# Natural Resources and Environmental Science

College of Agriculture and School of Human Environmental Sciences

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/EES 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.

## Plan of Study

As a Natural Resources and Environmental Science major, you are required to work with your advisor to develop a complete **Plan of Study** during your sophomore year for your junior and senior years. The plan will be signed by your advisor, approved by the NRES Steering Committee, and placed in your file in the Office of the Associate Dean for Academic Programs. If you are an upper division transfer student (from another university or from another UK college or department) then you will submit your plan during the first semester you are enrolled in the program.

## UK Core Requirements

See the *UK Core* section of the *2012-2013 Undergraduate Bulletin* at: **www.uky.edu/Registrar/bulletinCurrent/ukc.pdf** 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 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 approved list ..... 3

**UK Core Hours ..... 33**

## College Required Hours

*GEN 100 Issues in Agriculture ..... 3

**Subtotal: College Required Hours ..... 3**

**Except for students who enter the College after having already completed the U.S. Citizenship requirement of the UK Core.*

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| Premajor Requirements | Hours |
|---|---|
| BIO 150 Principles of Biology I | 3 |
| BIO 152 Principles of Biology II | 3 |
| CHE 105 General College Chemistry I | 4 |
| CHE 107 General College Chemistry II | 3 |
| CHE 111 Laboratory to Accompany General Chemistry I | 1 |
| CHE 113 Laboratory to Accompany General Chemistry II | 2 |
| ECO 201 Principles of Economics I | 3 |
| GLY/EES 220 Principles of Physical Geology | 4 |
| MA 123 Elementary Calculus and Its Applications | 4 |
| STA 291 Statistical Methods | 3 |
| **Subtotal: Premajor Hours** | **30** |

| 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 | 2 |
| FOR 325 Economic Botany: Plants and Human Affairs | 3 |
| FOR 340 Forest Ecology | 4 |
| FOR 460 Forest Hydrology and Watershed Management<br>**or**<br>GLY/EES 385 Hydrology and Water Resources | 3-4 |
| *NRE 301 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<br>**or**<br>†NRE 399 Experiential Education in Natural Resources and Environmental Science | 3 |
| NRE 471 Senior Problem in Natural Resources and Environmental Science | 3 |
| NRE 555 Introductory Geospatial Applications for Land Analysis | 3 |
| PLS 366 Fundamentals of Soil Science | 4 |

**May be used to satisfy the University Writing Requirement.*

***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.*

*†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.*

**Subtotal: Major Hours** ..... **43-44**

## Analytical Skill Development and Environmental System Emphasis Areas

Students must take nine hours 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 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 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 | 2 |
| FOR 320 Forest Valuation and Economics | 3 |
| 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 I | 3 |
| PLS 396 Soil Judging | up to 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 |

### Geospatial Analysis

| | |
|---|---|
| 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 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 Plants | 4 |
| BIO/GEO 530 Biogeography and Conservation | 3 |
| FOR 219 Dendrology | 4 |
| FOR 370 Wildlife Biology and Management | 4 |
| GEO 365 Special Topics in Regional Geography (Subtitle required) | 3 |

### Forestry

*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 |
| *FOR 350 Silviculture | 4 |
| FOR 310 Introduction to Forest Health and Protection | 3 |
| FOR 320 Forest Valuation and Economics | 3 |
| FOR 400 Human Dimensions of Forestry and Natural Resources | 3 |
| FOR 425 Forest Management | 4 |

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**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
CLD/SOC 440 Community Processes and Communication ..... 3
ENS 400 Senior Seminar (Subtitle required) ..... 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

**Environmental Soil Science**

PLS 396 Soil Judging ..... up to 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/NRE 477G Land Treatment of Waste ..... 3
PLS 566 Soil Microbiology ..... 3
PLS 573 Soil Morphology and Classification ..... 3
PLS 575 Soil Physics ..... 3

**Water Resources**

AEN 461G Biometeorology ..... 3

BAE 438G/CE 460 Fundamentals of Groundwater Hydrology
**or**
GLY/EES 585 Hydrogeology ..... 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
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**

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.

**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 ..... minimum of 11**

**TOTAL HOURS: ..... 120**