MEMORANDUM

TO: Craig Beyrouty
Dean, College of Agriculture and Natural Resources

FROM: Elizabeth Beise
Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to Modify the Bachelor of Science in Environmental Science and Policy - Environmental Economics Concentration (PCC Log. No. 18088)

The proposal to modify the Bachelor of Science in Environmental Science and Policy - Environmental Economics Concentration has been administratively approved. A copy of the approved proposal is attached.

The change is effective Fall 2019. Please ensure that the change is fully described in the Undergraduate Catalog and in all relevant descriptive materials, including the undergraduate program’s four-year plan (contact Lisa Kiely at lkiely@umd.edu for more information).

MDC/
Enclosure

cc: Janna Bianchini, Chair, Senate PCC Committee
Barbara Gill, Office of Enrollment Management
Reka Montfort, University Senate
Huifang Pan, Division of Information Technology
Pam Phillips, Institutional Research, Planning & Assessment
Kendall Aughenbaugh, University Archives
Linda Yokoi, Office of the Registrar
Doug Roberts, Office of Undergraduate Studies
Joe Sullivan, College of Agriculture and Natural Resources
Lori Lynch, Department of Agricultural and Resources Economics
Mark Carroll, Environmental Science and Policy Program
University of Maryland PCC
Program/Curriculum/Unit Proposal

Program: ENSP - Environmental Economics

Department/Unit: AREC

College/School: AGNR

Proposal Contact Person (with email): Jill Janofsky, jjjanofsk@umd.edu

Type of Action (check one):

☒ Curriculum change (includes modifying minors, concentrations/specializations and creating informal specializations)
☐ Curriculum change is for an LEP Program
☐ Rename a program or formal Area of Concentration
☐ Establish/Discontinue a formal Area of Concentration
☐ Other:

□ Establish a new academic degree/certificate program
□ Create an online version of an existing program
□ Establish a new minor
□ Suspend/Discontinue a degree/certificate program
□ Establish a new Master or Certificate of Professional Studies program
□ New Professional Studies program will be administered by Office of Extended Studies

Italics indicate that the proposal must be presented to the full University Senate for consideration.

Approval Signatures - Please print name, sign, and date. For proposals requiring multiple unit approvals, please use additional cover sheet(s).

1. Department Committee Chair
   [Signature]
   2/19/19

2. Department Chair
   [Signature]
   3/19/19

3. College/School PCC Chair
   [Signature]
   3/20/19

4. Dean
   [Signature]
   4/14/19

5. Dean of the Graduate School (if required)
   [Signature]
   5-8-19

6. Chair, Senate PCC
   [Signature]
   5-8-19

7. University Senate Chair (if required)
   [Signature]
   7/19/19

8. Senior Vice President and Provost
   [Signature]
   7/19/19

Instructions:
When approved by the dean of the college or school, please send the proposal and signed form to the Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus-5031, and email the proposal document as an MSWord attachment to pcc-submissions@umd.edu.

Summary of Proposed Action (use additional sheet if necessary):

ECON 300 is no longer offered by the ECON department, and this proposal aims to replace that requirement for the ENSP - Environmental Econ major with several different options for courses in mathematical methods for economic analysis. The suggested list of replacements are all courses in “methods” -- courses covering mathematical or statistical methods that can be applied to economic analysis of environmental policy issues.

Note: There is no double-counting when meeting this requirement; students will merely have the option of choosing from a list of courses rather than only ECON 300 as they have historically. See the attached proposal for more information.

Unit Code(s) (to be entered by the Office of Academic Planning and Programs):
1. Current Catalog Description of Program. Include any special admissions information.

Environmental Science and Policy is a broadly multi-disciplinary, undergraduate major, drawing courses and faculty from 8 departments and three Colleges (the Colleges of Agriculture and Natural Resources; Behavioral and Social Sciences; Computer, Mathematical, and Natural Sciences).

New ENSP students begin in the College of Agriculture and Natural Resources, where they will be guided through a structured, exploratory advising process. ENSP students are expected to declare a concentration by the end of their third semester in the program and, once they declare their concentration, will move administratively to the College and department sponsoring the concentration. There, they are advised by a faculty member in their discipline.

The ENSP faculty and staff aspire to provide a strong identity for the students enrolled in this major, and we encourage students to take advantage of the rich resources available at a Research I Public University. Experiential learning through research, internships, and study abroad is strongly encouraged.

ADMISSION TO THE MAJOR

Incoming students who wish to enter ENSP may do so by selecting ENSP-Undeclared (Science) or ENSP-Undeclared (Policy) on their application for admission. On-campus students may declare ENSP during a meeting with the Assistant Director. Please review the ENSP website at www.ensp.umd.edu to learn about the program and its requirements prior to your first advising meeting.

PROGRAM OBJECTIVES

The curriculum of Environmental Science and Policy comprises an introductory core of lower-level courses in environmental science, environmental policy, biology, chemistry, earth sciences, geography, economics, calculus, and statistics. This is followed by in-depth and focused training in one of eleven areas of concentration in biological resources, earth systems, or the human dimensions of the field; and two upper-level courses in applied science and policy. The educational philosophy of the program is to train students broadly using a multi-disciplinary approach at the introductory level so that they are exposed to the myriad ways there are to learn about environmental systems and to address human-environment issues. This introductory approach precedes the concentration in which the students are prepared for post-graduate study or work in a discipline-based field. The combination of the lower-level core courses and upper-level depth in a concentration prepares graduates to work and study independently or as members of teams in which they will
be asked to be experts in one area, while understanding and using effectively other natural and social science knowledge and investigative approaches.

PROGRAM LEARNING OUTCOMES

- Utilize and integrate knowledge and understanding of natural and social sciences.
- Depth and knowledge in an area of concentration.
- Readiness for full-time employment and grad school

https://academiccatalog.umd.edu/undergraduate/colleges-schools/agriculture-natural-resources/environmental-science-policy/environmental-science-policy-major/

2. Current Requirements for Program. Include all course requirements for program.

The ENSP Core consists of:

ENSP101 – Introduction to Environmental Science
ENSP102 – Introduction to Environmental Policy
ENSP400 – Senior Capstone

One course each from groups of courses in 4 out of the following 5 areas: Biology, Chemistry, Earth Sciences, Economics, Geography (list of eligible courses in each area attached).

One course in calculus.

One course in statistics.

One 300 level ENSP course in applied science and policy (see attached for list of eligible courses).

Under this, the ENSP – Environmental Economics concentration consists of two tracks. Track 1: Preparation for PhD programs in economics and quantitative careers requires principles of macroeconomics (ECON201), calculus 2 (MATH141), a second course in statistics (ECON321 or STAT400) and intermediate microeconomics (ECON326). Track 2: Preparation for MS programs in public policy law and decision-making careers informed by economics requires principles of macroeconomics (ECON201), applied statistics (BMGT230 or ECON230), applied intermediate microeconomics (AREC326), and applied quantitative methods in economics (ECON300).

In addition the concentration requires 15 credits of restricted electives inside economics and 12 credits of restricted electives outside economics. Restricted refers to an approved list of courses complementary to environmental economics. (see attached)

3. Description and Rationale for Modifications. Be sure to specify whether modifications apply to the entire program or to a particular specialization, concentration, or offering (e.g., online offering) of the program.

ECON 300 is no longer offered. An alternative is needed to meet the requirement for an applied quantitative or research methods course under Track 2 of the ENSP – Environmental Economics concentration. To satisfy this requirement the proposal would allow students to select one course from the following list of applied quantitative or research methods courses:
Calculus II (MATH121 or equivalent)
Data Science for Environmental and Resource Economics (AREC380)
Computer-Based Analysis in Agricultural and Resource Economics (AREC382)
Econometric Applications in Agricultural and Natural Resource Economics (AREC422)
Applied Econometrics (ECON424)
Applied Quantitative Methods in Environmental Science and Policy (ENSP305)
Fundamentals of Qualitative Research Methods for Environmental Studies (ENSP306)

This change will only be applied to the ENSP - Environmental Economics concentration.

Also, ECON481 is a current restricted elective inside economics. AREC481/ECON481 comprise two sections of the same course now being taught by AREC so AREC481 will be added to the list of restricted electives inside economics (see supporting email from ECON).

4. New course requirements. For curriculum changes, the clearest way to present curriculum change is to use a two-column table, with the old curriculum in the left column and the new curriculum in the right. For example:

<table>
<thead>
<tr>
<th>Current Curriculum (Credits)</th>
<th>Proposed Curriculum (Credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUR 100 Course Title A (3)</td>
<td>COUR 100 Course Title A (3)</td>
</tr>
<tr>
<td>COUR 200 Course Title B (3)</td>
<td>COUR 200 Course Title B (3) Removed</td>
</tr>
<tr>
<td>COUR 201 Course Title C (3)</td>
<td>COUR 201 Course Title C (3) New</td>
</tr>
<tr>
<td>COUR 400 Course Title D (3)</td>
<td>COUR 400 Course Title D (3)</td>
</tr>
<tr>
<td>Total Credits: ##</td>
<td>Total Credits:##</td>
</tr>
</tbody>
</table>

Start by using the table provided in the space below, or add your own table as an appendix. For a new concentration or specialization, add the requirements in lieu of the table. For a new term structure offering of the program, indicate the courses that will be offered through the new option only if they differ from the requirements or offerings in the existing program.
Track 2: Preparation for Master's programs in Public Policy, Law, and careers that involve decision-making informed by economic analysis.

<table>
<thead>
<tr>
<th>Current Curriculum</th>
<th>Proposed Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON201</td>
<td>ECON201</td>
</tr>
<tr>
<td>ECON230* or BMGT230*</td>
<td>ECON230* or BMGT230*</td>
</tr>
<tr>
<td>ECON300</td>
<td>Removed</td>
</tr>
<tr>
<td></td>
<td>One from: NEW</td>
</tr>
<tr>
<td></td>
<td>MATH 121 or equiv.</td>
</tr>
<tr>
<td></td>
<td>ECON 424</td>
</tr>
<tr>
<td></td>
<td>AREC 422</td>
</tr>
<tr>
<td></td>
<td>AREC 380</td>
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<tr>
<td></td>
<td>AREC 382</td>
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<tr>
<td></td>
<td>ENSP 305</td>
</tr>
<tr>
<td></td>
<td>ENSP 306</td>
</tr>
<tr>
<td>AREC326 or ECON 326</td>
<td>AREC326 or ECON 326</td>
</tr>
</tbody>
</table>

5. Use the space below for any additional comments on the courses or other requirements selected for the revised curriculum. Typical comments may be clarifications of why certain courses are being replaced or added.

There should be no double-counting when meeting this requirement. For example, a course taken from the proposed list cannot also be used to meet the ENSP Core requirement for a course in applied environmental policy, or to meet Environmental Economics Concentration requirements for restricted electives inside and outside economics.

6. Sample plan. Provide a term by term sample plan that shows how a hypothetical student would progress through the program to completion. For undergraduate programs, this should be the four-year plan.

See attached.

7. For new or modified courses, please provide the course catalog information (credits, description, prerequisites, etc.). Suffixed "Selected" or "Special" topics courses should be avoided. If suffixed - Selected or Special Topics courses are offered regularly in the new program, you should make the courses permanent.

Please note: new courses or modifications to courses need to be submitted through the Testudo Curriculum Management system and will need to follow the normal VPAC course proposal review process. You may submit individual course changes to VPAC concurrently with the PCC proposal; however, the course changes may be held depending on the outcome of the PCC proposal.
8. Supporting documentation. Correspondence from any department(s) or programs whose courses will be required or otherwise impacted. If the change in curriculum introduces a requirement (or recommendation) that majors take a course offered by another department, it is important to establish that such a requirement will not unduly burden faculty and resources elsewhere on campus. Use space below for any comments, otherwise add supporting correspondence as an appendix.

On Friday, January 25, 2019, the ENSP Steering Committee unanimously approved these modifications. Included were representatives from ENSP and AREC, who approved the use of their courses as options for this requirement. Supporting email from ECON attached.

9. Impact on current students. It should be specifically acknowledged that students enrolled in the program prior to the effective date of any curriculum change may complete their program under the old requirements if they wish. The courses required must remain available, or suitable substitutions specifically designated.

Please note: If the proposed curriculum change affects articulation or transfer programs, the proposal should explain how currently-enrolled community college students will be able to complete their projected programs. Any necessary modifications to articulation agreements should be attached.

There will not be a significant impact as the students will be taking the same number of courses to satisfy the “quantitative or research methods” course requirement. The number of credits remains the same. Students will have more flexibility in selecting a course to meet the requirement.

10. If changing the term-structure of the program, identify the term structure that will be used for the program:
   - Traditional Semester
   - Approved Campus 12-Week Term (see Academic Calendars)
   - *Non-Standard Term

*If you are using a non-standard term structure, indicate whether relevant offices, such as the Registrar’s Office and International Scholar & Student Services, have been notified and support the program. Non-standard terms need to fit within the university’s scheduling system calendar, and non-standard terms need to work with international student visa requirements.

Term structure:

11. Additional Information. Depending on the nature of the changes, other information may also be necessary for review.
   - New learning outcomes and assessment plan for new concentration or specialization, or if changes to curriculum warrant.
   - New program description for the catalog.
If the program is linked to another program, such as in a combined bachelor/master program, a dual master or dual master/doctoral program, or a joint-program with another university, provide as an appendix the new curriculum for each arrangement. Supporting correspondence from the director of the linked program should be included.
Permission to list ECON424 as one of several courses in a list to replace ECON300 under track 2 of the ENSP-Environmental Economics concentration

Cindy Clement <cclement@umd.edu>  
To: "Lars J. Olson" <ljolson@umd.edu>  
Cc: Cropper <mcropper@econ.umd.edu>, Jill Janofsky <jjanofsk@umd.edu>, Lori Lynch <llynch@umd.edu>, Shanna Edinger <Edinger@econ.umd.edu>  
Wed, Apr 24, 2019 at 11:57 AM

Lars,

Maureen asked me to reply on her behalf. We are willing to have ECON300 replaced with ECON424 in track #2 for ENSP-Environmental Economics majors. However, we noticed some issues with the stated prerequisites for a couple of our courses. Since you are updating various documents related to your major requirements anyway, it would be a good time to make corrections and avoid confusing students. We think the required prerequisites for the ECON courses included in your proposal should be:

ECON422: [ECON321 or STAT140] and [ECON325 or ECON326]

ECON424: [ECON230 or BMGT230] and [ECON305 or ECON306]

ECON481: [ECON230 or BMGT230] and ECON306

ECON456: [ECON230 or BMGT230] and ECON306

Also, since AREC is now offering AREC481 which is a shared course with our ECON481, please list AREC481 as a course option in place of ECON481.

Let me know if you have any questions.

Regards,

Cindy

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Cindy Clement, Ph.D.
Director of Undergraduate Studies in Economics, University of Maryland
301 405 3267 ** Tydings 3108 ** www.econ.umd.edu
### ENSP Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSP101 (NS)</td>
<td>Intro to Env Science</td>
<td>Fa</td>
<td></td>
</tr>
<tr>
<td>ENSP102 (HS)</td>
<td>Intro to Env Policy</td>
<td>Sp</td>
<td></td>
</tr>
<tr>
<td>ENSP400 (SP)</td>
<td>Senior Capstone</td>
<td>Fa,Sp</td>
<td></td>
</tr>
<tr>
<td><strong>Applied Science and Policy (one)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSP305</td>
<td>Quant. Methods</td>
<td>Fa,Sp</td>
<td></td>
</tr>
<tr>
<td>ENSP330</td>
<td>Environmental Law</td>
<td>Fa</td>
<td></td>
</tr>
<tr>
<td>ENSP342</td>
<td>Oceans: Integ. Policy</td>
<td>Sp</td>
<td></td>
</tr>
<tr>
<td>ENSP350</td>
<td>Energy &amp; Science</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td><strong>Statistics (one)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See page 2.</td>
<td>See page 2.</td>
<td></td>
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</tr>
</tbody>
</table>

### General Education

#### Fundamental Studies (15 credits)

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Course</th>
<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>Academic Writing (AW)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Professional Writing (PW)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Oral Communication (OC)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Math (MA)</td>
<td>Calculus</td>
<td>3-4</td>
</tr>
<tr>
<td>Analytical Reasoning (AR)</td>
<td></td>
<td></td>
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</table>

#### Distributive Studies (25 credits)

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Course</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Sciences w/Lab (NL)</td>
<td>ENSP Lab Sci</td>
<td>4</td>
</tr>
<tr>
<td>Natural Science (NS)</td>
<td>ENSP 101</td>
<td>3</td>
</tr>
<tr>
<td>History and/or Social Sci (HS1)</td>
<td>ENSP 102</td>
<td>3</td>
</tr>
<tr>
<td>History and/or Social Sci (HS2)</td>
<td>ECON201</td>
<td>4</td>
</tr>
<tr>
<td>Humanities (HU1)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Humanities (HU2)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Scholarship in Practice (SP, major)</td>
<td>ENSP 400</td>
<td>3</td>
</tr>
<tr>
<td>Scholarship in Practice (SP, non-major)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

#### I-Series (6 credits)*

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Course</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>I- Series (IS)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>I- Series (IS)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

#### Diversity (4-6 credits)*

* May double-count with Distributive Studies

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Course</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Plural Societies (UP)</td>
<td></td>
<td>3-6</td>
</tr>
<tr>
<td>Understanding Plural Societies (UP) or Cultural Competency (CC)</td>
<td></td>
<td>0-3</td>
</tr>
</tbody>
</table>

### Experiential Learning (0-3 credits)*

* May overlap with major requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Course</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical experience is not required, but is strongly recommended.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ENSP Graduation Requirements

- Students must earn C- or higher in all courses used for ENSP Core and Concentration requirements.
- Students’ major GPA must be 2.0 or higher.

### Graduation Requirements

- Up to 6 AP courses may be used for Gen Ed
- No more than 60 credits earned from Community College
- Last 30 credits must be earned at Maryland
- 120+ cumulative credits and 2.0+ cum GPA
**ECONOMICS FOUNDATION - Choose Track 1 or Track 2.** (13-14 credits)

**Track 1: Preparation for PhD programs in Economics and quantitative careers that produce economic analysis.** Students who choose this track should strongly consider Area 4 Restricted Electives and/or a Minor in Mathematics.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 201</td>
<td>Princ of Macro-Economics</td>
<td>3</td>
<td>F,Sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH141</td>
<td>Calculus II</td>
<td>4</td>
<td>F,Sp</td>
<td>MATH140</td>
<td></td>
</tr>
<tr>
<td>ECON321* or STAT400*</td>
<td>Economic Statistics Applied Probability and Statistics I</td>
<td>3</td>
<td>F,W,Sp,Su</td>
<td>ECON200 and 201; MATH140 and 141.</td>
<td>MATH141</td>
</tr>
<tr>
<td>ECON326</td>
<td>Intermediate Microecon Analysis</td>
<td>3</td>
<td>F,Sp</td>
<td>ECON200 and 201; MATH140 and 141.</td>
<td></td>
</tr>
</tbody>
</table>

* These courses fill the ENSP Core Statistics requirement

**Track 2: Preparation for Master's programs in Public Policy, Law, and careers that involve decision-making informed by economic analysis.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON201</td>
<td>Princ of Macro-Economics</td>
<td>3</td>
<td>F,Sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON230* or BMGT230*</td>
<td>Applied Econ Statistics Business Statistics</td>
<td>3</td>
<td>F,Sp</td>
<td>ECON200 and 201; MATH111 or MATH220;</td>
<td></td>
</tr>
<tr>
<td>One from:</td>
<td>Calculus II</td>
<td>3</td>
<td>F, Sp</td>
<td>MATH140</td>
<td></td>
</tr>
<tr>
<td>ECON424</td>
<td>Applied Econometrics</td>
<td>3</td>
<td>F, Sp</td>
<td>[BMGT230 or ECON230] and [ECON305 or ECON306]</td>
<td></td>
</tr>
<tr>
<td>AREC382</td>
<td>Econometric Applications in AREC</td>
<td>3</td>
<td>F, Sp</td>
<td>AREC326 or ECON326</td>
<td></td>
</tr>
<tr>
<td>AREC380</td>
<td>Data Science for Env &amp; Res.Econ.</td>
<td>3</td>
<td>F</td>
<td>ECON200 or equiv.</td>
<td></td>
</tr>
<tr>
<td>ENSP305</td>
<td>Applied Quant. Methods in Env Sci</td>
<td>3</td>
<td>Sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSP306</td>
<td>Applied Qual Methods in Env Sci.</td>
<td>3</td>
<td>Sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AREC326</td>
<td>Interim Applied Microcon</td>
<td>3</td>
<td>F,Sp</td>
<td>ECON200 (or AREC240) and 201; Calculus I (MATH220, 130, or 140)</td>
<td></td>
</tr>
</tbody>
</table>

* These courses fill the ENSP Core Statistics requirement

**RESTRICTED ELECTIVES INSIDE ECONOMICS** (15 credits)

Choose four (4): Speak with your advisor about which courses serve your interests best.

- AREC 446 Sustainable Development 3 TBA ECON326 or AREC326
- AREC 453 Natural Resources and Public Policy 3 F ECON326 or AREC326
- AREC 454 Economics of Climate Change 3 Sp ECON326 or AREC326
- AREC 455 Economics of Land Use 3 F ECON326 or AREC326
- AREC 456 Energy and Environ Economics 3 Sp ECON326 or AREC326
- AREC481/ECN481 Environmental Econ (strongly rec) 3 Sp [ECON320 or BMGT230] and EON 306

Choose one (1): Courses selected here may not “double-count” as Restricted Electives.

- AREC 385 or ENSP 305 Food and Agricultural Policy 3 F ECON326 or AREC326
- AREC 430 Intro to Agric and Resource Law 3 Sp 60 credits, Calculus and Statistics
- AREC 433 Agric Dev., Pop Growth, & Env. 3 Sp ECON326 or AREC326
- AREC 489L Agric Water Qual: Policy and Legal Issues 3 Sp ECON326 or AREC326
- AREC 422 or ECON 422 Econometrics Econometrics I ** 3 F, Sp ECON326 or AREC326 [ECON 321 or STAT400] and [ECON325 or ECON326]
- ECON 456 Law and Economics ** 3 Sp ECON306 and [ECON230 or BMGT230]

** Due to severe over-enrollment in Economics, ENSP students should prepare to enroll in AREC courses in this category.
RESTRICTED ELECTIVES OUTSIDE ECONOMICS: At least 12 credits in one (1) supporting area below. Other courses are allowed as Restricted Electives with advisor approval in advance. Additionally, consider the benefits of Minors in GIS and/or Statistics; note, however, that only 6 credits may overlap between a major and minor; and there may be no overlap between two minors.

### Area 1. Social Science. At least 9 credits must be 300- or 400-level.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
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<tbody>
<tr>
<td>ANTH 266</td>
<td>Changing Climate, Changing Cultures</td>
<td>3</td>
<td>F</td>
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<tr>
<td>ANTH 450</td>
<td>Theory &amp; Practice of Environ Anthro</td>
<td>3</td>
<td>Sp</td>
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<tr>
<td>GEOG 335 or 435</td>
<td>Population Geography – renumbered</td>
<td>3</td>
<td>Sp, F</td>
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<tr>
<td>GEOG 421</td>
<td>Regional Geography: China</td>
<td>3</td>
<td>Sp</td>
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<tr>
<td>GEOG 422</td>
<td>Regional Geography: Sub-Saharan Africa</td>
<td>3</td>
<td>F</td>
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<tr>
<td>GEOG 423</td>
<td>Regional Geography: Latin America</td>
<td>3</td>
<td>Sp</td>
<td></td>
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<tr>
<td>GEOG 331</td>
<td>Intro to Human Dimen of Global Chng</td>
<td>3</td>
<td>F</td>
<td>GEOG 201 or 202; or ANTH 220 or 260</td>
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<tr>
<td>GEOG 332</td>
<td>Economic Geography</td>
<td>3</td>
<td>F</td>
<td></td>
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<tr>
<td>GEOG 373</td>
<td>Geographic Information Systems</td>
<td>3</td>
<td>F, Su,W</td>
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<tr>
<td>GEOG 415</td>
<td>Land Use, Climate Change and Sust</td>
<td>3</td>
<td>Sp</td>
<td>GEOG 306 or permission.</td>
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<tr>
<td>GEOG 416</td>
<td>Conceptualizing and Modelling Human-Environment Interaction</td>
<td>3</td>
<td>Sp</td>
<td>GEOG 306 and MATH 220.</td>
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<tr>
<td>GEOG 431</td>
<td>Culture and Natural Resource Mgt</td>
<td>3</td>
<td>F</td>
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<tr>
<td>GEOG 437</td>
<td>Political Geography</td>
<td>3</td>
<td>F</td>
<td></td>
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<tr>
<td>GVPT 200</td>
<td>International Political Relations</td>
<td>3</td>
<td>Sp,Su,F,w</td>
<td>GVPT 100 or ENSP102</td>
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<tr>
<td>GVPT 273</td>
<td>Intro to Environmental Politics</td>
<td>3</td>
<td>Sp</td>
<td></td>
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<tr>
<td>GVPT 306</td>
<td>Global Ecopolitics</td>
<td>3</td>
<td>Sp</td>
<td>GVPT 200</td>
<td></td>
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<tr>
<td>GVPT 406</td>
<td>International Political Economy</td>
<td>3</td>
<td>F</td>
<td>GVPT 200</td>
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</tr>
<tr>
<td>HIST 405</td>
<td>Environmental History</td>
<td>3</td>
<td>varies</td>
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<tr>
<td>SOCY 305 or 405</td>
<td>Scarcity and Modern Society</td>
<td>3</td>
<td>Sp</td>
<td>3 credits of sociology</td>
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<tr>
<td>SOCY 406</td>
<td>Globalization</td>
<td>3</td>
<td>F</td>
<td>6 credits of sociology or dept perm.</td>
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<tr>
<td>SOCY 410</td>
<td>Social Demography</td>
<td>3</td>
<td>Sp, F</td>
<td>6 credits of sociology or dept perm.</td>
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<tr>
<td>SOCY 415</td>
<td>Environmental Sociology</td>
<td>3</td>
<td>F</td>
<td>6 credits of sociology or dept perm.</td>
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</table>

### Area 2. Earth Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOSC375 or GEOL375</td>
<td>Intro to the Blue Ocean</td>
<td>3</td>
<td>F</td>
<td>MATH 140</td>
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<tr>
<td>CHEM231/231</td>
<td>Organic Chemistry I</td>
<td>3/1</td>
<td>Sp, F</td>
<td>CHEM131/132 strongly recommended</td>
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<tr>
<td>ENST 200</td>
<td>Fundamentals of Soil Science</td>
<td>4</td>
<td>F</td>
<td>CHEM131/132 strongly recommended</td>
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<tr>
<td>ENST 413</td>
<td>Soil and Water Conservation</td>
<td>3</td>
<td>Sp</td>
<td>ENST200</td>
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<tr>
<td>ENST 423</td>
<td>Soil-Water Pollution</td>
<td>3</td>
<td>Sp</td>
<td>ENST200 and CHEM 231/232 or perm.</td>
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<tr>
<td>ENST 430</td>
<td>Wetland Soils</td>
<td>3</td>
<td>Sp</td>
<td>ENST 200</td>
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<tr>
<td>ENST 440</td>
<td>Crops, Soils, and Civilization</td>
<td>3</td>
<td>Sp</td>
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<td>ENST 441</td>
<td>Sustainable Agriculture</td>
<td>3</td>
<td>Fa</td>
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<tr>
<td>ENST 451</td>
<td>Water Quality: Field and Lab Analysis</td>
<td>3</td>
<td>Sp</td>
<td>CHEM 231/232</td>
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<tr>
<td>GEOG 301</td>
<td>Adv Geographical Environmental Sys</td>
<td>3</td>
<td>Sp</td>
<td>GEOG 201/211</td>
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<tr>
<td>GEOG 441</td>
<td>The Coastal Ocean</td>
<td>3</td>
<td>Sp</td>
<td>GEOG 201/211</td>
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<tr>
<td>GEOL 340</td>
<td>Geomorphology</td>
<td>4</td>
<td>Sp</td>
<td>GEOL 100 or 120, GEOL110</td>
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<tr>
<td>GEOL 451</td>
<td>Groundwater</td>
<td>3</td>
<td>F</td>
<td>CHEM 131/132, GEOL 100 or 120, GEOL110, and MATH141</td>
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<tr>
<td>GEOL 452</td>
<td>Watershed and Wetland Hydrology</td>
<td>3</td>
<td>F</td>
<td>CHEM 131/132 and GEOL 100/110 or perm.</td>
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<tr>
<td>GEOL 453</td>
<td>Ecosystem Restoration</td>
<td>3</td>
<td>F</td>
<td>CHEM131/2, MATH 220 or 140; GEOL100, GEOL120, or ENST200.</td>
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<tr>
<td>LARC 450</td>
<td>Environmental Resources</td>
<td>3</td>
<td>F</td>
<td>ENST 200 or permission of dept.</td>
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</tbody>
</table>
### Area 3. Life Science

At least 9 credits must be 300- or 400-level.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
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<tbody>
<tr>
<td>BSCI 207</td>
<td>Organismal Biology</td>
<td>4</td>
<td>Sp,Su,F</td>
<td>BSCI 170/171, BSCI 160/161 and CHEM 131/132</td>
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<tr>
<td>BSCI 361</td>
<td>Principles of Ecology</td>
<td>4</td>
<td>Sp</td>
<td>BSCI 160/161 and (MATH 140 or MATH 220)</td>
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<tr>
<td>BSCI 370</td>
<td>Principles of Evolution</td>
<td>3</td>
<td>F</td>
<td>BSCI 160/161</td>
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<tr>
<td>BSCI 460</td>
<td>Plant Ecology</td>
<td>3</td>
<td>TBA</td>
<td>BSCI 160/161</td>
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<tr>
<td>BSCI 461</td>
<td>Plant Ecology lab</td>
<td>2</td>
<td>TBA</td>
<td>Pre- or corequisite: BSCI 460</td>
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<tr>
<td>BSCI 462</td>
<td>Population Ecology</td>
<td>3</td>
<td>F</td>
<td>BSCI 160/161 and MATH 220</td>
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<tr>
<td>BSCI 473</td>
<td>Marine Ecology</td>
<td>3</td>
<td>F</td>
<td>BSCI 207</td>
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<tr>
<td>ENST 214</td>
<td>Intro to Fisheries and Wildlife Science</td>
<td>3</td>
<td>F</td>
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<tr>
<td>ENST 314</td>
<td>Fisheries Mgmt and Sustainability</td>
<td>3</td>
<td>Sp</td>
<td>Spring of “even” years (2016, 2018, etc.)</td>
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<tr>
<td>ENST 373</td>
<td>Natural History of the Ches Bay</td>
<td>3</td>
<td>F</td>
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<tr>
<td>ENST 410</td>
<td>Ecosystem Services: Integ. Anal.</td>
<td>3</td>
<td>F</td>
<td>BSCI 361</td>
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<td>ENST 450</td>
<td>Wetland Ecology</td>
<td>3</td>
<td>F</td>
<td>BIOM 301 or permission of dept.</td>
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</tr>
<tr>
<td>ENST 460</td>
<td>Principles of Wildlife Mgmt</td>
<td>3</td>
<td>F</td>
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<tr>
<td>ENST 461</td>
<td>Urban Wildlife Management</td>
<td>3</td>
<td>F</td>
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<tr>
<td>ENST 464</td>
<td>Wildlife Habitat Modeling</td>
<td>3</td>
<td>Sp</td>
<td>BSCI361 and GEOG373</td>
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<tr>
<td>ENST 479</td>
<td>Trop Ecol and Resource Mgmt.</td>
<td>3</td>
<td>Sp</td>
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<tr>
<td>ENST 422</td>
<td>Biogeography</td>
<td>3</td>
<td>F</td>
<td>BSCI361 or GEOG301</td>
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<tr>
<td>PLSC 471</td>
<td>Forest Ecology</td>
<td>3</td>
<td>Sp</td>
<td>BSCI 160/161</td>
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</tr>
</tbody>
</table>

### Area 4. Preparation for Graduate Work in Environmental Economics

Mathematics, Theory, Econometrics. Note: courses selected here may not “double-count” with courses in the Choose (4) area of Concentration requirements on page 2. Please discuss with your advisor other, additional coursework that may be helpful.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Cr</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>MATH 240</td>
<td>Introduction to Linear Algebra</td>
<td>4</td>
<td>Sp, Su, F</td>
<td>MATH 141 or equivalent</td>
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<tr>
<td>MATH 241</td>
<td>Calculus III</td>
<td>4</td>
<td>Sp, Su, F</td>
<td>MATH 141 and MATH 240</td>
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<tr>
<td>ECON 325</td>
<td>Intermediate Macroeconomics</td>
<td>3</td>
<td>Sp, Su, F</td>
<td>ECON 200 and 201; and MATH141.</td>
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<tr>
<td>ECON 414</td>
<td>Game Theory</td>
<td>3</td>
<td>Sp, F</td>
<td>ECON306 and [ECON230 or BMGT230]</td>
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<tr>
<td>ECON 422</td>
<td>Econometrics I</td>
<td>3</td>
<td>Sp,F</td>
<td>ECON 321 and [ECON325 or 326]</td>
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<tr>
<td>AREC 422</td>
<td>Econometric Applications in AREC</td>
<td>3</td>
<td>Sp,F</td>
<td>ECON 306 or AREC326</td>
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<tr>
<td>STAT 401</td>
<td>Applied Probability and Stat II</td>
<td>3</td>
<td>Sp, F</td>
<td>STAT 400</td>
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</tbody>
</table>
### Year 1 in ENSP

#### BENCHMARKS:
- By the end of Term 2 in ENSP, you must complete:
  - ENSP101 or ENSP102
  - MATH 120 or 140
- And two of:
  - AREC240 (HS2) or AREC241 (IS) or ECON200 (HS2)
  - BSCI 160/161
  - CHEM 131/132
  - ENSP Earth Science with lab

#### Fall
- MATH 120 or **140**
  - (140 is strongly recommended)
- ENSP 101
- Oral Comm (OC)
- GEOG 201/211
- UNIV 100

#### Spring
- MATH **141**
  - (strongly recommended) or Elective
- ENSP 102 (HS1)
- ENGL 101 (AW)
- AEC 240 (HS2) or AEC 241 (IS)
- Humanities (HU1)

#### Summer
- Winter

#### Sem credits
- 15

#### Total credits
- 16

### Year 2 in ENSP

#### BENCHMARKS:
- By the end of Term 4, an ENSP major would need to complete:
  - ENSP101 and ENSP 102
  - Calculus
  - Two ENSP Core Lab Sciences
- **Policy** students must complete all of:
  - AREC240 (HS2) or Calculus II
  - Calculus II or req’d Earth Sci
  - Statistics
  - Wildlife Ecology and Management and Conserveation Biology students must complete all of:
    - BSCI207
    - BSCI222
    - CHEM 213/232
    - MATH 121 or Calculus II
- **Other Science** students must complete all of:
  - Calculus II or req’d Earth Sci
  - CHEM 231/232 or req’d Earth Sci
  - PHYS 121 or PHYS 141 or req’d Life Sci

#### Fall
- MATH 240 or Elective
- Humanities (HU2)
- BSCI 160/161 or CHEM 131/132
- ECON 201

#### Spring
- I-Series 1
- GEOG202 (CC)
- ELECTIVE
- ECON200
- Understanding PL Societies (UP1)
- Schol in Prac (SP1)

#### Summer
- Winter

#### Sem credits
- 16

#### Total credits
- 15

### Year 3 in ENSP

#### Fall
- ECON 326
- Field course (1)
- I-Series 2
- ECON 321 (AR)
- ELECTIVE

#### Spring
- ECON 481
- One from “Select 1”
- Field course (2)
- Field course (3)
- Applied Sci & Pol

#### Summer
- Winter

#### Sem credits
- 15

#### Total credits
- 15

### Year 4 in ENSP

#### Fall
- AREC 455
- AREC 453
- ENSP386
- ELECTIVE

#### Spring
- ENSP 400 (SP2)
- AREC 454
- Professional Writing (PW)
- ELECTIVE

#### Summer
- Winter

#### Sem credits
- 15

#### Total credits
- 12

---

**Suggested graduation plan: ENVIRONMENTAL ECONOMICS** (Gen Ed Program, Effective Fall 2016)

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**Reviewed – 10/12/16 – WW**