

Natural Resources and Environmental Science

College of Agriculture, Food and Environment

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 and policy. As the world population grows, and as nations are drawn closer together through technology and trade, the conservation and management of natural resources will become increasingly important to the sustained well-being of all societies. The curriculum provides students with exposure to a broad array of key disciplines involved with natural resources. As a result, graduates have the capacity to integrate different perspectives and diverse bodies of knowledge in dealing with real resource management problems.

All students in the program share a common core of major requirements. This core is designed to provide the student with broad exposure to the technical and socioeconomic dimensions of natural resources and their management. Important components of this core of courses are a required three-week summer camp after the sophomore or junior year and a required internship or research experience. In addition to this core, all students must develop a Concentration Area consisting of at least 18 hours of course work. This Concentration Area allows the student to focus the degree on an area of interest in the technical or policy oriented aspects of natural resource management. These courses must be chosen in consultation with the academic advisor and must be approved by the advisor and the NRES Steering Committee as part of the plan of study for the student.

Graduates of the Natural Resources and Environmental Science degree program are employed as professionals in both the public and private sectors. Industries which have an impact upon the environment maintain a staff of environmental scientists and technicians to ensure compliance with the standards of our society. Government agencies employ broadly trained natural resource scientists to serve in regulatory or management functions for the resources in their jurisdiction. Additional employment opportunities exist in environmental journalism and education, and with the many nonprofit organizations which have environmental concerns. In addition, students in either option are well prepared for graduate programs dealing with resource and environmental issues and in traditional academic disciplines.

Graduation Requirements

To earn a Bachelor of Science in Natural Resources and Environmental Science, the student must complete at least 120 semester hours with at least a 2.0 grade-point standing. A minimum of 45 credit hours must be from upper division courses (300 and above). Remedial courses may **not** be counted toward the total hours required for the degree. In addition to the UK Core requirements, the student must complete college, premajor, major and concentration requirements, including an internship or research experience. The student will construct their concentration area with the approval of a faculty advisor in the area of interest.

UK Core Requirements

See the *UK Core* section of the 2016-2017 *Undergraduate Bulletin* for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity

Choose one course from approved list 3

II. Intellectual Inquiry in the Humanities

Choose one course from approved list 3

III. Intellectual Inquiry in the Social Sciences

Choose one course from approved list 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

CHE 105 General College Chemistry I 4
CHE 111 Laboratory to Accompany General Chemistry I 1

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 296 Statistical Methods and Motivations 3

IX. Community, Culture and Citizenship in the USA

GEN 100 Issues in Agriculture, Food and Environment 3

X. Global Dynamics

Choose one course from approved list 3

UK Core hours **33**

Graduation Composition and Communication Requirement (GCCR)

NRE 395 Independent Study in Natural Resources and Environmental Science
or
NRE 399 Experiential Education in Natural Resources
and Environmental Science 3

Graduation Composition and Communication Requirement hours (GCCR)

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Premajor Requirements

Hours

BIO 148 Introductory Biology I 3
BIO 152 Principles of Biology II 3
CHE 105 General College Chemistry I 4
CHE 111 Laboratory to Accompany General Chemistry 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

or

MA 137 Calculus I With Life Sciences Applications 4

STA 296 Statistical Methods and Motivations 3

Subtotal: Premajor hours **25**

Major Requirements

Hours

AEC 326 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

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University of Kentucky is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award associate, baccalaureate, masters, and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, call 404-679-4500, or online at www.sacscoc.org for questions about the accreditation of University of Kentucky.

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FOR 325 Economic Botany: Plants and Human Affairs	3
FOR 340 Forest Ecology	4
FOR 460 Forest Hydrology and Watershed Management or	
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
<i>*NRE 320 is a three-week summer camp field data collection experience. The student will attend this camp after the sophomore or junior year. This camp exposes the student to a wide range of natural resource techniques and concepts, including aquatic ecology, soil and plant sciences, wildlife and forestry, and waste management.</i>	
<i>†All students must complete either an internship (NRE 399) or a supervised research project (NRE 395). This requirement is designed to give the student real world exposure to natural resource work in their area of interest.</i>	
Subtotal: Major hours	44-46

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 course work, 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 may not 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 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	Hours
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 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 (Subtitle required)	3

3. Geospatial Analysis	Hours
BAE 538 GIS Applications for 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/NRE 556 Contemporary Geospatial Applications for Land Analysis	3

4. Environmental Education

*NRE 390 Special Topics in Natural Resources and Environmental Science	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 ASD, students must take NRE 390 Special Topics in Natural Resources and Environmental Science.*

5. 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, 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	Hours
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	Hours
*FOR 219 Dendrology	4
*FOR 350 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
<i>*For the Forestry ESE, students must take FOR 219 and FOR 350.</i>	
3. Human Dimensions and Natural Resource Planning	Hours
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
CLD/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	3
GEO 485G Urban Planning and Sustainability	3
GEO 490G American Landscapes	3
GEO 531 Landscape Ecology	3
LA 308 Regional Land Use Planning Systems	3
LA 457 Contemporary Regional Land Use Planning Applications	3

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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

AEN 461G Biometeorology	3
BAE 532/CE 542 Introduction to Stream Restoration	3
BAE 538 GIS Applications for Water Resources	3
BIO/GEO 530 Biogeography and Conservation	3
CHE 565 Environmental Chemistry	3
EES 530 Low Temperature Geochemistry	3
EES 585 Hydrogeology	3
GEO 230 Weather and Climate	3
GEO 451G Fluvial Forms and Processes	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
CLD/SOC 360 Environmental Sociology	3
ECO 410 Current Issues in Economics: (Subtitle required)	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 230 Fundamentals of Geology I	3
EES 235 Fundamentals of Geology II	3
EES 323 Field Work in Regional Geology	6
EES 360 Mineralogy	4
EES 420G Structural Geology	4
EES 450G Sedimentary Geology	4
EES 461 Igneous and Metamorphic Petrology	4
EES 530 Low Temperature Geochemistry	3
EES 550 Fundamental 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 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 should be selected by the student to lead to the minimum total of 120 hours required for graduation.

Subtotal: Electives 7-9

TOTAL HOURS: 120