and CPE Majors Only.
ECE 402	Course Description	Communications Engineering (ECE 402) This course provides an introduction to the theory and practice of digital communication systems. Topics covered include modulators, demodulators, transmitters, receivers. Bandwidth allocation and optimization is examined in time and frequency domains. MATLAB design projects expose students to a number of real-world issues in communications systems.	An overview of digital communications for wireline and wireless channels which focuses on reliable data transmission in the presence of bandwidth constraints and noise. The emphasis is on the unifying principles common to all communications systems, examples include digital telephony, compact discs, high-speed modems and satellite communications.	An overview of digital communications for wireline and wireless channels which focuses on reliable data transmission in the presence of bandwidth constraints and noise. The emphasis is on the unifying principles common to all communications systems, examples include digital telephony, compact discs, high-speed modems and satellite communications.	An overview of digital communications for wireline and wireless channels which focuses on reliable data transmission in the presence of bandwidth constraints and noise. The emphasis is on the unifying principles common to all communications systems, examples include digital telephony, compact discs, high-speed modems and satellite communications.	An overview of digital communications for wireline and wireless channels which focuses on reliable data transmission in the presence of bandwidth constraints and noise. The emphasis is on the unifying principles common to all communications systems, examples include digital telephony, compact discs, high-speed modems and satellite communications.
ECE 403	Course Description	Design and analysis of CMOS integrated circuits from single-transistor stages to operational amplifiers. Feedback in operational amplifier circuits, compensation, and stability.	Design and analysis of CMOS integrated circuits, from single transistor stages to operational amplifiers. Feedback in operational amplifier circuits, compensation and stability. ECE majors only.	Design and analysis of CMOS integrated circuits, from single transistor stages to operational amplifiers. Feedback in operational amplifier circuits, compensation and stability. ECE majors only.	Design and analysis of CMOS integrated circuits, from single transistor stages to operational amplifiers. Feedback in operational amplifier circuits, compensation and stability. ECE majors only.	
ECE 404	Course Title	Introduction to Solid State Devices	Introduction to Solid-State Devices			
ECE 404	Prerequisites	ECE 302 or E 304	ECE 302 or E 304; C: EE, CPE, NanoScience and Technology Majors Only.	ECE 302 or E 304; C: EE, CPE, NanoScience and Technology Majors Only.	ECE 302 or E 304; C: EE, CPE, NanoScience and Technology Majors Only.	ECE 302 or E 304; C: EE, CPE, NanoScience and Technology Majors Only.

Class		Correct	Incorrect Listings: MyPack Portal	Incorrect Listings: catalog.ncsu.edu	Incorrect Listings: acs.ncsu.edu	Incorrect Listings: Wolfware Classic
ECE 407	Course Description	This course focuses on engineering principles of computer communications and networking, including layering concepts, overview of protocols, architectures for local, metropolitan, and wide-area networks, routing protocols, internet operations, transport control and applications, emerging issues in computer networks.	This course focuses on engineering principles of computer communications and networking, including layering concepts, overview of protocols, architectures for local, metropolitan, and wide-area networks, routing protocols, internet operations, transport control and applications, emerging issues in computer networks. EE and CPE majors only.	This course focuses on engineering principles of computer communications and networking, including layering concepts, overview of protocols, architectures for local, metropolitan, and wide-area networks, routing protocols, internet operations, transport control and applications, emerging issues in computer networks. EE and CPE majors only.	This course focuses on engineering principles of computer communications and networking, including layering concepts, overview of protocols, architectures for local, metropolitan, and wide-area networks, routing protocols, internet operations, transport control and applications, emerging issues in computer networks. EE and CPE majors only.	This course focuses on engineering principles of computer communications and networking, including layering concepts, overview of protocols, architectures for local, metropolitan, and wide-area networks, routing protocols, internet operations, transport control and applications, emerging issues in computer networks. EE and CPE majors only.
ECE 420	Course Description	A study of applications of communications theory and signal processing to wireless systems. Topics include an introduction to information theory and coding, basics and channel models for wireless communications, and some important wireless communication techniques including spread-spectrum and OFDM. MATLAB exercises expose students to engineering considerations.	A study of applications of communication theory and signal processing to wireless systems. Topics include an introduction to information theory and coding, basics and channel models for wireless communications, and some important wireless communication techniques including spread-spectrum and OFDM. MATLAB exercises expose students to engineering considerations.	A study of applications of communication theory and signal processing to wireless systems. Topics include an introduction to information theory and coding, basics and channel models for wireless communications, and some important wireless communication techniques including spread-spectrum and OFDM. MATLAB exercises expose students to engineering considerations.	A study of applications of communication theory and signal processing to wireless systems. Topics include an introduction to information theory and coding, basics and channel models for wireless communications, and some important wireless communication techniques including spread-spectrum and OFDM. MATLAB exercises expose students to engineering considerations.	A study of applications of communication theory and signal processing to wireless systems. Topics include an introduction to information theory and coding, basics and channel models for wireless communications, and some important wireless communication techniques including spread-spectrum and OFDM. MATLAB exercises expose students to engineering considerations.
ECE 420	Prerequisites	ECE 402 and a course in probability or statistics	ECE 402	ECE 402	ECE 402	ECE 402
ECE 421	Course Description	This elective senior-level course in digital signal processing develops essential analysis and design tools required for a broad range of disciplines (e.g. communications, geophysics, medical image processing, etc.). This course is an introduction to graduate-level courses in communications and signal processing.	Concepts of electrical digital signal processing: Discrete-Time Signals and Systems, Z-Transform, Frequency Analysis of Signals and Systems, Digital Filter Design. Analog-to Digital-to-Analog Conversion, Discrete Fourier Transform.	Concepts of electrical digital signal processing: Discrete-Time Signals and Systems, Z-Transform, Frequency Analysis of Signals and Systems, Digital Filter Design. Analog-to Digital-to-Analog Conversion, Discrete Fourier Transform.	Concepts of electrical digital signal processing: Discrete-Time Signals and Systems, Z-Transform, Frequency Analysis of Signals and Systems, Digital Filter Design. Analog-to Digital-to-Analog Conversion, Discrete Fourier Transform.	
ECE 421	Prerequisites	ECE 301, MATLAB experience	ECE 301	ECE 301	ECE 301	ECE 301
ECE 422	Course Description	This course studies electromagnetic radiation, transmission lines, and antennas. Maxwell equations, wave equation, plane wave solutions, transmission lines, telegraph equation, terminations, reflection, matching, Smith chart, TEM, TE, and TM waves on parallel plate waveguide, survey of common transmission lines and waveguides, far-field solutions of Maxwell's equations for dipole antennas and dipole arrays.	Review of time-varying electromagnetic theory. A study of the analytical techniques and the characteristics of several useful transmission lines and antennas. Examples are coaxial lines, waveguides, microstrip, optical fibers and dipole, monopole and array antennas.	Review of time-varying electromagnetic theory. A study of the analytical techniques and the characteristics of several useful transmission lines and antennas. Examples are coaxial lines, waveguides, microstrip, optical fibers and dipole, monopole and array antennas.	Review of time-varying electromagnetic theory. A study of the analytical techniques and the characteristics of several useful transmission lines and antennas. Examples are coaxial lines, waveguides, microstrip, optical fibers and dipole, monopole and array antennas.	Review of time-varying electromagnetic theory. A study of the analytical techniques and the characteristics of several useful transmission lines and antennas. Examples are coaxial lines, waveguides, microstrip, optical fibers and dipole, monopole and array antennas.
ECE 423	Course Title	Optical Communications	Introduction to Photonics and Optical Communications			

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ECE 423	Course Description	This course examines optical communication systems, with an aim to produce students with a foundation and working knowledge of modern photonics concepts/terminology, major opto-electronic devices/components, optical communication systems, and device measurement/handling. As most electrical engineering students have minimal exposure to optics and photonics, we invoke a series of laboratory experiments to explore and demonstrate the most fundamental concepts and devices.	This course investigates photonic devices at the component level and examines the generation, propagation, and detection of light in the context of optical communication systems. Topics include the design of simple optical systems and focuses on the use of lasers, fiber optics, and photodetectors. The labs include building a Michelson interferometer, preparing and coupling light to an optical fiber, characterizing LEDs and laser diodes and making a fiber optical link.	This course investigates photonic devices at the component level and examines the generation, propagation, and detection of light in the context of optical communication systems. Topics include the design of simple optical systems and focuses on the use of lasers, fiber optics, and photodetectors. The labs include building a Michelson interferometer, preparing and coupling light to an optical fiber, characterizing LEDs and laser diodes and making a fiber optical link.	This course investigates photonic devices at the component level and examines the generation, propagation, and detection of light in the context of optical communication systems. Topics include the design of simple optical systems and focuses on the use of lasers, fiber optics, and photodetectors. The labs include building a Michelson interferometer, preparing and coupling light to an optical fiber, characterizing LEDs and laser diodes and making a fiber optical link.	This course investigates photonic devices at the component level and examines the generation, propagation, and detection of light in the context of optical communication systems. Topics include the design of simple optical systems and focuses on the use of lasers, fiber optics, and photodetectors. The labs include building a Michelson interferometer, preparing and coupling light to an optical fiber, characterizing LEDs and laser diodes and making a fiber optical link.
ECE 434	Prerequisites	ECE 302 or equivalent				ECE 314
ECE 442	Course Title	Introduction to IC technology and fabrication	Integrated Circuit Technology and Fabrication			
ECE 442	Prerequisites	ECE 404 or equivalent	ECE 404	ECE 404	ECE 404	**NOT LISTED**
ECE 445	Course Description	This course covers the fundamentals of nanotechnology and it's impact on nanoelectronics. Both silicon based nanoelectronics (MOSFETs) and carbon based nanoelectronics (nanotubes and molecular electronics) will be discussed. Emphasis will be placed on comparing the two approaches in terms of real world applications in logic and memory. Methods to create and measure nanopatterns and nanodevices will be presented. Limitations of various technologies will be discussed.	This course will discuss frontiers of nanoelectronics including fundamentals of silicon based devices and their impact on scaled logic and memory devices as well as organic based devices such as carbon nanotubes and molecular electronics. Additional topics include recent uses of polymer films for memory and photovoltaic applications, quantum confinements in 1D, 2D, and 3D, quantum dots, nanowires and resonant tunneling devices. Included are methods to create and measure nanostructures.	This course will discuss frontiers of nanoelectronics including fundamentals of silicon based devices and their impact on scaled logic and memory devices as well as organic based devices such as carbon nanotubes and molecular electronics. Additional topics include recent uses of polymer films for memory and photovoltaic applications, quantum confinements in 1D, 2D, and 3D, quantum dots, nanowires and resonant tunneling devices. Included are methods to create and measure nanostructures.	This course will discuss frontiers of nanoelectronics including fundamentals of silicon based devices and their impact on scaled logic and memory devices as well as organic based devices such as carbon nanotubes and molecular electronics. Additional topics include recent uses of polymer films for memory and photovoltaic applications, quantum confinements in 1D, 2D, and 3D, quantum dots, nanowires and resonant tunneling devices. Included are methods to create and measure nanostructures.	
ECE 451	Course Description	Long-distance transmission of electric power with emphasis on admittance and impedance modeling of components and systems, power flow studies and calculations, symmetrical and unsymmetrical fault calculations, economic operation of large-scale generation and transmission systems. Emphasis on applications of computer-based methods to power-system problems. Design project.	Long-distance transmission of electric power with emphasis on load flow, economic dispatch, fault calculations and system stability. Applications of digital computers to power-system problems. Major design project.	Long-distance transmission of electric power with emphasis on load flow, economic dispatch, fault calculations and system stability. Applications of digital computers to power-system problems. Major design project.	Long-distance transmission of electric power with emphasis on load flow, economic dispatch, fault calculations and system stability. Applications of digital computers to power-system problems. Major design project.	
ECE 451	Prerequisites	ECE 305 or equivalent	ECE 305	ECE 305	ECE 305	ECE 305

			Incorrect Listings			
Class		Correct	MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 452	Course Description	This course focuses on the new renewable energy based electric energy generation technologies and their integration into the power grid. The principals of new energy based distributed generation technologies: solar, wind, and fuel cells. Interconnection of distributed generation sources to power distribution grid. Economic aspects of distributed generation.	Principles and characteristics of renewable energy based electric power generation technologies such as photovoltaic systems, wind turbines, and fuel cells. Main system design issues. Integration of these energy sources into the power grid. Economics of distributed generation. Credit is not allowed for both ECE 452 and ECE 552.	Principles and characteristics of renewable energy based electric power generation technologies such as photovoltaic systems, wind turbines, and fuel cells. Main system design issues. Integration of these energy sources into the power grid. Economics of distributed generation. Credit is not allowed for both ECE 452 and ECE 552.	Principles and characteristics of renewable energy based electric power generation technologies such as photovoltaic systems, wind turbines, and fuel cells. Main system design issues. Integration of these energy sources into the power grid. Economics of distributed generation. Credit is not allowed for both ECE 452 and ECE 552.	
ECE 453	Prerequisites	None	A grade of C or better in ECE 305	A grade of C or better in ECE 305	A grade of C or better in ECE 305	ECE 305
ECE 455	Course Description	Techniques of computer control of industrial robots: interfacing with synchronous hardware including analog/digital and digital/analog converters, interfacing noise problems, control of electric and hydraulic actuators, kinematics and kinetics of robots, path control, force control, sensing including vision. Major design project.	Techniques of computer control of industrial robots: interfacing with synchronous hardware including analog/digital and digital/analog converters, interfacing noise problems, control of electric and hydraulic actuators, kinematics and kinetics of robots, path control, force control, sensing including vision. Major design project. EE, CPE, BME, JEM majors only.	Techniques of computer control of industrial robots: interfacing with synchronous hardware including analog/digital and digital/analog converters, interfacing noise problems, control of electric and hydraulic actuators, kinematics and kinetics of robots, path control, force control, sensing including vision. Major design project. EE, CPE, BME, JEM majors only.	Techniques of computer control of industrial robots: interfacing with synchronous hardware including analog/digital and digital/analog converters, interfacing noise problems, control of electric and hydraulic actuators, kinematics and kinetics of robots, path control, force control, sensing including vision. Major design project. EE, CPE, BME, JEM majors only.	
ECE 456	Prerequisites	ECE 301 and ECE435	ECE 435	ECE 435	ECE 435	ECE 435
ECE 461	Prerequisites	ECE 306	Grade of C- or better in ECE 306	Grade of C- or better in ECE 306	Grade of C- or better in ECE 306	Grade of C- or better in ECE 306
ECE 461	Course Description	Design and implementation of software for embedded computer systems. The students will learn about and use microcontrollers, C and assembly programming, real-time methods, computer architecture, interfacing, system development and communication networks. System performance is measured in terms of power consumption, speed and reliability. Efficient methods for project development and testing are emphasized.	Design and implementation of software for embedded computer systems. The students will learn to design systems using microcontrollers, C and assembly programming, real-time methods, computer architecture, interfacing system development and communication networks. System performance is measured in terms of power consumption, speed and reliability. Efficient methods for project development and testing are emphasized. Credit will not be awarded for both ECE 461 and ECE 561. Restricted to CPE and EE Majors.	Design and implementation of software for embedded computer systems. The students will learn to design systems using microcontrollers, C and assembly programming, real-time methods, computer architecture, interfacing system development and communication networks. System performance is measured in terms of power consumption, speed and reliability. Efficient methods for project development and testing are emphasized. Credit will not be awarded for both ECE 461 and ECE 561. Restricted to CPE and EE Majors.	Design and implementation of software for embedded computer systems. The students will learn to design systems using microcontrollers, C and assembly programming, real-time methods, computer architecture, interfacing system development and communication networks. System performance is measured in terms of power consumption, speed and reliability. Efficient methods for project development and testing are emphasized. Credit will not be awarded for both ECE 461 and ECE 561. Restricted to CPE and EE Majors.	

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ECE 463	Course Description	Advanced topics in microprocessor systems design. Measuring performance. Instruction-set architectures. Memory hierarchies, including caches, prefetching, program transformations for optimizing caches, and virtual memory. Processor architecture, including pipelining, hazards, branch prediction, static and dynamic scheduling, instruction-level parallelism, superscalar, and VLIW. Major projects.	Advanced topics in microprocessor systems design, including processor architectures, virtual-memory systems, multiprocessor systems, and single-chip microcomputers. Architectural examples include a variety of processors of current interest, both commercial and experimental. Major design project.	Advanced topics in microprocessor systems design, including processor architectures, virtual-memory systems, multiprocessor systems, and single-chip microcomputers. Architectural examples include a variety of processors of current interest, both commercial and experimental. Major design project.	Advanced topics in microprocessor systems design, including processor architectures, virtual-memory systems, multiprocessor systems, and single-chip microcomputers. Architectural examples include a variety of processors of current interest, both commercial and experimental. Major design project.	Advanced topics in microprocessor systems design, including processor architectures, virtual-memory systems, multiprocessor systems, and single-chip microcomputers. Architectural examples include a variety of processors of current interest, both commercial and experimental. Major design project.
ECE 464	Course Title	Digital ASIC Design	ASIC Design	ASIC Design	ASIC Design	ASIC Design
ECE 464	Prerequisites	ECE 212	ECE 406, ECE 302	ECE 406, ECE 302	ECE 406, ECE 302	ECE 406, ECE 302
ECE 466	Prerequisites	ECE 209 or competence in any machine language programming, CSC 316 or competence with programming data structures and programming ability in C or C++/Java.	ECE 306 and either ECE 309 or CSC 316.	ECE 306 and either ECE 309 or CSC 316.	ECE 306 and either ECE 309 or CSC 316.	ECE 306 and either ECE 309 or CSC 316.
ECE 468	Course Description	Conventional and emerging nano-manufacturing techniques and their applications in the fabrication of various structures and devices. Review of techniques for patterning, deposition, and etching of thin films including emerging techniques such as imprint and soft lithography and other unconventional techniques. Electronic and mechanical properties of 0 to 3-D nanostructures and their applications in nano-electronics, MEMS/NEMS devices, sensing, energy harvesting, storage, flexible electronics and nano-medicine. Credit for both ECE/CHE 468 and ECE/CHE 568 is not allowed.	Conventional and emerging nano-manufacturing techniques and their applications in the fabrication of various structures and devices. Review of techniques for patterning, deposition, and etching of thin films including emerging techniques such as an imprint and soft lithography and other unconventional techniques. Electronic and mechanical properties of 0 to 3-D nanostructures and their applications in nano-electronics, MEMS/NEMS devices, sensing, energy harvesting, storage, flexible electronics and nano-medicine. Credit for both ECE/CHE 468 and ECE/CHE 568 is not allowed.	Conventional and emerging nano-manufacturing techniques and their applications in the fabrication of various structures and devices. Review of techniques for patterning, deposition, and etching of thin films including emerging techniques such as an imprint and soft lithography and other unconventional techniques. Electronic and mechanical properties of 0 to 3-D nanostructures and their applications in nano-electronics, MEMS/NEMS devices, sensing, energy harvesting, storage, flexible electronics and nano-medicine. Credit for both ECE/CHE 468 and ECE/CHE 568 is not allowed.	Conventional and emerging nano-manufacturing techniques and their applications in the fabrication of various structures and devices. Review of techniques for patterning, deposition, and etching of thin films including emerging techniques such as an imprint and soft lithography and other unconventional techniques. Electronic and mechanical properties of 0 to 3-D nanostructures and their applications in nano-electronics, MEMS/NEMS devices, sensing, energy harvesting, storage, flexible electronics and nano-medicine. Credit for both ECE/CHE 468 and ECE/CHE 568 is not allowed.	
ECE 470	Prerequisites	ECE 407	ECE407 or CSC401	ECE407 or CSC401	ECE407 or CSC401	ECE407 or CSC401
ECE 470	Course Description	The course consists in a series of 10-11 lab exercises focused on teaching the students the practical aspects of configuring and trouble-shooting small networks. Theoretical presentation on essential and common Internet protocols are always coupled with practical lab exercises.	Introduction, Planning and Managing networking projects, networking elements-hardware, software, protocols, applications; TCP/IP, ATM, LAN emulation. Design and implementation of networks, measuring and assuring network and application performance;metrics, tools, quality of service. Network-based applications, Network management and security.	Introduction, Planning and Managing networking projects, networking elements-hardware, software, protocols, applications; TCP/IP, ATM, LAN emulation. Design and implementation of networks, measuring and assuring network and application performance;metrics, tools, quality of service. Network-based applications, Network management and security.	Introduction, Planning and Managing networking projects, networking elements-hardware, software, protocols, applications; TCP/IP, ATM, LAN emulation. Design and implementation of networks, measuring and assuring network and application performance;metrics, tools, quality of service. Network-based applications, Network management and security.	

			Incorrect Listings			
Class		**Correct**	**MyPack Portal**	**catalog.ncsu.edu**	**acs.ncsu.edu**	**Wolfware Classic**
ECE 482	Course Description	ECE482 is a 3-credit course and part of the two-semester senior capstone design sequence of ECE482 and ECE483 (second semester. The students working in eTeams (entrepreneurship teams) develop project design and implementation plans for their senior capstone design which they will implement the following semester/year in ECE483. The course requires students to develop an original idea for a prototype product, to perform high-level engineering design and analysis, to analyze prototype product's economic viability in the marketplace and to create financial projections for growth. This course is a full-immersion engineering experience and has been holistically designed to integrate the skills and knowledge that students have learned in their engineering studies. This methodology provides the students a more in-depth exposure to new product development and the engineering profession.	Applications of engineering, mathematics, basic sciences, finance, and business to the design and development of prototype engineering products. This course requires a complete written report and an end-of-course presentation. This is the first course in a two semester sequence. Students taking this course will implement their designed prototype in ECE 483: Senior Design Project in Electrical Engineering and Computer Engineering II-Engineering Entrepreneurs. Departmental approval required.		Applications of engineering, mathematics, basic sciences, finance, and business to the design and development of prototype engineering products. This course requires a complete written report and an end-of-course presentation. This is the first course in a two semester sequence. Students taking this course will implement their designed prototype in ECE 483: Senior Design Project in Electrical Engineering and Computer Engineering II-Engineering Entrepreneurs. Departmental approval required.	
ECE 482	Prerequisites	ECE383 (waived under special circumstances)	none	none	none	none

			Incorrect Listings			
Class		**Correct**	**MyPack Portal**	**catalog.ncsu.edu**	**acs.ncsu.edu**	**Wolfware Classic**
ECE 483	Course Description	ECE483 is the second in a two-semester senior capstone design sequence (ECE482, Engineering Entrepreneurship and New Product Development I being the first) and is a full-immersion, multidisciplinary, engineering experience that has been holistically designed to integrate the skills and knowledge that students have learned in their engineering studies. This methodology provides the students a more in-depth exposure to new product and business development and to the engineering profession. ECE483 is a 3-credit course where students, working in multidisciplinary eTeams (entrepreneurship teams), take their ideas and plans from ECE 482 and implement a prototype new technology-based product and its associated business plan. In addition to these, they are required to run their eTeams as virtual startup companies where they assume the roles of company founders and to recruit students from the 1-credit ECE383 course to participate on their eTeams as virtual employees. The students will further develop their ideas from ECE482 by performing detailed low-level engineering design, analysis, and implementation. The will also create a full business plan, a virtual company website, give several presentations, and compete in both the end-of-semester Plexus Presentation Competition and in the NC State Entrepreneurship Initiative s eGames.	Applications of engineering, science, management and entrepreneurship to the design, development and prototyping of new product ideas. Based on their own new product ideas, or those of others, students form and lead entrepreneurship teams (eTeams) to prototype these ideas. The students run their eTeams as 'virtual' startup companies where the seniors take on the executive roles. Joining them are students from other grade levels and disciplines throughout the university that agree to participate as eTeam members. Departmental approval required.	Applications of engineering, mathematics, basic sciences, finance, and business to the design and development of prototype engineering products. This course requires a complete written report and an end-of-course presentation. This is the first course in a two semester sequence. Students taking this course will implement their designed prototype in ECE 483: Senior Design Project in Electrical Engineering and Computer Engineering II-Engineering Entrepreneurs. Departmental approval required.	Applications of engineering, science, management and entrepreneurship to the design, development and prototyping of new product ideas. Based on their own new product ideas, or those of others, students form and lead entrepreneurship teams (eTeams) to prototype these ideas. The students run their eTeams as 'virtual' startup companies where the seniors take on the executive roles. Joining them are students from other grade levels and disciplines throughout the university that agree to participate as eTeam members. Departmental approval required.	
ECE 483	Prerequisites	ECE482, ECE383 (ECE383 is waived under special circumstances) and 2 400 level courses in their specific discipline.	ECE 301, ECE 302, ECE 303, and any two ECE specialization courses.	ECE 301, ECE 302, ECE 303, and any two ECE specialization courses.	ECE 301, ECE 302, ECE 303, and any two ECE specialization courses.	ECE 301, ECE 302, ECE 303, and any two ECE specialization courses.

Class		Correct	Incorrect Listings MyPack Portal	catalog.ncsu.edu	acs.ncsu.edu	Wolfware Classic
ECE 484	Course Description	This course, ECE484, is the first of a two course sequence that fulfills the capstone requirement for Electrical (EE) and Computer (CPE) Engineering students. ECE484, prepares the students for planning and completing their Senior Design Projects in the second course, ECE485. In the first third of the semester, students are instructed in Product Life Cycle, Business Models, Market Research, Engineering Research, Project Planning and Team Building through lectures and in-class workshops. In the last two thirds of the course, students apply this knowledge to developing a project proposal and completing a system level design for their project. Each project team will complete a comprehensive project plan for implementing their Senior Design Project that is approved by sponsors, advisors and course instructors.	Applications of engineering and basic sciences to the total design of electrical and/or computer engineering circuits and systems. Consideration of the design process including concept and feasibility study, systems design, detailed design, project management, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Supported with introduction to a parallel functions impacting engineering design process to including: industrial design, finance, operations, etc. EE and CPE Majors only.	Applications of engineering and basic sciences to the total design of electrical and/or computer engineering circuits and systems. Consideration of the design process including concept and feasibility study, systems design, detailed design, project management, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Supported with introduction to a parallel functions impacting engineering design process to including: industrial design, finance, operations, etc. EE and CPE Majors only.	Applications of engineering and basic sciences to the total design of electrical and/or computer engineering circuits and systems. Consideration of the design process including concept and feasibility study, systems design, detailed design, project management, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Supported with introduction to a parallel functions impacting engineering design process to including: industrial design, finance, operations, etc. EE and CPE Majors only.	
ECE 484	Prerequisites	ECE380, ECE 301, ECE 302	none	ECE 380 and ECE 301 and ECE 302 and ENG 331; Coreq: One 400-level ECE Elective.	ECE 380 and ECE 301 and ECE 302 and ENG 331; Coreq: One 400-level ECE Elective.	
ECE 485	Course Description	This course, ECE485, is the second of a two course sequence that fulfills the capstone requirement for Electrical (EE) and Computer (CPE) Engineering students. ECE485 is the implementation and documentation of the project proposal completed and approved in the first course, ECE484. Student project teams will complete the building of a working prototype and delivery of a final documentation package that would allow another student to build and maintain a similar system. Each team will be required to give a least two project demonstrations as defined in their project plan and will be required to give oral and written project reports throughout the semester.	Applications of engineering and basic sciences to the total design of electrical engineering circuits and systems. Consideration of the design process including feasibility study, preliminary design detail, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Complete written and oral engineering report required. EE and CPE majors only.	Applications of engineering and basic sciences to the total design of electrical engineering circuits and systems. Consideration of the design process including feasibility study, preliminary design detail, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Complete written and oral engineering report required. EE and CPE majors only.	Applications of engineering and basic sciences to the total design of electrical engineering circuits and systems. Consideration of the design process including feasibility study, preliminary design detail, cost effectiveness, along with development and evaluation of a prototype accomplished through design-team project activity. Complete written and oral engineering report required. EE and CPE majors only.	

NC STATE UNIVERSITY

College of Sciences
Department of Biological Sciences

Campus Box 7614
112 Derieux Place
Raleigh, NC 27695-7614

To: Mike Mullen, Vice Chancellor and Dean for Academic and Student Affairs

From: Jane Lubischer, Assistant Department Head for Undergraduate Programs, Department of Biological Sciences

Subject: Minor Action to update our curricula to include new courses and new course prefixes

Date: 4 April 2016

Proposed effective date: when approved

Proposed changes and justification
The proposed changes are all driven by changes in course prefixes (BIO to AEC) or new course offerings.

Curricula	Requirement terms	Revision
17BIOSCEEC (subplan in 17BIOSCBS)	2014 Summer 2 (3-50) 2013 Summer 1 (3-40) 2011 Summer 1 (3-40)	Ecology requirement should now include AEC 360 as well as BIO 360 and PB 360
17BIOSCEEC	2014 Summer 2 (3-60) 2013 Summer 1 (3-45) 2011 Summer 1 (3-45)	Field Ecology Methods requirement should now include AEC 460 and BIO 460
17ZOOBS	2014 Summer 2 (4-35) 2013 Summer 1 (4-35) 2011 Summer 1 (4-35)	Ecology requirement should now include AEC 360 as well as BIO 360 and PB 360

List	Curricula affected	Add courses
Additional Science & Math	17BIOSCBS 17ZOOBS	AEC 360, 450, 501, 515 BIO 478 FW 444 MA 331
Life Science Electives (4-10)	17BIOBA	AEC 360, 460 BIO 434, 456, 478 FW 444 MA 331

SIGNATURES (AS REQUIRED):

	4/4/16
Head, Department of Biological Sciences	Date
	4/5/16
Chair, College Courses & Curric. Committee	Date
	4/5/16
Dean, College of Sciences	Date
Chair, Univ Courses & Curric. Committee	Date
	EFFECTIVE DATE:
Dean, Academic and Student Affairs	Date

Proposed Semester-by-Semester Display (Format A)

PROPOSED EFFECTIVE SEMESTER: **Summer 2015**

DEGREE TITLE: B.A. in Biological Sciences

CONCENTRATION TITLE: N/A

FRESHMAN YEAR

Fall Semester	*Credits*		*Spring Semester*	*Credits*
BIO 181 Intro Bio: Ecol, Evol, Biodiv	4		BIO 183 Intro Bio: Cell & Molecular	4
CH 101 Chemistry-A Molecular Sci.	3		[2]Organic Chemistry and Lab	4
CH 102 General Chemistry Lab	1		[4]ENG 101	4
LSC 101 Critical & Creative Life Sci	2		GEP Elective*	3
[1]Calculus	3		GEP PE/Healthy Living Requirement*	1
[3]LSC 103 Exploring Life Sci Disciplines	1			
	Total: 14			*Total: 16*

SOPHOMORE YEAR

Fall Semester	*Credit*		*Spring Semester*	*Credit*
[5]Statistics	3		[7]Life Science Elective	3
[6]Advanced Communication Requirement	3		[7]Life Science Elective	4
[7]Life Science	3		[8]Cross Discipline Elective	3
[8]Cross Discipline Elective	3		[8]Cross Discipline Elective	3
GEP Elective*	3		[9]Free Elective	3
	Total: 15			*Total:* 16

JUNIOR YEAR

Fall Semester	*Credit*		*Spring Semester*	*Credit*
[10]PY 131 Conceptual Physics	4		[7]Life Science Elective	3
[11]Experiential Learning Requirement	3		[7]Life Science Elective	3
[8]Cross Discipline Elective	3		[8]Cross Discipline Elective	3
GEP Elective*	3		[6]Advanced Communication Requirement	3
[9]Free Elective	3		GEP Elective*	3
	Total: 16			*Total:* 15

SENIOR YEAR

Fall Semester	*Credit*		*Spring Semester*	*Credit*
[7]Life Science Elective	3		[7]Life Science Elective	3
[7]Life Science Elective	3		[8]Cross Discipline Elective	3
[8]Cross Discipline Elective	3		[9]Free Elective	3
GEP Elective*	3		[9]Free Elective	3
GEP PE/Healthy Living Requirement*	1		GEP Elective*	3
	Total: 13			*Total:* 15

Minimum Credit Hours Required for Graduation: 120

Footnotes

A grade of C- or better is required in the following courses:

LSC 101 Critical and Creative Thinking in the Life Sciences
LSC 103 Exploring Life Science Disciplines
BIO 181 Introductory Biology: Ecology, Evolution, and Biodiversity
BIO 183 Introductory Biology: Cell and Molecular Biology
CH 101 Chemistry – A Molecular Science
CH 102 General Chemistry Lab
ENG 101 Academic Writing & Research
[3]Calculus

IMPORTANT NOTES:

- Students should check with their adviser before electing to take any course with S/U grading if it is normally graded A-F. Up to 12 hours of Free Electives can be taken S/U.
- Student are responsible for determining the pre-requisites for any course they are interested in taking.
- Students interested in graduate school or professional school should check the courses required for admission to the programs to which they plan to apply.
- The B.A. in Biological Sciences cannot be used as a second major for students already in a degree program in the life sciences (including the B.S. in Biological Sciences, Biochemistry, Genetics, Microbiology, Nutrition Sciences, Plant Biology, or Zoology).

[1]*Calculus alternatives (take one course)*

Students interested in taking more than one semester of calculus should start with either MA 131 or MA 141, because MA 121 does not serve as a pre-requisite for either MA 231 or MA 241. Additional semesters of calculus can be used toward Life Science Electives requirements.

MA 121 Elements of Calculus
MA 131 Calculus for Life and Management Sciences A (first of two-semester series)
MA 141 Calculus I (first of three-semester series)

[2]*Organic chemistry alternatives (take one)*

CH 220 is a single semester organic chemistry course, with lab included. CH 221 is the first of a two semester sequence (with CH 223) in organic chemistry, with CH 222 serving as the lab. Students earning a B.A. in Biological Sciences can take either CH 220 or CH 221 plus CH 222 to meet their organic chemistry requirement. Students who wish to take two semesters of organic chemistry should NOT start with CH 220, but should take CH 221/222 and CH 223/224.

[3]*LSC 103 Exploring Life Science Disciplines*

LSC 103 deals with transition-to-college issues while exploring degree program options within the life sciences. If a student enters the B.A. in Biological Sciences after taking a similar course in another program, that course can be substituted for LSC 103 on the degree audit, an action initiated by the academic advisor.

[4]*ENG 101 and the General Education Program (GEP)*
All NC State students take 26 credit hours as part of the General Education Program (GEP). This includes ENG 101, which can be taken either the first or second semester of the first year, and LS 101, which meets 2 credit hours of the Interdisciplinary Perspectives GEP requirement. For their GEP Elective(s) in the first year, students are encouraged to explore the GEP course lists *(http://oucc.ncsu.edu/gep-courses)* for Interdisciplinary Perspectives, Humanities, or Social Sciences and choose a course in which they are interested.

[5]*Statistics alternatives (take one course)*
ST 101
ST 311
ST/BUS 350

[6]*Advanced Communication Requirement (take one course from each list, minimum 6 cr hrs)*
Communication courses
COM 110 Public Speaking
COM 112 Interpersonal Communication
COM 201 Introduction to Persuasion Theory
COM 202 Small Group Communication
COM 203 Theory and Practice of Acting
COM 211 Argumentation and Advocacy
COM 213 Oral Interpretation of Literature
COM 226 Introduction to Public Relations
COM 240 Communication Inquiry

Advanced Writing courses
ENG 201 Writing Literary Analysis
ENG 214 Introduction to Editing
ENG 232 Literature and Medicine
ENG 287 Explorations in Creative Writing
ENG 288 Fiction Writing
ENG 289 Poetry Writing
ENG 292 Writing About Film
ENG 316 Principles of News and Article Writing
ENG 323 Writing in the Rhetorical Tradition
ENG 331 Communication for Engineering and Technology (Junior standing required)
ENG 332 Communication for Business and Management (Junior standing required)
ENG 333 Communication for Science and Research (Junior standing required)
ENG 381 Creative Nonfiction Writing Workshop
ENG 422 Writing Theory and the Writing Process

[7]*Life Science Electives (take a total of 25 credit hours)*
A total of 25 credit hours must be taken from the courses listed below. At least 19 of these hours must be at the 300 level or higher. With adviser approval, students can use a total of up to 3 hours of learning experience (e.g., BIO 492, 493) or honors research experience toward Life Science Electives or toward [8]Cross Discipline Electives. Some experimental courses (295, 495, and 592) and graduate (500-) level courses may also be used as Life Science Electives, with

adviser and departmental approval. Students should check the prerequisites and restrictions on courses in which they are interested.

Microbiology and Biochemistry courses
- BCH 220 Role of Biotechnology in Society
- BCH 351 or BCH 451 Biochemistry
- BCH 452 Introductory Biochemistry Lab
- BCH 453 Biochemistry of Gene Expression
- BCH 454 Advanced Biochemistry Laboratory
- BCH 455 Proteins and Molecular Mechanisms
- BIT/MB 210 Phage Hunters
- BIT/MB 211 Phage Genomics
- CH 223 Organic Chemistry II
- CH 224 Organic Chemistry II Lab
- MB 200 Microbiology and World Affairs
- MB 320 Fundamentals of Microbial Cell Culture
- MB 325 Fundamentals of Microbial Cell Biotransformations
- MB 351 General Microbiology
- MB 352 General Microbiology Laboratory
- MB 354 Inquiry-Guided Microbiology Lab
- MB 360 Scientific Inquiry in Microbiology: At the Bench
- MB 405 Food Microbiology
- MB 406 Food Microbiology Lab
- MB 411 Medical Microbiology
- MB 412 Medical Microbiology Laboratory
- MB 414 Microbial Metabolic Regulation
- MB 420 Fundamentals of Microbial Cell Biotransformations
- MB 435 Bacterial Pathogenesis
- MB 451 Microbial Diversity
- MB 452 Microbial Diversity Lab
- MB 455 Microbial Biotechnology
- MB 461 Molecular Virology
- SSC 332 Environmental Soil Microbiology

Molecular, Genetic, Cellular, and Developmental Biology courses
- BIO 267 Research in the Life Sciences I: Research Skills
- BIO 269 Research in the Life Sciences II: Guided Research
- BIO 361 Developmental Biology
- BIO 370 Developmental Anatomy of the Vertebrates
- BIO 375 Developmental Anatomy Lab
- BIO 405 Functional Histology
- BIO/PB 414 Cell Biology
- BIT 200 Early Research in Biotechnology
- BIT 210 Phage Hunters
- BIT 211 Phage Genomics
- BIT 410 Manipulation of Recombinant DNA
- BIT 462 Gene Expression Analysis: Microarrays

BIT 464 Protein Purification
BIT 465 Real-time PCR Techniques
BIT 466 Animal Cell Culture Techniques
BIT 467 PCR and DNA Fingerprinting
BIT 468 Genome Mapping
BIT 471 RNA Interference and Model Organisms
BIT 473 Experimental Analysis of Protein-Protein Interactions
BIT 474 Plant Genetic Engineering
BIT 476 Applied Bioinformatics
BIT 481 Plant Tissue Culture and Transformation
GN 301 Genetics in Human Affairs -*or*- ANS 215 Basic Agricultural Genetics
GN 311 Principles of Genetics
GN 312 Elementary Genetics Lab
GN 421 Molecular Genetics
GN 423 Population, Quantitative, and Evolutionary Genetics
GN 425 Advanced Genetics Laboratory
GN 427 Introductory Bioinformatics
GN 434 Genes and Development
GN 441 Human and Biomedical Genetics
GN 451 Genome Science
GN 461 Advanced Bioinformatics
MB 461 Molecular Virology
PB 476 Applied Bioinformatics
PB 480 Introduction to Plant Biotechnology
PB 481 Plant Tissue Culture and Transformation

Physiology, Neurobiology, and Behavioral Biology courses
AEC 441 Biology of Fishes
AEC 442 Biology of Fishes Lab
ANS 205 Physiology of Domestic Animals
ANS 206 Anatomy of Domestic Animals Lab
ANS 220 Reproduction and Lactation in Domestic Animals
ANS 221 Reproduction and Lactation in Domestic Animals Lab
ANS 225 Principles of Animal Nutrition or ANS 230 Nutrition of Domestic Animals
ANS 231 Nutrition of Domestic Animals Lab
ANS 330 Laboratory Animal Science
ANS/PO/NTR 415 Comparative Nutrition
BIO 212 (Basic Human Anat & Phys) -*or*- 250 (Animal Anatomy & Physiology)
BIO 233 Human-Animal Interactions (IP)
ENT 201 (Insects and People) -*or*- 207 (Insects and Human Disease; IP)
BIO 410 Animal Behavior
BIO 421 Advanced Human Anatomy and Physiology
BIO 422 Biological Clocks
BIO 424 Endocrinology
BIO 434 Hormones and Behavior
BIO 426 Advanced Human Anatomy and Physiology Lab
BIO 444 The Biology of Love and Sex

BIO 456 Epigenetics, Development, and Disease
BSC 478 Research Fundamentals in Biological Sciences
BIO 488 Neurobiology
ENT 305 Introduction to Forensic Entomology
MB 441 Immunology
NTR 301 Introduction to Human Nutrition
NTR 330 Public Health Nutrition
NTR 401 Advanced Nutrition and Metabolism
NTR 410 Maternal and Infant Nutrition
NTR 419 Human Nutrition and Chronic Disease
NTR 421 Life Cycle Nutrition
PB 215 Medicinal Plants
PB 321 Introduction to Whole Plant Physiology
PB 421 Plant Physiology
PO 405 Avian Physiology
TOX 201 Poisons, People and the Environment

Ecology, Evolution, Biodiversity, and Conservation Biology courses
AEC 380 Water Resources (IP)
AEC 400 Applied Ecology
AEC 420 Introduction to Fisheries Science
AEC 423 Introduction to Fisheries Sciences Laboratory
AEC/BIO 460 Field Ecology and Methods
BIO 227 Understanding Structural Diversity through Biological Illustration (IP)
BIO 315 Parasitology
BIO 317 Primate Ecology and Evolution
BIO/PB 330 Evolutionary Biology
BIO 333 Captive Animal Biology
BIO 350 Animal Phylogeny and Diversity
BIO 353 Wildlife Management
AEC/BIO/PB 360 Ecology
BIO 402 Invertebrate Biology
BIO 419 Limnology
BIO 425 General Entomology
CH/MEA 323 Earth System Chemistry
COM 436 Environmental Communication
CS 230 Introduction to Agroecology
CS 430 Advanced Agroecology
ENT 212 Basic Entomology
ENT 305 Introduction to Forensic Entomology
ENT 402 Forest Entomology
ENT 425 General Entomology
ES 100 Introduction to Environmental Sciences
ES 200 Climate Change and Sustainability
ES 300 Energy and Environment
ES 400 Analysis of Environmental Issues
FOR 260 Forest Ecology

FOR 261 Forest Communities
FW 444 Mammalogy
FW 465 African Ecology and Conservation
MA 331 Differential Equations for the Life Sciences
MEA 200 Introduction to Oceanography
MEA 210 Oceanography Lab
MEA 220 Marine Biology
MEA 250 Introduction to Coastal Environments
MEA 251 Introduction to Coastal Environments Laboratory
MEA 300 Environmental Geology
MEA/CH 323 Earth System Chemistry
MEA 369 Terrestrial Paleontology
MEA 384 Paleoecology
MEA/BIO 449 Principles of Biological Oceanography
NR 303 Humans and the Environment
NR 406 Conservation of Biological Diversity
PB 200 (Plant Life) -*or*- 250 (Plant Biology)
PB 213 Plants and Civilization
PB 215 Medicinal Plants
PB 219 Plants in Folklore, Myth, & Religion
PB 220 Local Flora
PB 277 Space Biology
PB/BIO 360 Ecology
PB 403 Systematic Botany
PB 405 Wetland Flora
PP 315 Principles of Plant Pathology
SSC 201 Soil Science Laboratory
TOX 201 Poisons, People and the Environment

[8]*Cross Discipline Electives (take 21 credit hours)*
Courses can be selected from a wide range of fields outside of the life sciences (below). At least 15 of these hours must be at the 300 level or higher and the rest must be at the 200 level or higher. With adviser approval, students can use a total of up to 3 hours of learning experience (e.g., BIO 492, 493) or honors research experience toward [7]Life Science Electives or toward Cross Discipline Electives. Some experimental courses (295, 495, and 592) and graduate (500-) level courses may also be used as Cross Discipline Electives, with adviser and program approval. Students should check the prerequisites and restrictions on courses in which they are interested. For example, most ELM courses are restricted to Elementary Education majors and therefore would be appropriate only to those with a second major in Elementary Education.

ADN >199 (Art and Design)
AES >199 (Agricultural and Environmental Systems)
AFS >199 (Africana Studies)
ANS >199 (Animal Science)
ANT >199 (Anthropology)
ARC >199 (Architecture)

ARE	>199	(Agricultural and Resource Economics)
ARS	>199	(Arts Studies)
BAE	>199	(Biological & Agricultural Engineering)
BBS	>199	(Bioprocessing)
BEC	>199	(Biomanufacturing Training & Education Center)
BIT	>199	(Biotechnology)
BMA	>199	(Biomathematics)
BME	>199	(Biomedical Engineering)
BUS	>199	(Business Management)
CE	>199	(Civil Engineering)
CH	>199	(Chemistry)
CHE	>199	(Chemical Engineering)
CL	>199	(Comparative Literature)
COM	>199	(Communication)
CS	>199	(Crop Science)
CSC	>199	(Computer Science)
DS	>199	(Design Studies)
EAC	>199	(Adult and Higher Education)
EC	>199	(Economics)
ECD	>199	(Counselor Education)
ECE	>199	(Electrical & Computer Engineering)
ECI	>199	(Curriculum, Instruction and Counselor Education)
ED	>199	(Education)
EDP	>199	(Educational Psychology)
EI	>199	(Entrepreneurship Initiative)
ELM	>199	(Elementary Education)
ELP	>199	(Educational Leadership and Policy Studies)
EMS	>199	(Mathematics, Science and Technology Education)
ENG	>199	(English)
ENT	>199	(Entomology)
ET	>199	(Environmental Technology)
FL*	>199	(Foreign Languages and Literatures)
FM	>199	(Feed Mill)
FOR	>199	(Forestry)
FS	>199	(Food Science)
FTD	>199	(Fashion and Textile Design)
FW	>199	(Fisheries and Wildlife Science)
GC	>199	(Graphic Communications)
GD	>199	(Graphic Design)
GEO	>199	(Geography)
GPH	>199	(Global Public Health)
GTI	>199	(Global Training Initiative)
HA	>199	(History of Art)
HI	>199	(History)
HS	>199	(Horticulture Science)
ID	>199	(Industrial Design)
IDS	>199	(Interdisciplinary Studies)

IS	>199	(International Studies)
LAR	>199	(Landscape Architecture)
LOG	>199	(Logic)
LPS	>199	(Leadership in the Public Sector)
MA	>199	(Mathematics)
MAE	>199	(Mechanical & Aerospace Engineering)
MEA	>199	(Marine, Earth, and Atmospheric Sciences)
MIE	>199	(Management, Innovation and Entrepreneurship)
MSE	>199	(Materials Science & Engineering)
MT	>199	(Medical Textiles)
MUS	>199	(Music)
NE	>199	(Nuclear Engineering)
NPS	>199	(Nonprofit Studies)
PA	>199	(Public Administration)
PCC	>199	(Polymer and Color Chemistry)
PHI	>199	(Philosophy)
PO	>199	(Poultry Science)
PP	>199	(Plant Pathology)
PRT	>199	(Parks, Recreation and Tourism Management)
PS	>199	(Political Science)
PSE	>199	(Paper Science Engineering)
PSY	>199	(Psychology)
PY	>199	(Physics)
REL	>199	(Religion)
SMT	>199	(Sustainable Materials Technology)
SOC	>199	(Sociology)
SSC	>199	(Soil Science)
ST	>199	(Statistics)
STS	>199	(Science, Technology, and Society)
SW	>199	(Social Work)
TC	>199	(Textile Chemistry)
TDE	>199	(Tech Engr & Des Educ)
TE	>199	(Textile Engineering)
TED	>199	(Technology Education)
THE	>199	(Theatre)
TMS	>199	(Textile Materials Science)
TOX	>199	(Toxicology)
TT	>199	(Textile Technology)
WGS	>199	(Women's and Gender Studies)
WPS	>199	(Wood and Paper Science)

[9]*Free Electives (take 12 credit hours)*
These electives cannot be remedial nor can they be taken at an elementary level after you have taken comparable coursework at a more advanced level.

[10]*Physics Alternatives*
PY 211 is a suitable substitute for PY 131.

[11]*Experiential Learning Requirement*
Experiential Learning opportunities can take many forms, but should be relevant to a possible career path for the student. The out-of-class experience to be undertaken to meet this requirement must be approved in advance by the adviser and program director. It is the responsibility of the student to identify an opportunity and to make arrangements with a supervisor to pursue that opportunity.

***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.

Introduction to Writing: ENG 101 (4 credit hours with a C- or better)
Students must complete ENG 101 during their freshman year.
Mathematical Sciences (6 credit hours – one course with MA or ST prefix)
In this degree program, this GEP requirement is met through the Major course requirements.
Natural Sciences (7 credit hours – include one laboratory course or course with a lab)
In this degree program, this GEP requirement is met through the Major course requirements.
Humanities (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
Social Sciences (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
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.
Additional Breadth - (3 credit hours)
Choose from the University approved GEP Humanities course list or the GEP Social Sciences course list or the GEP Visual & Performing Arts course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
Interdisciplinary Perspectives (5 credit hours)
In this degree program, 2 credit hours are met through a Major course requirement. For the remaining 3 credit hours, choose from the University approved GEP Interdisciplinary Perspectives course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.

The following **Co-Requisites** must be satisfied to complete GEP requirements:
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.
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.
Foreign Language proficiency - Proficiency at the FL_102 level is required for graduation.

PROPOSED CURRICULUM REQUIREMENTS

Format B – GEP 2009

Degree Title: Bachelor of Arts in Biological Sciences (17BIOBA)
Current Degree Key: none
Effective Date: Summer 2015

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**
Required Courses		
†LSC 101 Critical & Creative Thinking in the Life Sciences	2	Interdisciplinary Perspectives (2 hours)
†LSC 103 Exploring Life Science Disciplines	1	
†BIO 181 Introductory Biology I	4	Natural Sciences (4 hours)
†BIO 183 Introductory Biology II	4	Natural Sciences (3 hours)
†CH 101 Chemistry – A Molecular Science	3	
†CH 102 General Chemistry Lab	1	
[2]CH 220/222 Introductory Organic Chemistry and Lab (or CH 221/222)	4	
†[1]MA 121 Elements of Calculus (or MA 131 or MA 141)	3	Mathematical Sciences (3 hours)
[10]PY 131 Conceptual Physics (or PY 133 or PY 211)	4	
[5]ST 101 Introduction to Statistics (or ST 311 or ST/BUS 350)	3	Mathematical Sciences (3 hours)
†*C- or better required in these courses*		
[6]Advanced Communication Requirement	6	Communication in the Major requirement
[7]Life Science Electives (at least 19 hours at the 300 level or higher)	25	
[8]Cross Discipline Electives (at least 15 hours at the 300 level or higher)	21	
[11]Experiential Learning Requirement	3	
Free Electives: [9]Free Electives	12	
Total credit hours under Major Field of Study: ***Minimum 27 hours required in program area.***	96 hours	
COLLEGE REQUIREMENTS:		
Orientation Course(s): requirement met by Exploring Life Science Disciplines (above)		
Total credit hours under College Requirements:	0	

NCSU GENERAL EDUCATION PROGRAM REQUIREMENTS

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.
Specific courses should not be listed in any of the fields below other than ENG 101.

At least one of the following must be listed:

1 Choose course(s) from the University Approved GEP course list for this category.
2 Minimum requirements are satisfied by Major/College course requirements.
3 Major/College course requirement satisfies **X** credit hrs of this requirement. Remaining hours required must be chosen from the University Approved GEP course list for the category.
4 Co-requisite is satisfied by a Major/College course requirement.
5 Choose course(s) from the University Approved GEP course lists for the Humanities/ Social Sciences/ Visual & Performing Arts.
6 Choose course(s) from the University Approved GEP course lists for Natural Sciences/Mathematical Sciences.

General Education Program Requirements: *Minimum 39-40 hrs*	*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)** *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.*	X	*Minimum requirements are satisfied by Major course requirements.*
Natural Sciences *(7 credits)* **(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.*	X	*Minimum requirements are satisfied by Major course requirements.*
English 101 **(C- or better required)** *(4 credits)*	4	ENG 101
Humanities *(6 credits)* **(Courses from *two different* disciplines)** *Course(s) used to satisfy this requirement can also satisfy either the Global Knowledge or U.S. Diversity co-requisites.*	6	*Choose courses from the University-approved GEP course list for Humanities.*
Social Sciences *(6 credits)* **(Courses from *two different* disciplines)** *Course(s) used to satisfy this requirement can also satisfy either the Global Knowledge or U.S. Diversity co-requisites.*	6	*Choose courses from the University-approved GEP course list for Social Sciences.*
Additional Breadth (AB) *(3 credits)* **(Choose approach that is *different* from the approach of the Major)** *An AB course cannot be double-counted except in satisfying the Global Knowledge or U.S. Diversity co-requisites.*	3	*Choose course(s) from the University-approved GEP course lists for the Humanities/Soc Sciences/Visual & Performing Arts*
Interdisciplinary Perspectives *(5 credits)* *Course(s) used to satisfy this requirement can also satisfy either the Global Knowledge or U.S. Diversity co-requisites.*	3	*Choose course from the University-approved GEP course list for Interdisciplinary Persp. LS 101 meets the other 2 credit hours of this requirement.*
Physical Education/Healthy Living *(2 credits)* **(Including one *Fitness and Wellness* course)**	2	*Choose courses from the University-approved GEP course list for Physical Ed/Healthy Living.*
Total credit hours needed to complete GEP that are not satisfied as part of the Major/College requirements.	24 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	*Choose course from the University-approved GEP course list for U.S. Diversity.*
Global Knowledge co-requisite (GK)	n/a	*Choose course from the University-approved GEP course list for Global Knowledge.*

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.	120 total hours	

Biological Sciences (BS): Ecology, Evolution, & Conservation Biology (17BIOSCBS-17BIOSCEEC)

FRESHMAN YEAR

Fall Semester	Credit		Spring Semester	Credit
LSC 101 Critical Creative Thinking Life Sci*	2		BIO 183 Intro Bio: Cellular & Molecular	4
BIO 181 Intro Bio: Ecol, Evol, Biodiversity	4		CH 221 Organic Chemistry I	3
CH 101 Chemistry-A Molecular Science	3		CH 222 Organic Chemistry I Lab	1
CH 102 General Chemistry Lab	1		ENG 101 Academic Writing & Research*	4
MA 131[1] Calculus Life & Mgmt Sci. A	3		MA 231[1] Calculus Life & Mgmt Sci. B	3
LSC 103 Exploring Opportunities Life Sci	1			
HES_*** Health & Exercise Studies Course*	1			**15**
	15			

SOPHOMORE YEAR

Fall Semester	Credit		Spring Semester	Credit
Physiology Requirement[2]	3		GN 311 Principles of Genetics	4
CH 223 Organic Chemistry II	3		GN 312 Elementary Genetics Lab	1
CH 224 Organic Chemistry II Lab	1		CH 201 Chemistry-A Quantitative Sci.	3
Free Elective[3] **OR** ~~BIO/PB 360~~ Ecology[11]	3-4		CH 202 Quantitative Chemistry Lab	1
GEP Social Sciences Requirement*	3		Free Elective[3] **OR** ~~BIO/PB 360~~ Ecology[11]	3-4
GEP Humanities Requirement*	3		GEP Social Sciences Requirement*	3
	16-17			**15-16**

JUNIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
AEC 460 Field Ecology & Methods	4		Learning Experience Elective[7]	3
Advanced Writing Requirement[5]	4		PY 212[6] College Physics II	4
PY 211[6] College Physics I	3		BIO/PB 330 Evolutionary Biology	3
ST 311 Introduction to Statistics	3		EEC Elective[8]	3
HES_*** Health & Exercise Studies Course*	1		Organismal Biology Elective[9]	3
	15			**16**

SENIOR YEAR

Fall Semester	Credit		Spring Semester	Credit
NR 406 Conserv Biological Diversity	3		EEC Elective[8]	3
EEC Elective[8]	3		EEC Elective[8]	3
EEC Elective[8]	3		EEC Elective[8]	3
GEP Humanities Requirement*	3		GEP Additional Breadth Requirement*	3
Free Elective[3]	3		Free Elective[3]	3
	15			**15**

Minimum Credit Hours Required for Graduation:	**123**

EEC Footnotes:

A grade of C- or better is required in the following courses:

AEC 460 Field Ecology and Methods
BIO 181 Introductory Biology: Ecology, Evolution, and Biodiversity
BIO 183 Introductory Biology: Cellular and Molecular Biology
BIO/PB 330 Evolutionary Biology
AEC/BIO/PB 360 Ecology
GN 311 Principles of Genetics
GN 312 Elementary Genetics Lab
NR 406 Conservation of Biological Diversity

Physiology Requirement[2]
MA 131 Calculus for Life and Management Sciences A
MA 231 Calculus for Life and Management Sciences B
CH 101/102 Chemistry – A Molecular Science & Lab
CH 221/222 Organic Chemistry I & Lab
CH 223/224 Organic Chemistry II & Lab
CH 201/202 Chemistry - A Quantitative Science & Lab
PY 211 College Physics I
PY 212 College Physics II
ST 311 Introduction to Statistics
EEC Electives[8]

Organismal Biology Elective[9]

Advanced Writing Requirement[5]
ENG 101 Academic Writing & Research

Taking courses for credit only (S/U): PE, Free Electives and courses offered only for S/U credit can be applied to graduation requirements. Students should check with their adviser before electing to take any course that normally is graded A-F as an S/U course.

[1] *Mathematics Alternatives*
MA 141 and MA 241 is a suitable substitute for MA 131 and MA 231.

[2] *Physiology Requirement (take one of the following options)*
BIO 250 Animal Anatomy & Physiology
PB 321 Introduction to Whole Plant Physiology
PB 421 Plant Physiology

[3] *Free Electives (take 9 credit hours)*
These electives cannot be remedial nor can they be taken at an elementary level after you have taken comparable coursework at a more advanced level. Students interested in graduate school or professional school should check the courses required for admission to the programs to which they plan to apply.

[5] *Advanced Writing Requirement (take one course)*
Cannot be double-counted for a GEP requirement.

COM 211 Argumentation and Advocacy
ENG 201 Writing Literary Analysis
ENG 214 Introduction to Editing
ENG 232 Literature and Medicine
ENG 233 The Literature of Agriculture
ENG 287 Explorations in Creative Writing
ENG 288 Fiction Writing
ENG 289 Poetry Writing
ENG 292 Writing about Film

ENG 316 Principles of News and Article Writing
ENG 323 Writing in the Rhetorical Tradition
ENG 331 Communication for Engineering and Technology (Junior standing)
ENG 332 Communication for Business and Management (Junior standing)
ENG 333 Communication for Science and Research (Junior standing)
ENG 381 Creative Nonfiction Writing Workshop (ENG 215, 287, 288, or 289 required)

ENG 388 Intermediate Fiction Writing Workshop (a "B" or better in ENG 288 required)
ENG 389 Intermediate Poetry Writing Workshop (a "B" or better in ENG 289 required)

ENG 416 Advanced News and Article Writing (ENG 215 required)
ENG 417 Editorial and Opinion Writing (ENG 214 and 215 required)
ENG 422 Writing Theory and the Writing Process
ENG 425 Analysis of Scientific and Technical Writing (ENG 314, 331, 332 or 333 required)
ENG 426 Analyzing Style

[6] *Physics Alternatives*
PY 205 and PY 208 can be substitutes for PY 211 and PY 212. PY 205 and PY 208 are calculus-based and require that you take the 40 series of Mathematics[1] (MA 141 and MA 241). PY 201 and PY 202 would also be a suitable substitute for PY 211 and PY 212. PY 201 and PY 202 are calculus-based, require the 40 series of Mathematics[1], and are restricted to students in PAMS.

[7] *Learning Experience Elective (take <u>one</u> course for 3 credit hours)*
Learning experience in an appropriate area, with prior approval by faculty adviser, prospective supervisor, and departmental undergraduate coordinator. Contact and arrangements with prospective supervisors is the responsibility of the student.

BIO 499 Honors Project, Part 2 (requires BIO 498)
BIO 492 External Learning Experience
BIO 493 Special Problems in Biological Sciences

[8] *EEC Electives (take 18 credit hours)*
Select from the following list. Students can use up to 3 hours of BIO 444 or BIO 492 or BIO 493 or ALS 498/499 (must complete both) toward EEC Electives.

* indicates that this course also serves as a Plant Co-requisite [10]

AEC 400 Applied Ecology
BCH 451 Principles of Biochemistry
BIO 267 Research in the Life Sciences I: Research Skills
BIO 315 General Parasitology
BIO 317 Primate Ecology and Evolution
BIO 333 Captive Animal Biology
BIO 350 Animal Phylogeny and Diversity
BIO/FW 353 Wildlife Management

BIO 402 Invertebrate Biology
BIO 410 Introduction to Animal Behavior
AEC 419 Limnology
AEC 420 Introduction to Fisheries Science
BIO 440 The Human Animal: An Evolutionary Perspective
AEC 441 Biology of Fishes
AEC 442 Biology of Fishes Laboratory
BIO 485 Capstone Course in Ecology, Evolution, and Conservation Biology
BMA 567 Modeling of Biological Systems
COM 436 Environmental Communication
CS 230 Introduction to Agroecology*
CS 430 Advanced Agroecology*
ENT/BIO 425 General Entomology
ENT/ZO 502 Insect Diversity
ENT/ZO 509 Biology of Aquatic Insects
ENT 520 Insect Behavior
FW 444 or ZO 544 Mammalogy
GIS 410 OR 510 Introduction to Geographic Information Systems
GIS 530 Principles of Geospatial Information Science
GIS 550 Geospatial Data Structures and Web Services
GN 423 Population, Quantitative and Evolutionary Genetics
MA 242 Calculus III
MA 440 Game Theory
MB 451 Microbial Diversity
MB 452 Microbial Diversity Lab
MEA/BIO 220 Marine Biology

PB 250 Plant Biology*
PB 403 Systematic Botany*
PB 565 Plant Community Ecology*
PP 222 Kingdom of Fungi*
SSC 361 Role of Soils in Environmental Management
SSC 470 Wetland Soils
SSC 562 Environmental Applications Of Soil Science
AEC 501 Ornithology
ZO 542 Herpetology

[9] *Organismal Biology Elective (take 3 credit hours)*

* indicates that this course also serves as a Plant Co-requisite [10]

BIO 315 General Parasitology
BIO 350 Animal Phylogeny and Diversity
BIO 402 Invertebrate Biology
BIO/ENT 425 General Entomology
AEC 441 Biology of Fishes
AEC 442 Biology of Fishes Laboratory
FOR 339 Dendrology*
MB 351 General Microbiology
MB 352 OR 354 General Microbiology Laboratory
PB 220 Local Flora*
PB 222 Kingdom of Fungi*
PB 250 Plant Biology*
PB 403 Systematic Botany*
PB 405 Wetland Flora*
ZO 501 Ornithology
ZO 542 Herpetology
ZO 544 Mammalogy

[10] *Plant Co-Requirement (take <u>one</u> course)*

At least one course must be taken from the following list. This course can also be used to meet one other requirement in the major (e.g., the Physiology Requirement[2], a Free Elective[3], an EEC Elective[8], or the Organismal Biology Elective[9]).

CS 230 Introduction to Agroecology
CS 430 Advanced Agroecology
FOR 339 Dendrology
PB 220 Local Flora
PB 222 Kingdom of Fungi
PB 250 Plant Biology
PB 321 Introduction to Whole Plant Physiology
PB 403 Systematic Botany
PB 405 Wetland Flora
PB 565 Plant Community Ecology

[11] *Ecology Requirement*

The required Ecology course is now offered as AEC 360 or PB 360; it was previously also offered as BIO 360. Any of these courses can be used to meet this requirement

***<u>General Education Program (GEP) requirements and GEP Footnotes:</u>**
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 athttp://oucc.dasa.ncsu.edu/general-education-program/.

Introduction to Writing: ENG 101 (4 credit hours with a C- or better) *Must be taken during the first year.*
<u>Mathematical Sciences</u> (6 credit hours – one course with MA or ST prefix)
In EEC, this GEP requirement is met through Major course requirements.

Natural Sciences (7 credit hours – include one laboratory course or course with a lab)
In EEC, this GEP requirement is met through Major course requirements.
Humanities (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Humanities course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
Social Sciences (6 credit hours selected from two different disciplines/course prefixes)
Choose from the University approved GEP Social Sciences course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
Health & Exercise Studies (2 credit hours – at least one 100-level Fitness and Wellness Course)
Choose from the University approved GEP Physical Education/Healthy Living course list.
Additional Breadth - (3 credit hours)
Choose from the University approved GEP Humanities course list or the GEP Social Sciences course list or the GEP Visual & Performing Arts course list. Some courses on this list will also meet the U.S. Diversity or Global Knowledge co-requisites.
Interdisciplinary Perspectives (5 credit hours)
In EEC, this GEP requirement is met through Major course requirements.

The following **Co-Requisites** must be satisfied to complete the General Education Program requirements:
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.
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.
Foreign Language proficiency - Proficiency at the FL_102 level is required for graduation.

Curriculum Revision: B.S. in Zoology (17ZOOBS)

Justification

Beginning Fall 2014, incoming FR intending to major in any one of seven life sciences degree programs, including Zoology, will be admitted into the new Life Sciences First Year Program. These students will start their studies with a common first year curriculum as part of the 11LSFY or 17LSFY plan. As part of this new program, we have developed two new courses that need to be incorporated into the degree audits of the participating programs. Some programs also require adjustments to their 8-semester displays. These changes do not involve a change in total credit hours.

This action addresses the 17ZOOBS curriculum (B.S. in Zoology). Separate actions are being submitted for each of the participating curricula (11BIOCHBS, 11NTSBS, and 11PBBS in CALS; 17BIOSCBS, 17GNBS, 17MBIOBS, and 17ZOOBS in COS).

Proposed Revisions with Reasons

1. Add LSC 101 to Fall semester of the first year and include it on the list of courses that require a C- or better. This new course will meet 2 credits of the GEP Interdisciplinary Perspectives requirement, replacing the GEP IP Requirement from SR Fall semester. The 3 cr GEP Humanities Requirement currently sitting in the first year is moved to SR Fall semester.

2. Replace the Exploring Life Sciences requirement with LSC 103 Exploring Opportunities in the Life Sciences. This course will serve as the college orientation course.

3. Move ENG 101 to Spring semester of the first year and move the Health and Exercise Studies requirement to Fall semester of the first year to balance the credit hours in each of the first two semesters.

4. Replace ALS 498/499 with BIO 498/499 in Footnotes 6 (Zoology Electives) and 7 (Additional Science and Math Electives).

5. Add the following courses to the Zoology Electives[6] list: AEC 400, BIO 380, and FW 444.

These changes are highlighted in Format A and Format B.

Statement of Program Objectives (no changes)

Catalog Description (no changes)

Number of Majors and Graduates (BS in Zoology)

Graduates			Majors	
2012-13	64		F 2013	297
2011-12	76		F 2012	316
2010-11	68		F 2011	314
2009-10	78		F 2010	309
2008-09	62		F 2009	362
2007-08	62		F 2008	366
2006-07	74		F 2007	349
2005-06	62		F 2006	339

Statement on Other Departments Likely to be Affected

With the proposed changes, more students in LSFY programs will take ENG 101 during spring semester. We consulted with Registration & Records and with the Department of English (Coordinator of ENG 101) and received the following responses:

Susan Miller-Cochran skmille4@ncsu.edu 11:31 AM (9 hours ago)

to Louis, me, Susan, Michelle, Sherwood

If this isn't a problem for registration, it shouldn't be a problem for us. The problem we generally encounter is that folks want 101 in the fall, so this is a wonderfully refreshing change. :-)

We like to keep individual sections of 101 varied in disciplinary representation, but this should not be a problem.

Susan

On Mar 20, 2014, at 11:29 AM, Louis Hunt <ldhunt@ncsu.edu> wrote:

Jane,

I don't think it would be a problem to exclude all first-year Life Science students from the fall ENG 101 distribution. In fact, I suspect there might be advantages to being more deliberate in assigning who gets ENG 101 in fall, versus spring.

We "batch" enroll all of the ENG 101 sections for the fall, so excluding ~200 of these students will simply mean that ~200 students from other majors will get those seats. We'll just need some additional details about building schedules for those students.

Louis

Proposed Semester-by-Semester Display (Format A) – changes are highlighted

PROPOSED EFFECTIVE SEMESTER: **7/2014**

DEGREE TITLE: B.S. in Zoology (no concentration)

CURRENT DEGREE KEY: 17ZOOBS

FRESHMAN YEAR

Fall Semester	*Credits*		*Spring Semester*	*Credits*
LSC 101 Critical Creative Thinking Life Sci*	2		BIO 183 Intro Bio: Cellular & Molecular	4
BIO 181 Intro Bio: Ecol, Evol, Biodiv	4		CH 221 Organic Chemistry I	3
CH 101 Chemistry-A Molecular Science	3		CH 222 Organic Chemistry I Lab	1
CH 102 General Chemistry Lab	1		ENG 101 Academic Writing & Research*	4
MA 131[1] Calculus Life & Mgmt Sci. A	3		MA 231[1] Calculus Life & Mgmt Sci. B	3
LSC 103 Exploring Opportunities Life Sci*	1			
GEP Health and Exercise Studies Req*	1			
	Total: 15			*Total:* 15

SOPHOMORE YEAR

Fall Semester	*Credits*		*Spring Semester*	*Credits*
BIO 250 Animal Anatomy & Physiology	4		~~BIO/PB 360~~ Ecology Requirement[8]	4
CH 223 Organic Chemistry II	3		GN 311 Principles of Genetics	4
CH 224 Organic Chemistry II Lab	1		CH 201 Chemistry-A Quantitative Sci.	3
ST 311 Introduction to Statistics or ST 371 Intro to Probability & Distrib Theory	3		CH 202 Quantitative Chemistry Lab	1
			GEP Interdisciplinary Perspectives Reqt*	3
GEP Humanities Requirement*	3			
GEP Health and Exercise Studies Req*	1			
	Total: 15			*Total:* 15

JUNIOR YEAR

Fall Semester	*Credits*		*Spring Semester*	*Credits*
Animal Phylogeny Requirement[2]	4		Advanced Writing Requirement[5]	3
Free Elective[3]	3		Zoology Elective[6]	3
PY 211[4] College Physics I	4		PY 212[4] College Physics II	4
GEP Social Sciences Requirement*	3		GEP Social Sciences Requirement*	3
			Free Elective[3]	3
	Total: 14			*Total:* 16

SENIOR YEAR

Fall Semester	*Credits*		*Spring Semester*	*Credits*
Zoology Elective[6]	3		Zoology Elective[6]	3
Zoology Elective[6]	3		Sci & Math Elective[7]	3
Sci & Math Elective[7]	3		Free Elective[7]	3
Sci & Math Elective[7]	3		GEP Additional Breadth Requirement*	3
GEP Humanities Requirement*	3		Free Elective[3]	3
	Total: 15			*Total:* 15

Minimum Credit Hours Required for Graduation: 120†

Footnotes:

†A grade of C- or better is required in the following courses:

LSC 101 Critical and Creative Thinking in the Life Sciences
BIO 181 Intro Bio: Ecology, Evolution, and Biodiversity
BIO 183 Intro Bio: Cellular and Molecular Biology
BIO 250 Animal Anatomy and Physiology
~~BIO/PB 360~~ Ecology Requirement[8]
Animal Phylogeny Requirement[2]
Zoology Electives[6]
GN 311 Principles of Genetics
CH 101/102 Chemistry – A Molecular Science & Lab
CH 221/222 Organic Chemistry I & Lab
CH 223/224 Organic Chemistry II & Lab
CH 201/202 Chemistry – A Quantitative Science & Lab
ENG 101 Academic Writing & Research
Advanced Writing Requirement[5]
MA 131 Calculus for Life and Management Sciences A
MA 231 Calculus for Life and Management Sciences B
PY 211 College Physics I
PY 212 College Physics I
ST 311 Introduction to Statistics or ST 371 Intro to Probability & Distrib Theory

Taking courses for credit only (S/U): only PE, Free Electives and courses offered only for S/U credit can be applied to graduation requirements. Students should check with their adviser before electing to take any course that normally is graded A-F as an S/U course.

NOTE 1 to Reg & Rec: Can you please fix our Zoology footnotes so that there are returns/space lines between them? After the list of C-wall courses, the "Taking courses for …" statement follows (no return) immediately after, then there is no separation between that statement and the first numbered footnote, nor are there any returns/spacing lines until footnote 5. It is very difficult to read.

NOTE 2 to Reg & Rec: The only other change to the Zoology footnotes is to add the following:

[8] *Ecology Requirement*
Ecology is offered as AEC 360 and as PB 360. Formerly, it was offered as BIO 360. Any of these three can be used to meet this requirement.

NC STATE UNIVERSITY

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2500 Stinson Drive, Campus Box 7909
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919.515.5876 direct line
919.515.5115 fax
lisa.marshall@ncsu.edu

MEMORANDUM

Date: April 20, 2016

To: Registration & Records

From: Ms. Lisa Marshall, Nuclear Engineering Course & Curriculum Committee

L Marshall

Re: Addition of NE 521

Please add NE 521 to the Approved Electives list for 14NEBS. If further information is needed, do hesitate to contact me.

Thanks,

Chair, College Courses& Curricula Committee — Date

Chair, University Courses& Curricula Committee — Date

Dean of Undergraduate Academic Programs — Date

North Carolina State University is a land-grant university and a constituent institution of The University of North Carolina

Office of Undergraduate Programs

NC STATE UNIVERSITY

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MEMO

Date: April 7, 2016

To: Dr. Barbara Kirby, Associate Vice Provost, Academic Programs & Services

From: Dr. Lee Craig, Department Head, Economics

Subject: Minor Adjustment to B.S in Economics 8-Semester Display

We propose to adjust the B.S. in Economics 8-semester display as listed below. EC 451, Introduction to Econometrics, is a course most appropriate for students in their junior year. This would move EC 451 to the junior year- spring semester, and an advised elective to the senior year- fall semester.

DEGREE TITLE: B. S. Economics (ECS)

FRESHMAN YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
ENG 101 Comp & Rhetoric [1]	4	EC 205 Fundamental of Econ [5]	3
Humanities [6]	3		4
Math 131 or 141[2]	3	Natural Science [4]	3
Natural Science [4]	4	Humanities[6]	4
Physical Education[18]	1	Math 132 and 231OR 241 [2]	1
		Physical Education[3]	
	Total: 15		*Total:* 15

SOPHOMORE YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
EC 301 Intermediate Microeconomics	3	ST/BUS 350 Econ Bus Stat [10]	3
	3	EC 302 Intermediate Macroeconomics	3
MA 114 or 242[7]	4		3
Natural Science [4]	3	Natural Science [4]	3
Social Science [8]	3	Additional Breadth Elective [9]	3
Interdisciplinary Perspective[15]		Free Elective [11]	
	*Total:*16		*Total:* 15

JUNIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
EC 351 Quant Analysis for Economics	3	**EC 451 Intro to Econometrics**	**3**
	3		
Quantitative Elective [12]	3	Economics Electives [14]	3
Advanced Writing [13]	3	**Advised Electives** [16]	**6 3**
Economics Elective [14]	2-3	Free Elective [11]	6
Interdisciplinary Perspective[15]			
	Total: 14-15		*Total:* 15

SENIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
~~**EC 451 Intro to Econometrics**~~	~~**3**~~	EC 490 Research Seminar in Economics [17]	3
			6
Economics Electives [14]	6	Advised Elective [16]	5-6
Advised Electives [16]	~~**3**~~ **6**	Free Electives[11]	
Free Elective [11]	3		
	Total: 15		*Total:* 14-15

Minimum Credit Hours Required for Graduation: 120

PROPOSED EFFECTIVE: IMMEDIATELY

RECOMMENDED BY:

HEAD, DEPARTMENT/PROGRAM — DATE 4/12/16

ENDORSED BY:

CHAIR, COLLEGE COURSES & CURRICULA COMMITTEE — DATE 4/19/16

COLLEGE DEAN — DATE 4/19/16

APPROVED BY:

CHAIR, UNIVERSITY COURSES & CURRICULA COMMITTEE — DATE

CHAIR, COUNCIL ON UNDERGRADUATE EDUCATION — DATE

DEAN OF UNDERGRADUATE ACADEMIC PROGRAMS — DATE

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Office of Undergraduate Programs

NC STATE UNIVERSITY

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Date: April 13, 2016

To: Dr. Barbara Kirby, Associate Vice Provost, Academic Programs & Services

From: Dr. Tamah Morant, Associate Dean for Undergraduate Programs, Management

Subject: Minor Adjustment to the Course Catalog Listing of Planned PCOM Course Offerings

Please accept our request to modify the catalog as listed below to correctly reflect when we plan to offer our courses. We hope this update will assist students with their academic plan of work.

Course	Course Title	Current Catalog Listing	Proposed Catalog Listing
EC 413	Competition, Monopoly and Public Policy	Fall	Fall alternate years
EC 437	Health Economics	Fall	Fall alternate years
EC 451	Introduction to Econometrics	Fall	Fall and Spring
EC 474	Economics of Financial Institutions and Markets	Spring	Spring alternate years
EC 480	Introduction to Economic Research	Spring	Fall
ACC 411	Business Valuation	Fall, Spring Summer	Fall and Spring
ACC 420	Strategic Management Accounting	Fall, Spring Summer	Fall and Spring
ACC 451	Internal Auditing	Not listed	Fall and Spring
MIE 335	Organizational Behavior	Fall and Spring	Spring alternate years
MIE 410	Business Opportunity Analysis	No listing	Fall and Spring
MIE 411	Managing the Growth Venture	No listing	Spring alternate years
MIE 412	Finance and Accounting for Entrepreneurs	Spring	Fall and Spring
MIE 413	New Venture Planning	Spring	Fall and Spring
MIE 416	The Legal Dynamics of Entrepreneurship	No listing	Fall
MIE 418	Social Entrepreneurship	No listing	Fall and Spring
MIE 432	Labor and Employee Relations	Fall and Spring	Spring
MIE 435	Leadership and Management	Fall and Spring	Spring alternate years
MIE 436	Training and Development	Fall and Spring	Fall
MIE 439	HR Practicum	Spring	Fall
BUS 458	Analytics: From Data to Decisions	Spring	Fall and Spring
BUS 461	Services Marketing	Spring	Delete from catalog

PROPOSED EFFECTIVE: IMMEDIATELY

ENDORSED BY:

4/19/16

CHAIR, COLLEGE COURSES & CURRICULA COMMITTEE DATE

4/19/16

COLLEGE DEAN DATE

APPROVED BY:

CHAIR, UNIVERSITY COURSES & CURRICULA COMMITTEE DATE

CHAIR, COUNCIL ON UNDERGRADUATE EDUCATION DATE

DEAN OF UNDERGRADUATE ACADEMIC PROGRAMS DATE