CHANGE UNDERGRADUATE PROGRAM FORM

1. General Information

College:	Agriculture and School of Human Environmental Sciences	Department:	Natural Resources and Environmental Science
Current Major Name:	Natural Resources and Environmental Science	*Proposed Major Name:*	*(No change proposed)*
Current Degree Title:	B.S., Natural Resources and Environmental Science	*Proposed Degree Title:*	*(No change proposed)*
Formal Option(s):	N/A	*Proposed Formal Option(s):*	_____
Specialty Field w/in Formal Option:	N/A	*Proposed Specialty Field w/in Formal Options:*	_____
Date of Contact with Associate Provost for Academic Administration[1]:	6/29/12		
Bulletin (yr & pgs):	2012-2013, pgs. 107-109	CIP Code[1]:	03.0101
Today's Date:	9/28/2012		
Accrediting Agency (if applicable):	N/A		
Requested Effective Date:	☒ Semester following approval.	OR	☐ Specific Date[2]: _____
Dept. Contact Person:	Dr. Mary Arthur , Steering Committee Chair	Phone:	257-2852
Email:	marthur@uky.edu		

[1] Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the (APAA) can provide you with that during the contact.
[2] Program changes are typically made effective for the semester following approval. No program will be made effective until all approvals are received.

2. General Education Curriculum for this Program:

The new General Education curriculum is comprised of the equivalent of 30 credit hours of course work. There are, however, some courses that exceed 3 credits & this would result in more than 30 credits in some majors.

- There is no foreign language requirement for the new Gen Ed curriculum.
- There is no General Education Electives requirement.

Please list the courses/credit hours currently used to fulfill the University Studies/General Education curriculum:

_____

Please identify below the suggested courses/credit hours to fulfill the General Education curriculum.

General Education Area	Course	Credit Hrs
I. Intellectual Inquiry (one course in each area)		
Arts and Creativity	*no suggested course*	*3*
Humanities	*no suggested course*	*3*
Social Sciences	*no suggested course*	*3*
Natural/Physical/Mathematical	✓*CHE 105/111*	*5*
II. Composition and Communication		
Composition and Communication I	✓CIS or WRD 110	3
Composition and Communication II	✓CIS or WRD 111	3
III. Quantitative Reasoning (one course in each area)		

Quantitative Foundations[3]	✓ ✓ MA 123 or MA 113 or MA 137 ✓	4
Statistical Inferential Reasoning	STA 210 ✓	3
IV. Citizenship (one course in each area)		
Community, Culture and Citizenship in the USA	GEN 100	3
Global Dynamics	no suggested course	3
	Total General Education Hours	33

3. Explain whether the proposed changes to the program (as described in sections 4 to 12) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).

NRES is an interdisciplinary degree with multiple courses required from other departments. These departments include Agricultural Economics, Forestry, Landscape Architecture, Plant and Soil Sciences, and Earth and Environmental Science.

4. Explain how satisfaction of the University Graduation Writing Requirement will be changed.

Current	*Proposed*
☐ Standard University course offering.	☐ *Standard University course offering.*
List: _____	*List:* _____
☒ Specific course – NRE 301	☒ *Specific course) – NRE 201* just submitted

[3] Note that MA 109 is NOT approved as a Quantitative Foundations course. Students in a major requiring calculus will use a calculus course (MA 113, 123, 137 or 138) while students not requiring calculus should take MA 111, PHI 120 or another approved course.

list:	*list:*

5. List any changes to college-level requirements that must be satisfied.

Current	*Proposed*
☒ Standard college requirement.	☒ *Standard college requirement.*
List: GEN 100	*List: GEN 100*
☐ Specific required course – list: _____	☐ *Specific course – list:* _____

6. List pre-major or pre-professional course requirements that will change, including credit hours.

Current	*Proposed*
BIO 150, 3 hours	*BIO 148, 3 hours*
BIO 152, 3 hours	*BIO 152, 3 hours*
CHE 105, 4 hours	*CHE 105, 4 hours*
CHE 111, 1 hour	*CHE 111, 1 hour*
CHE 107, 3 hours	*ECO 201, 3 hours*
CHE 113, 2 hours	*EES 220, 4 hours*
ECO 201, 3 hours	*MA 123 or MA 113 or MA 137, 4 hours*
GLY 220, 4 hours	*STA 210, 3 hours*
MA 123, 4 hours	*Total pre-major requirements = 25 hours*
STA 291, 3 hours	
Total pre-major requirements = 30 hours	

7. List the major's course requirements that will change, including credit hours.

Current	*Proposed*
AEC 424 Principles of Environmental Law (3)	*AEC 424 Principles of Environmental Law (3)*
AEC 445G Introduction to Resource and Environmental Economics (3)	*AEC 445G Introduction to Resource and Environmental Economics (3)*
FOR 230 Conservation Biology (3)	*FOR 230 Conservation Biology (3)*
FOR 240 Forestry and Natural Resource Ethics (2)	*FOR 240 Forestry and Natural Resource Ethics or PHI 336 Environmental Ethics (2-3)*
FOR 325 Economic Botany: Plants and Human Affairs (3)	*FOR 325 Economic Botany: Plants and Human Affairs (3)*
FOR 340 Forest Ecology (4)	*FOR 340 Forest Ecology (4)*
FOR 460 Forest Hydrology and Watershed Management or GLY/EES 385 Hydrology and Water Resources (3-4)	*FOR 460 Forest Hydrology and Watershed Management or EES 385 Hydrology and Water Resources (3-4)*
NRE 301 Natural Resources and Environmental Science (3)	*NRE 201 Natural Resources and Environmental Science (3)* In process
NRE 320 Natural Resource and Environmental Analysis (3)	*NRE 320 Natural Resource and Environmental Analysis (3)*
NRE 381 Natural Resource and Environmental Policy Analysis (3)	*NRE 381 Natural Resource and Environmental Policy Analysis (3)*
NRE 395 Independent Study in Natural Resources and Environmental Science or NRE 399 Experiential Education in Natural Resources and Environmental Science (3)	*NRE 395* Independent Study in Natural Resources and Environmental Science or NRE NRE 399* Experiential Education in Natural Resources and Environmental Science (3)*
NRE 471 Senior Problem in Natural Resources and Environmental Science (3)	*NRE 471 Senior Problem in Natural Resources and Environmental Science (4)*
NRE 555 Introductory Geospatial Applications for Land Analysis (3)	*NRE 355 Introductory Geospatial Applications for Land Analysis (3)*
PLS 366 Fundamentals of Soil Science (4)	*PLS 366 Fundamentals of Soil Science (4)*
Total major requirements = 43-44 hours	*Total major requirements = 44-46 hours*
	**Requires an approved Learning Contract*

	through the Stuckert Career Center prior to registration.

8. Does the pgm require a minor AND does the proposed change affect the required minor? ☐ N/A
☐ Yes ☒ No

If "Yes," indicate current courses and proposed changes below.

Current	*Proposed*
———	———

9. Does the proposed change affect any option(s)? ☐ N/A
☒ Yes ☐ No

If "Yes," indicate current courses and proposed changes below, including credit hours, and also specialties and subspecialties, if any.

Current	*Proposed*
Analytical Skill Development and Environmental Systems Emphasis Areas: Students must take nine hour in one of four Analytical Skill Development Areas and nine hours in one of seven Environmental System Emphasis Areas. A total of seven hours of 300-level and above courses must be completed between the Analytical Skill Development and section and the Environmental System Emphasis area. Depending on the student's interest and career goals they will select from a list of courses in specific topic areas. Courses taken to complete the Analytical Skill Development section may not count towards the Environmental System Emphasis Area and vice versa.	***Analytical Skill Development (ASD) and Environmental System Emphasis Areas(ESEA): Students must select one area within Analytical Skill Development and one Environmental System Emphasis Area and complete nine hours of course work in each area from the list***

Analytical Skill Development Area

Economic and Policy Analysis

AEC 483 Regional Economics (3)

AEC 532 Agricultural and Food Policy (3)

AEC/NRE 545 Resource and Environmental Economics (3)

CLD/SOC 360 Environmental Sociology (3)

FOR 280, Forest Policy (3)

FOR 320 Forest Valuation and Economics

GEO 235 Environmental Management and Policy (3)

GEO 455 Globalization and the Changing World Economy (3)

PS 489G The Analysis of Public Policy (3)

Field and Laboratory Analysis of Ecosystems

BIO/NRE 420G Taxonomy of Vascular Plants (4)

BIO 452G Laboratory in Ecology (2)

ENT/FOR 402 Forest Entomology (3)

FOR 219 Dendrology (4)

FOR 250 Statistics and Measurements 1 (3)

PLS 396 Soil Judging (3)

PLS/NRE 455G Wetland Delineation (3)

PLS 573 Soil Morphology and Classification (3)

PLS 597 Special Topics in Plant and Soil Science (3)

of courses provided below. Students must select from the courses listed under each ASD and ESEA but may request one (1) substitute course per ASD and ESEA, subject to approval by both their academic advisor and the DUS. For the 18 hours of ASD and ESEA coursework, all classes must be 200-level or above and at least twelve (12) credit hours must be in 300-level or above courses. Classes taken to complete the ASD requirement cannot count towards the ESEA course requirement and vice versa. Research experiences, internships, or apprenticeships cannot be used to satisfy the ASD and ESEA requirements, including

Geospatial Analysis

BAE 538 GIS Applications in Water Resources (3)

FOR 200 Basics of Geospatial Technology (2)

FOR 330 GIS and Spatial Analysis (3)

GEO 309 Introduction to GIS (3)

GEO 409 Advanced GIS (3)

GEO 415 Map Interpretation (3)

LA 856/NRE 556 Contemporary Geospatial Applications for Land Analysis (3)

Individualized Analytical Skill Development

A written proposal must be submitted to the NRES Steering Committee to approve courses for the Individualized Analytical Skill Development.

Environmental System Emphasis Area

Conservation Biology

BIO/PLS 210 The Life Processes of Plants (3)

BIO 325 Ecology (4)

BIO 361 Ecology of the Kentucky Flora and Vegetation (3)

BIO 375 Behavioral Ecology and Sociobiology (3)

BIO/NRE 420G Taxonomy of Vascular

individualized options.

Analytical Skill Development Areas:

(1) Economic and Policy Analysis

AEC 309 International Agriculture, World Food Needs, and U.S. Trade in Agricultural Products (3)

AEC 483 Regional Economics (3)

AEC 532 Agricultural and Food Policy (3)

AEC/NRE 545 Resource and Environmental Economics (3)

CLD/SOC 360 Environmental Sociology (3)

FOR 320 Forest Valuation and Economics (3)

FOR 400 Human Dimensions of Forestry and Natural Resources (3)

GEO 235 Environmental Management and Policy (3)

GEO 455 Globalization and the Changing World Economy (3)

(2) Field and Laboratory Analysis of Ecosystems

BIO/NRE 420G Taxonomy of Vascular Plants (4)

ENT 300 General Entomology (3)

ENT/FOR 402 Forest Entomology (3)

FOR 219 Dendrology (4)

FOR 250 Statistics and Measurements 1 (3)

PLS 396 Soil Judging (3)

Plants (4)	***PLS/NRE 455G Wetland Delineation (3)***
BIO/GEO 530 Biogeography and Conservation (3)	***PLS 573 Soil Morphology and Classification (3)***
FOR 219 Dendrology (4)	***PLS 597 Special Topics in Plant and Soil Science (3)***
FOR 370 Wildlife Biology and Management (4)	
GEO 365 Special Topics in Regional Geography (3)	***(3) Geospatial Analysis***
	BAE 538 GIS Applications in Water Resources (3)
	FOR 200 Basics of Geospatial Technology (2)
Forestry	***FOR 330 GIS and Spatial Analysis (3)***
*For the Forestry Environmental System Emphasis Area student must take FOR 219 Dendrology and FOR 360 Silviculture. FOR 219 can be taken as part of the Analytical Skill Development but the hours will not count towards both Analytical Skill Development courses and Environmental System Emphasis Area courses.	***GEO 309 Introduction to GIS (3)***
	GEO 409 Advanced GIS (3)
	GEO 415 Map Interpretation (3)
	LA 856/NRE 556 Contemporary Geospatial Applications for Land Analysis (3)
*FOR 219 Dendrology (4)	***(4) Environmental Education***
*FOR 360 Silviculture (4)	****NRE 390 Environmental Education(3)***
FOR 310 Introduction to Forest Health and Protection (3)	***CLD 230 Intrapersonal Leadership(3)***
	CLD/SOC 360 Environmental Sociology (3)
FOR 320 Forest Valuation and Economics (3)	***AED/FCS 583 Designing Curriculum and Assessment in Career and Technical Education (3)***
FOR 400 Human Dimensions of Forestry and Natural Resources (3)	***EDP 202 Human Development and Learning (3)***
FOR 425 Forest Management (4)	****For the environmental education ASD, students must take NRE 390 Environmental Education.***
Human Dimensions and Natural Resource Planning	***(4) Individualized Analytical Skill Development***
BIO/GEO 530 Biogeography and Conservation (3)	***With advisor approval, a student may submit a request for an individualized ASD. The written proposal must include a memo explaining the***

CLD/SOC 340 Community Interaction (3) CLD/SOC 360 Environmental Sociology (3) CLD/SOC 420 Sociology of Communities (3) CLS/SOC 440 Community Processes and Communication (3) ENS 400 Senior Seminar (3) FOR 400 Human Dimensions of Forestry and Natural Resources (3) FOR 470 Interdependent Natural Resource Issues (3) GEO 285 Introduction to Planning GEO 485G Urban Planning and Sustainability (3) GEO 490G American Landscapes (3) GEO 531 Landscape Ecology (3) LA 858 Regional Land Use Planning Systems (3) LA 869 Advanced Regional Land Use Planning Applications (3) Environmental Soil Science PLS 396 Soil Judging (3) PLS/NRE 450G Biogeochemistry (3) PLS/NRE 455G Wetland Delineation PLS 468G Soil Use and Management (3) PLS/NRE 470G Soil Nutrient Management (3) PLS/NRE 477G Land Treatment of Waste	***rationale, a list of proposed courses for the ASD, an explanation of how those courses meet the intent of the ASD, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.*** ***Environmental System Emphasis Areas:*** ***(1) Conservation Biology*** ***BIO/PLS 210 The Life Processes of Plants (3)*** ***BIO 325 Ecology (4)*** ***BIO 375 Behavioral Ecology and Sociobiology (3)*** ***BIO/NRE 420G Taxonomy of Vascular Plants (4)*** ***BIO/GEO 530 Biogeography and Conservation (3)*** ***FOR 219 Dendrology (4)*** ***FOR 370 Wildlife Biology and Management (4)*** ***(2) Forestry*** ****FOR 219 Dendrology (4)*** ****FOR 360 Silviculture (4)*** ***FOR 320 Forest Valuation and Economics (3)*** ***FOR 400 Human Dimensions of Forestry and Natural Resources (3)*** ***FOR 402 Forest Entomology (3)*** ***FOR 425 Forest Management (4)*** ****For the Forestry ESEA, students must take***

(3) PLS 566 Soil Microbiology (3) PLS 573 Soil Morphology and Classification (3) PLS 575 Soil Physics (3) Water Resources AEC 461G Biometeorology (3) BAE 438G/CE 460 Fundamentals of Groundwater Hydrology or GLY/EES 585 Hydrogeology (3) BAE 532/CE 542 Introduction to Stream Resortation (3) BAE 538 GIS Applications to Water Resources (3) BIO/GEO 530 Biogeography and Conservation (3) CHE 565 Environmental Chemistry (3) GEO 230 Weather and Climate (3) GEO 451G Fluvial Forms and Processes (3) GLY/EES 530 Low Temperature Geochemistry (3) PLS/NRE 450G Biogeochemistry (3) PLS/NRE 455G Wetland Delineation (3) PLS 573 Soil Morphology and Classification (3) PLS 575 Soil Physics (3) Wildlife Management	***FOR 219 and FOR 360.*** ***(3) Human Dimensions and Natural Resource Planning*** ***BIO/GEO 530 Biogeography and Conservation (3)*** ***CLD/SOC 340 Community Interaction (3)*** ***CLD/SOC 360 Environmental Sociology (3)*** ***CLD/SOC 420 Sociology of Communities (3)*** ***CLS/SOC 440 Community Processes and Communication (3)*** ***FOR 400 Human Dimensions of Forestry and Natural Resources (3)*** ***FOR 470 Interdependent Natural Resource Issues (3)*** ***GEO 285 Introduction to Planning*** ***GEO 485G Urban Planning and Sustainability (3)*** ***GEO 490G American Landscapes (3)*** ***GEO 531 Landscape Ecology (3)*** ***LA 858 Regional Land Use Planning Systems (3)*** ***LA 869 Advanced Regional Land Use Planning Applications (3)*** ***(4) Environmental Soil Science*** ***PLS 396 Soil Judging (3)*** ***PLS/NRE 450G Biogeochemistry (3)*** ***PLS/NRE 455G Wetland Delineation***

BIO/ENT 300 General Entomology (3) BIO 304 Principles of Genetics (4) BIO 325 Ecology (4) BIO 350 Animal Physiology or ASC 325 Animal Physiology (3-4) BIO 375 Behavioral Ecology and Sociobiology (3) BIO 555 Vertebrate Zoology (5) BIO 559 Ornithology (4) FOR 370 Wildlife Biology and Management (4) PLS/NRE 455G Wetland Delineation (3) Individualized System Emphasis Area A written proposal must be submitted by a student with an advisor's approval to the NRES Steering Committee for an Individualized System Emphasis Area. Potential topics may include renewable energy, sustainability, or outdoor recreation. The student's proposal should also include an explanation of how the Experiential Learning requirement will be coordinated with the Emphasis Area.	***PLS 468G Soil Use and Management (3)*** ***PLS/NRE 470G Soil Nutrient Management (3)*** ***PLS 566 Soil Microbiology (3)*** ***PLS 573 Soil Morphology and Classification (3)*** ***PLS 575 Soil Physics (3)*** ***(5) Water Resources*** ***AEC 461G Biometeorology (3)*** ***EES 585 Hydrogeology (3)*** ***BAE 532/CE 542 Introduction to Stream Resortation (3)*** ***BAE 538 GIS Applications to Water Resources (3)*** ***BIO/GEO 530 Biogeography and Conservation (3)*** ***CHE 565 Environmental Chemistry (3)*** ***GEO 230 Weather and Climate (3)*** ***GEO 451G Fluvial Forms and Processes (3)*** ***EES 530 Low Temperature Geochemistry (3)*** ***PLS/NRE 450G Biogeochemistry (3)*** ***PLS/NRE 455G Wetland Delineation (3)*** ***PLS 573 Soil Morphology and Classification (3)*** ***PLS 575 Soil Physics (3)*** ***(6) Wildlife Management*** ***BIO/ENT 300 General Entomology (3)*** ***BIO 304 Principles of Genetics (4)***

BIO 325 Ecology (4)

BIO 350 Animal Physiology or ASC 325 Animal Physiology (3-4)

BIO 375 Behavioral Ecology and Sociobiology (3)

BIO 559 Ornithology (4)

FOR 370 Wildlife Biology and Management (4)

PLS/NRE 455G Wetland Delineation (3)

(7) Global Sustainable Food Systems

AEC 309 International Agriculture, World Food Needs, and U.S. Trade in Agricultural Products (3)

ECO 410 Current Issues in Economics: World Food Economics (3)

ENT 300 General Entomology (3)

ENT 310 Insect Pests of Field Crops (3)

PLS 404 Integrated Weed Management (4)

SAG 201 Cultural Perspectives on Sustainability (3)

SAG/PLS 386 Plant Production Systems (4)

SAG 390 Agroecology (3)

(8) Earth Systems Science

EES 210 Habitable Planet (3)

EES 230 Fundamentals of Geology I (3)

EES 235 Fundamentals of Geology II (3)

EES 323 Geology Field Camp (6)

EES 360 Mineralogy (4)

EES 420 Structural Geology (4)

EES 450 Sedimentary Geology (4)

EES 461 Igneous and Metamorphic Petrology (4)

EES 530 Low Temperature Geochemistry (3)

EES 550 Fundamentals of Geophysics (3)

EES 585 Hydrogeology (3)

GEO 331 Global Environmental Change(3)

GEO 351 Physical Landscapes (3)

GEO 451G Fluvial Forms and Processes (3)

PLS 450G Biogeochemistry(3)

(9)Individualized System Emphasis Area

With advisor approval, a student may submit a request for an individualized ESEA. The written proposal must include a memo explaining the rationale, a list of the proposed courses for the ESEA, an explanation of how those courses meet the intent of the ESEA, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.

10. Does the change affect pgm requirements for number of credit hrs outside the major subject in a related field?

☐ Yes ☒ No

If so, indicate current courses and proposed changes below.

Current	*Proposed*
_____	_____

11. Does the change affect pgm requirements for technical or professional support electives?
☐ Yes ☒ No

If so, indicate current courses and proposed changes below.

Current	*Proposed*
_____	_____

12. Does the change affect a minimum number of free credit hours or support electives?
☒ Yes ☐ No

If "Yes," indicate current courses and proposed changes below.

Current	*Proposed*
6	*7-9*

13. Summary of changes in required credit hours:

	Current	*Proposed*
a. Credit Hours of Premajor or Preprofessional Courses:	30	*25*
b. Credit Hours of Major's Requirements:	43-44	*44-46*
c. Credit Hours for Required Minor:	0	*0*
d. Credit Hours Needed for a Specific Option:	18	*18*

e.	Credit Hours Outside of Major Subject in Related Field:	———	———
f.	Credit Hours in Technical or Professional Support Electives:	———	———
g.	Minimum Credit Hours of Free/Supportive Electives:	6	*7-9*
h.	Total Credit Hours Required by Level: 100:	21	*18*
	200:	15	*16*
	300:	23-35	*23-45*
	400-500:	15-25	*16-25*
i.	Total Credit Hours Required for Graduation:	120	*120*

14. Rationale for Change(s) – if rationale involves accreditation requirements, please include specific references to that.

The two primary goals underlying the proposed changes are (1) to more fully integrate the NRES program into the students' earlier years, and (2) to align the curriculum more closely to the skills and knowledge necessary for careers in Natural Resources and Environmental Science.

15. List below the typical semester by semester program for the major. If multiple options are available, attach a separate sheet for each option.

YEAR 1 – FALL:	GEN 100, 3 credits	**YEAR 1 – SPRING:**	*CHE 105, 4 credits*
(e.g. "BIO 103; 3 credits")	CIS/WRD 110, 3 credits		*CHE 111, 1 credit*
	MA 123, 4 credits		*CIS/WRD 111, 3 credits*
	UK Core, 3 credits		*STA 210, 3 credits*
	UK Core, 3 credits		*UK Core, 3 credits*

			Elective, 1 credit
YEAR 2 - FALL :	BIO 148, 3 credits	**YEAR 2 – SPRING:**	*BIO 152, 3 credits*
	ECO 201, 3 credits		*EES 220, 4 credits*
	FOR 230, 3 credits		*FOR 240, 2 credits*
	NRE 201, 3 credits		*NRE 381, 3 credits*
	UK Core, 3 credits		*UK Core, 3 credits*
YEAR 3 - FALL:	FOR 325, 3 credits	**YEAR 3 - SPRING:**	*PLS 366, 4 credits*
	NRE 355, 3 credits		*AEC 445G, 3 credits*
	AEC 424, 3 credits		*NRE 320, 3 credits*
	ASD or ESEA course, 3 credits		*ASD or ESEA courses, 6 credits*
	Elective, 3 credits		
YEAR 4 - FALL:	FOR 340, 4 credits	**YEAR 4 - SPRING:**	*NRE 471, 4 credits*
	FOR 460G, 3 credits		*ASD or ESEA,6 credits*
	NRE 395 or 399, 3 credits		*Electives, 3 credit hours*
	ASD or ESEA courses, 3 credits		
	Electives, 2 credit hours		

Signature Routing Log

General Information:

Current Degree Title and Major Name: Bachelor of Science in Natural Resources and Environmental Science

Proposal Contact Person Name: Mary Arthur Phone: 257-2852 Email: mary.arthur@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
NRES Steering Committee	9/28/2012	Mary Arthur / 257-2852 / mary.arthur@uky.edu	
Agricultural Economics	10/2/12	Leigh Maynard / 257-5762 / lmaynard@uky.edu	
Forestry	10-4-12	Terrell Baker / 257-7596 / terrellbaker@uky.edu	
Landscape Architecture	10/01/2012	Ned Crankshaw / 257-4691 / nedcrankshaw.uky.edu	
Plant and Soil Sciences	10/3/12	Todd Pfeiffer/257-5020 ext. 80709/tpfeiffe@uky.edu	
Earth and Environmental Sciences	10-3-2012	Dave Moecher /257-6939 / moker@uky.edu	

CHANGE UNDERGRADUATE PROGRAM FORM

Chair of Sustainable Agriculture Curriculum Committee	4/5/12	Lee Meyer /257-7276 / lee.meyer@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[4]
Undergraduate Council	5/14/13	Joanie Ett-Mims	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[4] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

Signature Routing Log

General Information:

Current Degree Title and Major Name: Additional Signature page for B.S in Natural Resources and Environmental Science; Natural Resources and Environmental Science

Proposal Contact Person Name: Mary Arthur Phone: 7-2852 Email: marthur@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Undergraduate Curriculum Committee, College of Agriculture	11/16/2012	Larry Grabau / 7-3469 / Larry.Grabau@uky.edu	
		/ /	
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[4]
Undergraduate Council	5/14/13	Joanie Ett-Mims	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[4] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

UNIVERSITY OF KENTUCKY

September 28, 2012

Dear Dr. Larry Grabau:

On behalf of the Natural Resources and Environmental Science (NRES) Steering Committee, I am attaching a proposed comprehensive curriculum revision. Please find enclosed an Undergraduate Program Change form, course change forms, a course drop form, and an appendix with additional materials pertaining to the NRES curriculum update. The two main reasons underlying the proposed changes are (1) to more fully integrate the NRES program in the students' earlier years and (2) to align the curriculum more closely to the skills and knowledge necessary for NRES-type careers. Specific proposed changes and the rationale behind those changes are explained below.

As shown in the Undergraduate Program Change form (see #6), the number of pre-major requirements was reduced from 30 hours to 25 hours in order to strengthen the major requirements, increasing the total major credit hour requirements from 43-44 to 44-46 (#7). This was accomplished by dropping CHE 107/CHE 113 and STA 291 from pre-major requirements and increasing the number of credit hours for NRE 471 from three to four to enable this capstone course to function more fully (see details below). At the same time, the NRES course selection was updated to include two new Environmental System Emphasis Areas (ESEAs) called "Global Sustainable Food Systems" and "Earth Systems Science" and one new analytical skill development (ASD) area (Environmental Education). We have also modified the language under the ASD and ESEA sections (see #9) to require that at least twelve credit hours of course work be at the 300-level or above in order to meet the University requirement for 45 hours of 300-level and above course work. Other small changes were made such as switching BIO 150 to BIO 148, updating the new prefix for GLY courses to EES, inclusion of MA 113 and MA 137 as alternatives to MA 123 as a pre-major requirement, and dropping NRE/PLS 477G (Land treatment of waste) from the Environmental Soil Science ESEA (see attached course drop form). These changes still allow us meet the required number of credit hours for graduation (see #13).

We propose to increase the number of credit hours from 3 to 4 for NRE 471, Senior Problem in Natural Resources and Environmental Science (see enclosed course change form). This capstone course brings together all of the natural resource concepts into

solving relevant problems. The students interrogate a local natural resource issue in a detailed manner. This requires large amounts of research outside of the classroom including interviews, primary data collection, and library research. Written reports are prepared and oral presentations are delivered. Historically, the meeting pattern for this course has included two 50-minute lectures and approximately two hours of laboratory for a total of three credits. We propose to change the meeting pattern to two 90-minute lectures plus a 2-hour laboratory, increasing the number of credit hours from three to four.

Another proposed change is to modify NRE 301 (Natural Resources and Environmental Science) to NRE 201 (see enclosed course change form). This is needed so that we can engage NRES students earlier in their program, simultaneously building on the chemistry and biology concepts students typically learn in the first year, and laying the groundwork for the more focused coursework in natural and social science in the subsequent years.

Thank you for your consideration of these revisions to the NRES curriculum. Feel free to contact me if you have any questions at 257-2852 or mary.arthur@uky.edu.

Mary A. Arthur, PhD
Professor of Forest Ecology
Chair, NRES Steering Committee

MEMO

To: Undergraduate Council

From: Mary A. Arthur, Chair, Natural Resources and Environmental Science program

Date: June 3, 2013

Re: Explanations and additional information regarding NRES curriculum revision

---

Please find the following explanations relative to queries from the UGC emailed to me on May 17, 2013:

1. CHE 107 is being dropped as a requirement (not as a prerequisite) because we found that the chemistry taught in this course was not essential to the coursework that follows (including PLS 366, FOR 340, or FOR 460). For students who are interested in going to graduate school in the natural sciences, advisors strongly advise them to take CHE 107 as an elective.

2. STA 210 is not, of course, a direct replacement for STA 291, the latter of which we have previously required in the NRES program. However, we found that we had two goals for the students with regard to statistics. First, that they be able to 'think statistically', to understand statistical inferential reasoning, and secondly, that they be able to use statistics to analyze data. The first goal is well met with STA 210, and simultaneously covers one of the UK Core requirements. The second goal, we found, was not being met with STA 291 because students most often took the course out of synch with courses in which they needed to analyze their own data. As a result, we are now addressing the statistical analysis part of our goal within individual courses, most notably PLS 366 and FOR 340.

3. I have attached a new syllabus for NRE 201 (formerly NRE 301) that has revised learning outcomes that are more measurable than what was provided in an earlier syllabus.

4. For NRE 471 it isn't possible to provide 'tentative weekly topics' as this course is problem-based over the entire semester, the topic is entirely different each time it is taught, and the way that class time is used is determined as the semester unfolds and the individual group projects begin to shape up. To address the UGC's request for more information regarding this course, I have included a pdf of the 2013 final project that students produced as a direct result of the course and which I hope will go a long way in communicating both the nature and the rigor of this capstone course. I have also attached a course calendar that primarily includes assignment due dates, rather than weekly topics, for the reasons stated above.

A. Analytical Skill Development — Hours: 9

Analytical Skill Development (ASD): **Students must select ONE area within Analytical Skill Development** and complete nine hours of course work in the area from the list of courses provided below. Students must select from the courses listed under each ASD but may request one (1) substitute course, subject to approval by both their academic advisor and the DUS. For the 18 hours of ASD and ESEA coursework, all classes must be 200-level or above and at least twelve (12) credit hours must be in 300-level or above courses. Classes taken to complete the ASD requirement cannot count towards the ESEA course requirement. Experiential learning courses cannot satisfy ASD requirements.

Course	Credit hours	Course Offered	Prerequisites Blue – High likelihood course may be taken without pre-req. These courses have a history of our students taking them or 'consent of instructor' is noted. Red – Pre-req. courses required. Pre-req. may count as elective. Blank – No pre-req. or pre-req filled by a pre-major or major requirement.
Economic and Policy Analysis – The economic and policy analysis skill development area will provide students with the theoretical and analytical tools necessary to evaluate the economic and social effects of resource and environmental issues. The policy courses will help students understand how environmental policy is made, the public agencies that manage resources, and how policies are evaluated for impact on humans and the environment.			
AEC 309 International Agriculture, World Food Needs, and U.S. Trade in Agricultural Products	3		
AEC 483 Regional Economics	3	Spring	ECO 202
AEC 532 Agriculture and Food Policy	3	Spring	AEC 305
AEC/NRE 545 Resource and Environmental Economics	3	Fall	
CLD/SOC 360 Environmental Sociology	3	Every other Spring	SOC 101 or CLD 102
FOR 320 Forest Valuation and Economics	3	Fall (2011)	
FOR 400 Human Dimensions of Forestry and Natural Resources	3		
GEO 235 Environmental Management and Policy	3	Fall	
GEO 455 Economic Geography	3	Spring 2009	GEO 152, 160, or 172
Field and Laboratory Analysis of Ecosystems – Students will learn the theory and application of sample data collection and techniques, field and laboratory analysis, statistical analysis, and data interpretation required to evaluate the quality of water, soil, and ecosystem resources. This analytical skill development area is geared towards students pursuing careers as environmental science and protection scientists/technicians and forest and conservation scientists/technicians.			
BIO/NRE 420G Taxonomy of Vascular Plants	4	Spring	
BIO 452B Laboratory in Ecology	2	Spring	BIO 325 or equivalent and consent of instructor
ENT/BIO 300 General Entomology	3	Fall	
ENT/FOR 402 Forest Entomology	3	Fall	
FOR 219 Dendrology	4	Fall	
FOR 250 Statistics and Measurements I	3	Fall (2010)	MA 109 or Calculus, FOR 100, and FOR 200.
PLS 396 Soil Judging	Up to 3 credits	Fall	consent of instructor

PLS/NRE 455G Wetland Delineation	3	Fall Even Years	
PLS 573 Soil Morphology and Classification	3	Every other Fall	consent of instructor
PLS 597 Special Topics in Plant and Soil Science: Environmental Sampling and Analysis	3	Spring 2009	consent of instructor

Geospatial Analysis – Geospatial technologies are often used in conjunction with traditional natural resource and environmental scientist job requirements. This development area will provide students with enhanced skills beyond the major requirements in the use of geospatial software, approaches, and products. Students will learn the theory and application required to address a variety of environmental conditions. This analytical skill development area is geared towards students wishing to pursue careers that depend on extensively applying geospatial technologies to natural resources and environmental science issues or advanced study in geospatial science.

BAE 538 Applications for Water Resources	3	Fall	consent of instructor
FOR 200 Basics of Geospatial Technology	2	Fall (2010)	
FOR 330 GIS and Spatial Analysis	3	Fall (2011)	MA 109 or Calculus, FOR 150, and FOR 200
GEO 309 Digital Geographic Data: Sources, Characteristics, Problems, and Uses	3	Fall, Spring	
GEO 409 Geographic Information Systems and Science: Fundamentals	3	Fall	GEO 309
GEO 415 Map Interpretation	3	Spring 2008, 2007	consent of instructor
LA 956/NRE 556 Advanced Geographic Information Systems (GIS) and Landscape Analysis	3	Every other Fall	LA 855/NRE 555 and either STA 291 or STA 570

Environmental Education – The environmental education area will introduce you to the concepts of Environmental Education (in NRE 390) and then provide you with the background necessary to apply your environmental systems knowledge in an educational (formal and non-formal) setting.

**For the environmental education analytical skill emphasis area students must take NRE 390 Environmental Education.*

*NRE 390 Environmental Education	3	Even years	
CLD 230 Intrapersonal Leadership	3		
CLD/SOC 360 Environmental Sociology	3	Every other Spring	SOC 101 or CLD 102
AED/FCS 583 Designing Curriculum and Assessment in Career and Technical Education	3	Spring	okay
EDP 202 Human Development and Learning	3	Fall, Spring	

Individualized Analytical Skill Development – With advisor approval, a student may submit a request for an individualized ASD. The written proposal must include a memo explaining the rationale, a list of proposed courses for the ASD, and explanation of how those courses meet the intent of the ASD, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.

B. Environmental Systems Emphasis Area — Hours: 9

Environmental Systems Emphasis Areas (ESEA): **Students must select ONE Environmental Systems Emphasis Area** and complete nine hours of course work in each area from the list of courses provided below. Students must select from the courses listed under each ESEA but may request one (1) substitute course, subject to approval by both their academic advisor and the DUS. For the 18 hours of ASD and ESEA coursework, all classes must be 200-level or above and at least twelve (12) credit hours must be in 300-level or above courses. Classes taken to complete the ESEA requirement cannot count towards the ASD course requirement. Experiential learning courses cannot satisfy ESEA requirements.

Conservation Biology – The conservation biology emphasis area will provide students with knowledge of the ecological underpinnings of conservation biology. Depending on the courses chosen, students will: (1) learn to identify trees and other plants and develop a taxonomic framework for plant identification; (2) develop an understanding of plant community ecology; (3) develop an understanding of ecosystem pattern and process; (4) gain an introduction to the vegetation, flora and forests of Kentucky and surrounding states. Students who choose courses in this environmental systems emphasis area may be qualified to pursue careers as naturalists, natural resource managers, natural resource educators, or pursue graduate education in ecology or botany.

BIO/PLS 210 The Life Processes of Plants	3	Fall	
BIO 325 Introductory Ecology	4	Fall, Spring, Summer	
BIO 375 Behavioral Ecology and Sociobiology	3	Fall	
BIO/NRE 420G Taxonomy of Vascular Plants	4	Spring	
BIO/GEO 530 Biogeography and Conservation	3	Fall	
FOR 219 Dendrology	4	Fall	
FOR 370 Wildlife Biology and Management	4	Spring (2011)	

Forestry – The forestry emphasis area will provide students with an understanding of dendrology and silviculture. In dendrology, students will learn basic concepts of botany related to woody species and their use, along with basic soil and site characteristics used in the identification of trees and forest vegetation. In silviculture, students will learn the approaches for ecologically based manipulation of forests to achieve a desired management objective. Students who choose this emphasis area may be qualified to pursue careers in natural resource management. *[Note: Students with a B.S. in Forestry from a Society of American Foresters (SAF) accredited forestry program may be more competitive for certain forestry jobs. The NRES program is <u>not</u> an SAF accredited program.]*

**For the forestry environmental system emphasis area students must take FOR 219 Dendrology and FOR 350 Silviculture. FOR 219 can be taken as part of Analytical Skill Development but the hours will not count towards both Analytical Skill Development courses and Environmental System Emphasis Area courses.*

*FOR 219 Dendrology	4	Fall	
*FOR 350 Silviculture	4	Fall (2011)	FOR 219 and FOR 250
FOR 320 Forest Valuation and Economics	3	Fall (2011)	
FOR 400 Human Dimensions of Forestry and Natural Resources	3	Fall (2012)	
FOR 402 Forest Entomology	3	Fall	
FOR 425 Forest Management	4	Fall	consent of instructor

Earth Systems Science-The GP emphasis area will provide context for understanding the processes that operate within and at the interface between the lithosphere, biosphere/hydrosphere, and atmosphere, i.e., the environments in which bedrock, soil, water, air and organisms interact physically and chemically. Students pursuing the GP area of emphasis may choose to pursue the minor in Geology, which can be partly satisfied with NRES required courses EES 220 and PLS 366, plus EES 230 and 235, and an additional 5 credits at the 300 level or higher in EES or a related field. All courses listed below at the 300+ level would count toward the minor. Students who take EES 385 among their NRES major requirements may also count this course toward the minor.

EES 210 Habitable Planet	3		
EES 230 Fundamentals of Geol ogy I	3	Fall, Spring	
EES 235 Fundamentals of Geology II	3	Spring	
EES 323 Geology Field Camp	6	Summer, odd years	EES 220, 230, 235
EES 360 Mineralogy	4	Spring	CHE 105, EES 220; Prereq or Concurrent: EES 230 or EES 235
EES 420 Structural Geology	4	Spring	EES 235
EES 450 Sedimentary Geology	4	Fall	EES 360
EES 461 Igneous and Metamorphic Petrology	4	Fall	EES 360
EES 530 Low Temperature Geochemistry	3	Fall	EES 360 or consent
EES 550 Fundamentals of Geophysics	3	Fall	EES 220, MA 113, or consent
EES 585 Hydrogeology	3	Spring	EES 220, MA 113 or 125
GEO 331 Global Environmental Change			
GEO 351 Physical Landscapes	3	Fall	GEO 130
GEO 451G Fluvial Forms and Processes	3	Fall	GEO 351
PLS 450G Biogeochemistry			

Human Dimensions and Natural Resource Planning – The human dimensions and natural resource planning emphasis area will provide students with an understanding of the interaction between society and natural systems and provide students with the skills and knowledge for tomorrow's effective conservation leaders. This emphasis area does this by building upon the core NRES curriculum with coursework and internship experience focused on land planning, legal aspects of land and water, landscape ecology, biogeography, and geospatial technologies. Private foundations and government entities are funding land conservation efforts, and increasingly, real estate developers and their consultants are incorporating land conservation into their development projects. There is a professional community working in a variety of capacities for conservation organizations globally and there is the opportunity for advanced study in a variety of graduate programs.

BIO/GEO 530 Biogeography and Conservation	3	Fall	
CLD/SOC 340 Community Interaction	3	Fall, Spring	consent of instructor
CLD/SOC 360 Environmental Sociology	3	Every other Spring	SOC 101 or CLD 102
CLD/SOC 420 Sociology of Communities	3	Spring	consent of instructor
CLD/SOC 440 Community Processes and Communication	3	Spring	consent of instructor
ENS 400 Senior Seminar in Environmental Studies	3	Spring 2008, 2007	consent of instructor
FOR 400 Human Dimensions of Forestry and Natural Resources	3	Fall (2012)	
FOR 470 Interdependent Natural Resource Issues – Analysis and Solutions	3	Spring (2013)	
GEO 285 Introduction to Planning	3	Fall, Spring	
GEO 485G Urban Planning and Sustainability	3	Fall, Spring 2009	consent of instructor
GEO 490G American Landscapes	3	Fall 2007	consent of instructor
GEO 531 Landscape Ecology	3	Spring 2009	
LA 858 Regional Land Use Planning Systems	3	Spring	consent of instructor
LA 869 Advanced Regional Land Use Planning Applications	3	Offered every other fall	consent of instructor

Soil Science – Students choosing this emphasis area will learn about the dynamic and interrelated processes taking place within the thinkskin of the Earth (i.e. Critical Zone) and the services provided by these processes to ensure adequate and sustainable feed, fuel and fiber production, clean air and water, and healthy habitats. Topics covered include bioremediation, phytoremediation, soil fertility, microbiology, soil chemistry, biogeochemistry, etc. Students completing this emphasis area will be equipped to evaluate soils for a range of management options, and be eligible for positions with public and private agencies (e.g. the Natural Resoruce Conservation Service, Environmental Protection Agency, U.S. Department of Agriculture, Environmental Consulting Firms, etc.)

PLS 396 Soil Judging	Up to 3 credits	Fall	consent of instructor
PLS/NRE 450G Biogeochemistry	3	Last offered 2007	
PLS/NRE 455G Wetland Delineation	3	Fall 2008	
PLS 468G Soil Use and Management	3	Fall	
PLS/NRE 470G Soil Nutrient Management	3	Every other Spring	consent of instructor
PLS 566 Soil Microbiology	3	Spring	
PLS 573 Soil Morphology and Classification	3	Fall 2009, 2007	consent of instructor
PLS 575 Soil Physics	3	Fall 2009, 2007	consent of instructor

Global Sustainable Food Systems – Students who choose this area will be exposed to basic principles in sustainable agriculture, issues in global food systems, and the ecology of agricultural systems, emphasizing the overlap and complementarities between systems emphasized through NRES major requirements and food production systems. Some students choosing this ESEA may want to obtain the minor in Sustainable Agriculture, which requires the selection of SAG 101 (not listed below because all 9 credits must be 200 or above), in addition to SAG 201 and 386.

SAG 201 Cultural Perspectives on Sustainability	3	Spring	SAG 101
SAG/PLS 386 Plant production systems	4	Fall	PLS 210, PLS 366 or consent of instructor
SOC 360 Environmental Sociology	3	Fall, Spring	
ENT 310 Insect Pests of Field Crops	3	Fall	
ENT 300 General Entomology	3	Fall	
AEC 309 International Agriculture, World Food Needs and U.S. Trade in Agricultural Products	3	Fall	ECO 201
PLS 404 Integrated Weed Management	4		PLS 386
SAG 390 Agroecology	3	Spring	
ECO 410 Current Issues in Economics: World Food Economics			

Water Resources – The water resources emphasis area will provide students with a fundamental understanding of the hydrologic cycle so that students understand how climate, soils, vegetation, and land-use affect the amount, timing and quality of water. Use of this information is important in natural resource management so that one may determine where water resource management objectives are compatible and where they conflict with other resource management objectives. Ultimately, students will gain an understanding of the role of watershed management and multiple use in planning and implementing natural resource programs while becoming familiar with current issues in watershed management and water resources.

AEN 461G Biometeorology	3	Spring	
EES 585 Hydrogeology	3	Spring	
BAE 532/CE 542 Introduction to Stream Restoration	3	Spring	consent of instructor
BAE 538 GIS Applications to Water Resources	3	Fall	consent of instructor

BIO/GEO 530 Biogeography and Conservation	3	Fall	
CHE 565 Environmental Chemistry	3	Spring	
GEO 230 Weather and Climate	3	Fall	consent of instructor
GEO 451G Fluvial Forms and Processes	3	Spring 2009	GEO 351 or EES 341
EES 530 Low Temperature Geochemistry	3	Fall	consent of instructor
PLS/NRE 450G Biogeochemistry	3	Last offered in 2007	
PLS/NRE 455G Wetland Delineation	3	Fall even years	
PLS 573 Soil Morphology and Classification	3	Fall 2009, 2007	consent of instructor
PLS 575 Soil Physics	3	Fall 2009, 2007	consent of instructor

Wildlife Management – The wildlife ecology and management emphasis area will provide opportunities for students to gain knowledge and experience, understand fundamental concepts, and develop basic skills in the area of wildlife ecology and management. The curriculum provides students with the option to meet certification requirements to become a registered Associate Wildlife Biologist® with The Wildlife Society.

BIO/ENT 300 General Entomology	3	Fall	
BIO 304 Principles of Genetics	4	Fall, Spring, Summer	BIO 150, BIO 152, and BIO 315
BIO 325 Introductory Ecology	4	Fall, Spring, Summer	
BIO 350/ASC 325 Animal Physiology	3-4	Fall, Spring, Summer	BIO 150-153 or equivalent; BIO 315; CHE 105, 107
BIO 375 Behavioral Ecology and Sociobiology	3	Fall	
BIO 559 Ornithology	4	Spring 2009	consent of instructor
FOR 370 Wildlife Biology and Management	4	Spring (2011)	
PLS/NRE 455G Wetland Delineation	3	Fall 2008	

Individualized System Emphasis Area - With advisor approval, a student may submit a request for an individualized ESEA. The written proposal must include a memo explaining the rationale, a list of the proposed courses for the ESEA, an explanation of how those courses meet the intent of the ESEA, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.

C. Experiential Learning

Hours: Credit hours included under major requirements

NRE 395 Independent Study in Natural Resources and Environmental Science – A pre-professional research oriented experience under the direction of a UK faculty member and coordinated with the student's Analytical Skill Development Area and Environmental System Emphasis Area. This course requires consent of appropriate faculty and a plan of learning objectives approved by the NRES Internship Coordinator

OR

NRE 399 Experiential Education in Natural Resources and Environmental Science – A pre-professional internship which is coordinated with the student's Analytical Skill Development Area and Environmental System Emphasis Area. This course requires consent of appropriate faculty and approval by NRES Internship Coordinator. The pre-professional internship may be conducted locally, nationally, or internationally.

Suggested Language for the UK 2013-2014 Bulletin

Bachelor of Science in Natural Resources and Environmental Science

The program in Natural Resources and Environmental Science is designed to provide students with the knowledge and skills needed for a career in the rapidly growing fields of environmental science, natural resource management, and environmental policy. With global climate change and an inter-connected world economy, the conservation and management of our natural resources and sustainability of our natural environment is becoming an issue for all societies. This curriculum provides students with exposure to a broad array of disciplines which are essential in approaching issues of natural resources, environmental quality, and environmental sustainability. Experiential learning is a key component in the curriculum. As a result, graduates have the capacity to integrate different perspectives and diverse bodies of knowledge in dealing with environmental resource management problems.

All students in the program take a common core of major requirements which is designed to provide exposure to technical and socioeconomic dimensions of natural resources management and policy. Important components of the core requirements are a required three-week summer camp, a pre-professional internship or research experience, and a senior capstone course that is problem based. In addition to the core requirements, all students must complete nine hours of course work in both an Analytical Skill Development Area (ASD) and an Environmental System Emphasis Area (ESEA). This allows students to match analytical skills to an area of particular interest in conservation biology, natural resource planning, environmental soil science, water resources, forestry, wildlife management, agricultural sustainability, geological processes, or related areas. Courses completed for the ASD and ESEA are selected from a list of choices in each area. Students are required to complete an off-campus internship or a research experience that is related to their ESEA and/or ASD. NRES majors have completed internships in several foreign countries, although most are conducted within the U.S. with organizations such as the National Park Service, the U.S. Forest Service, with local nature preserves, an Alaska salmon recovery program, a national laboratory, environmental consulting firms, private corporations, and both state and local governments. All seniors apply their course work and experiential learning to the senior capstone course which focuses on a well-defined natural resource

issue, requires group collaboration and problem-solving, and involves actual stakeholders.

Graduates of the Natural Resource and Environmental Science degree program move on to graduate work or careers. Many graduates continue their studies in Masters or PhD programs or go on to Law School. Most graduates begin careers as aspiring environmental professionals in both the public and private sector. Additional employment opportunities exist in environmental education, journalism, and work with nonprofit organizations which have environmental concerns.

Graduation Requirements

To earn a Bachelor of Science in Natural Resources and Environmental Science, a student must complete at least 120 semester hours of credit with at least a 2.0 cumulative grade point average. A minimum of 45 credits must be from upper division courses (300-level and above). Remedial course may **not** be counted towards the total degree hours. In addition to the UK Core requirements, students must complete College requirements, pre-major and major requirements, and complete an internship or research experience. With advisor approval, students select an Analytical Skill Development and an Environmental System Emphasis Area which focuses course work in a student's areas of interest.

Plan of Study

Each student majoring in Natural Resources and Environmental Science works with a faculty advisor to complete a Plan of Study, typically after the sophomore year. The Plan of Study is designed to help students complete a degree in four years by focusing attention on the required courses and which semester they should be completed. All students must have a signed Plan of Study before they have a graduation audit.

UK Core Requirements

See the UK Core section of this Bulletin for the current UK core requirements. Listed below are the general UK Core areas and suggested courses in select areas. Students should work with their faculty advisor to discuss completion of UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity
Choose one course from the approved list..... 3

II. Intellectual Inquiry into the Humanities

Choose one course from the approved list..... 3

III. Intellectual Inquiry into the Social Sciences
Choose one course from the approved list..... 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences
CHE 105/CHE 111 General College Chemistry I & Lab 5

V. Composition and Communication I
CIS/WRD 110 Composition and Communication I 3

VI. Composition and Communication II
CIS/WRD 111 Composition and Communication II 3

VII. Quantitative Foundations
MA 123 Elementary Calculus and Its Applications 4

VIII. Statistical Inferential Reasoning
STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning..... 3

IX. Community, Culture and Citizenship in the USA
GEN 100 Issues in Agriculture 3

X. Global Dynamics
Choose one course from the approved list 3
UK Core Hours 33

College Required Hours
GEN 100 Issues in Agriculture 3
Subtotal: College Required Hours 3

Pre-major Requirements **Hours**

BIO 148 Introductory Biology.....3
BIO 152 Principles of Biology I.....3
CHE 105 General College Chemistry II.....4
CHE 111 General Chemistry Lab I.....1
ECO 201 Principles of Economics I 3
EES 220 Principles of Physical Geology 4
MA 123 Elementary Calculus and Its Applications
or
MA 113 Calculus I 4

or
MA 137 Calculus I (Life Sciences)....4
STA 210 Making Sense of Uncertainty 3
Total pre-major requirements....25

Major Requirements	**Hours**
AEC 424 Principles of Environmental Law	3
AEC 445G Introduction to Resource and Environmental Economics	3
FOR 230 Conservation Biology	3
FOR 240 Forestry and Natural Resource Ethics **or** PHI 336 Environmental Ethics	2-3
FOR 325 Economic Botany: Plants and Human Affairs	3
FOR 340 Forest Ecology	4
FOR 460 Forest Hydrology and Watershed Management Or GLY/EES 385 Hydrology and Water Resources	3-4
NRE 201 Natural Resources and Environmental Science	3
NRE 320 Natural Resource and Environmental Analysis	3
NRE 381 Natural Resource and Environmental Policy Analysis	3
NRE 395* Independent Study in Natural Resources And Environmental Science **or** NRE 399** Experiential Education in Natural Resources and Environmental Science	3
NRE 471 Senior Problem in Natural Resources And Environmental Science	4
NRE 355 Introductory Geospatial Applications for Land Analysis	3
PLS 366 Fundamentals of Soil Science	4
Total Major Requirements	**44-46**

*Requires a written proposal and a learning contract approved by the DUS.
** Requires an approved Learning Contract through the Stuckert Career Center

Analytical Skill Development and Environmental System Emphasis Areas

Analytical Skill Development (ASD) and Environmental System Emphasis Areas (ESEA): Students must select one area within Analytical Skill Development and one Environmental System Emphasis Area and complete nine hours of course work in each area from the list of courses provided below. Students must select from the courses listed under each ASD and ESEA but may request one (1) substitute course per ASD and ESEA, subject to approval by both their academic advisor and the DUS. For the 18 hours of ASD and ESEA coursework, all classes must be 200-level or above and at least twelve (12) credit hours must be in 300-level or above courses. Classes taken to complete the ASD requirement cannot count towards the ESEA course requirement. Research experiences, internships, or apprenticeships cannot be used to satisfy the ASD and ESEA requirements including individualized options.

Analytical Skill Development Areas

(1) Economic and Policy Analysis **Hours**

AEC 309 International Agriculture, World Food Needs, And U.S. Trade in Agricultural Products....3
AEC 483 Regional Economics....3
AEC 532 Agricultural and Food Policy....3
AEC/NRE 545 Resource and Environmental Economics....3
CLD/SOC 360 Environmental Sociology....3
FOR 320 Forest Valuation and Economics....3
FOR 400 Human Dimensions of Forestry and Natural Resources....3
GEO 235 Environmental Management and Policy....3
GEO 455 Globalization and the Changing World Economy....3

(2) Field and Laboratory Analysis of Ecosystems

BIO/NRE 420G Taxonomy of Vascular Plants.... 4
BIO 452B Laboratory in Ecology.... 2
ENT 300 General Entomology.... 3
ENT/ FOR 402 Forest Entomology.... 3
FOR 219 Dendrology.... 4
FOR 250 Statistics and Measurements I.... 3
PLS 396 Soil Judging.... 3
PLS/NRE 455G Wetland Delineation.... 3
PLS 573 Soil Morphology and Classification.... 3
PLS 597 Special Topics in Plant and Soil Science.... 3

(3) Geospatial Analysis

BAE 539 GIS Applications in Water Resources 3
FOR 200 Basics of Geospatial Technology 2
FOR 330 GIS and Spatial Analysis 3
GEO 309 Introduction to GIS 3
GEO 409 Advanced GIS 3
GEO 415 Map Interpretation 3
LA 856/ NRE 556 Contemporary Geospatial
Applications for Land Analysis 3

(4) Environmental Education

*NRE 390 Environmental Education.....3
CLD 230 Intrapersonal Leadership.....3
CLD/SOC 360 Environmental Sociology.....3
AED/FCS 583 Designing Curriculum and Assessment in Career and Technical Education.....3
EDP 202 Human Development and Learning.....3
*For the environmental education analytical skill emphasis area, students must take NRE 390 Environmental Education.

(4) Individualized Analytical Skill Development

With advisor approval, a student may submit a request for an individualized ASD. The written proposal must include a memo explaining the rationale, a list of proposed courses for the ASD, and explanation of how those courses meet the intent of the ASD, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.

Environmental System Emphasis Areas **Hours**

(1) Conservation Biology

BIO/PLS 210 The Life Processes of Plants 3
BIO 325 Ecology 4
BIO 375 Behavioral Ecology and Sociobiology..... 3
BIO/NRE 420G Taxonomy of Vascular Plants 4
BIO/GEO 530 Biogeography and Conservation 3
FOR 219 Dendrology 4
FOR 370 Wildlife Biology and Management 4

(2) Forestry

* FOR 219 Dendrology 4
* FOR 360 Silviculture 4
FOR 320 Forest Valuation and Economics 3
FOR 400 Human Dimensions of Forestry and Natural Resources 3
FOR 402 Forest Entomology 3
FPR 425 Forest Management 4
* For the Forestry ESEA, students must take FOR 219 And FOR 360

(3) Human Dimensions and Natural Resource Planning

BIO/GEO 530 Biogeography and Conservation..... 3
CLD/SOC 340 Community Interaction 3
CLD/SOC 360 Environmental Sociology 3
CLD/SOC 420 Sociology of Communities 3
CLS/SOC 440 Community Processes and Communication 3
ENS 400 Senior Seminar 3
FOR 400 Human Dimensions of Forestry and Natural Resources 3
FOR 470 Interdependent Natural Resource Issues 3
GEO 285 Introduction to Planning 3
GEO 485G Urban Planning and Sustainability 3
GEO 490G American Landscapes 3
GEO 531 Landscape Ecology 3
LA 858 Regional Land Use Planning Systems 3
LA 869 Advanced Regional Land Use Planning Applications 3

(4) Environmental Soil Science

PLS 396 Soil Judging 3
PLS/NRE 450G Biogeochemistry 3
PLS/NRE 455G Wetland Delineation 3
PLS 468G Soil Use and Management 3
PLS/NRE 470G Soil Nutrient Management 3
PLS 566 Soil Microbiology 3
PLS 573 Soil Morphology and Classification 3
PLS 575 Soil Physics 3

(5) Water Resources

AEC 461G Biometeorology 3
EES 583 Hydrogeology 3
BAE 532/CE 542 Introduction to Stream Restoration 3

BAE 538 GIS Applications to Water Resources 3
BIO/GEO 530 Biogeography and Conservation 3
CHE 565 Environmental Chemistry 3
GEO 230 Weather and Climate 3
GEO 451G Fluvial Forms and Processes 3
GLY/EES 530 Low Temperature Geochemistry..... 3
PLS/NRE 450G Biogeochemistry 3
PLS/NRE 455G Wetland Delineation 3
PLS 573 Soil Morphology and Classification 3
PLS 575 Soil Physics 3

(6) Wildlife Management
BIO/ENT 300 General Entomology 3
BIO 304 Principles of Genetics 4
BIO 325 Ecology 4
BIO 350 Animal Physiology or
ASC 325 Animal Physiology..... 3-4
BIO 375 Behavioral Ecology and Sociobiology 3
BIO 559 Ornithology 4
FOR 370 Wildlife Biology and Management 4
PLS/NRE 455G Wetland Delineation 3

(7) Global Sustainable Food Systems
AEC 309 International Agriculture, World Food Needs, and U.S.
Trade in Agricultural Products 3
ECO 410 Current Issues in Economics: World Food Economics 3
ENT 300 General Entomology 3
ENT 310 Insect Pests of Field Crops 3
PLS 404 Integrated Weed Management 4
SAG 201 Cultural Perspectives on Sustainability 3
SAG/PLS 386 Plant Protection Systems 4
SAG 390 Agroecology 3

(8) Earth Systems Science
EES 210 Habitable Planet.....3
EES 230 Fundamentals of Geology I.....3
EES 235 Fundamentals of Geology II.....3
EES 323 Geology Field Camp.....6
EES 360 Mineralogy.....4
EES 420 Structural Geology.....4
EES 450 Sedimentary Geology.....4
EES 461 Igneous and Metamorphic Petrology.....4
EES 530 Low Temperature Geochemistry.....3
EES 550 Fundamentals of Geophysics.....3

EES 585 Hydrogeology.....3
GEO 331 Global Environmental Change.....3
GEO 351 Physical Landscapes.....3
GEO 451G Fluvial Forms and Processes.....3
PLS 450G Biogeochemistry.....3

(9) Individualized System Emphasis Area

With advisor approval, a student may submit a request for an individualized ESEA. The written proposal must include a memo explaining the rationale, a list of the proposed courses for the ESEA, an explanation of how those courses meet the intent of the ESEA, and a copy of the student's Plan of Study which includes the proposed course work. The written proposal must be submitted to the DUS for Steering Committee approval.

Subtotal: Analytical Skill Development and Environmental System Emphasis Areas 18

Electives

Free elective courses may be selected to complete a minimum total of 120 hours for graduation.

Subtotal: Electives 7-9

UNIVERSITY OF KENTUCKY

Department of Philosophy
College of Arts & Sciences
1415 Patterson Office Tower
Lexington, KY 40506-0027
859 257-1861
fax 859 257-3286
www.uky.edu/ArtsSciences/Philosophy

Prof. Mary A. Arthur
Department of Forest Ecology
103 T.P. Cooper Building
University of Kentucky
Lexington, KY 40546-0073

October 26, 2012

Dear Professor Arthur,

I'm writing to express my support for including PHI 336: Environmental Ethics as an elective in the Natural Resources and Environmental Science program. The course has a strong focus on public lands and forestry and appears to be highly suitable for this program. Please feel free to contact me at david.bradshaw@uky.edu if there are any questions.

Sincerely,

David Bradshaw

David Bradshaw
Professor of Philosophy
Chair, Philosophy Department

Ellis, Janie

From: Ett, Joanie M
Sent: Tuesday, June 18, 2013 2:38 PM
To: Ellis, Janie
Cc: Brothers, Sheila C
Subject: NRES BS, NRE 301, NRE 471, NRE 477G
Attachments: NRE 301-change Revised.pdf; NRE 471-change Revised.pdf; NRE 477G-drop.pdf; NRES BS-change Revised.pdf

Hi Janie,

The Undergraduate Council has reviewed and recommends approval of the following:

NRES BS-change
NRE 301-change
NRE 471-change
NRE 477G-drop

Thanks,
Joanie

Joanie Ett-Mims
Undergraduate Education
University of Kentucky
113 Bowman Hall
Lexington, KY 40506-0059
(859)257-9039 Phone
(859)257-1455 Fax
joanie.ett-mims@uky.edu