

**Department of Earth, Atmospheric, & Planetary Sciences**  
**Environmental Geosciences Major**  
Requirements

1<sup>st</sup> Semester

- (3) EAS 10900 (or 191) Dynamic Earth or EAS113 Envi Sci
- (4) CHM 11500 Chemistry I
- (4-5) Calculus I (MA 16100)
- (4) ENGL 10600 Fr. Comp (1<sup>st</sup> or 2<sup>nd</sup> sem)

15-16 Total Credits

2<sup>nd</sup> Semester

- (3) EAS 11800 Intro. to Earth Science
- (4) CHM 11600 Chemistry II
- (4-5) Calculus II (MA 16200)
- (3) Language & Culture (or other core requirement)
- (1) EAS 13700 (Fr Sem Earth & Atmospheric Sciences)

15 - 16 Total Credits

3<sup>rd</sup> Semester

- (3) EAS 22500 Atmospheric Sciences
- (4) Second Science Lab sequence, Part 1<sup>c</sup>
- (3) Environmental Elective
- (3) General Education Elective
- (3) XXX xxxxx Language & Culture

16 Total Credits

4<sup>th</sup> Semester

- (3) EAS 2xxxx Biogeochemistry
- (3) AGRY 33700 Environmental Hydrology
- (4) Second Science Lab sequence, Part 2
- (3) XXX xxxxx General Education Elective
- (3) XXX xxxxx Language & Culture

16 Total Credits

5<sup>th</sup> Semester

- (3) AGRY/ASM/CE Geographical Info. Sys.
- (3) CS xxxxx Programming<sup>c</sup>
- (3) EAS xxxxx EAS Env. Elective
- (3) STAT 30100 or equiv
- (3) XXX xxxxx Science or Engr Elective<sup>a</sup>

15 Total Credits

6<sup>th</sup> Semester

- (3-4) EAS 440 Geochem/CE 353 Physico-chem Envi Eng
- (3) EAS 30900 Computer Aided Analysis in Geos
- (3) XXX xxxxx Multidisciplinary Science
- (3-4) XXX xxxxx Capstone research experience
- (3) XXX xxxxx Free Elective

15-17 Total Credits

7<sup>th</sup> Semester

- (3) EAS xxxxx Capstone com/team/present
- (3) EAS xxxxx EAS Env. Elective
- (3) FNR 40600 Environmental Economics
- (3) XXX xxxxx General Education Elective
- (3) Great Issues Course

15 Total Credits

8<sup>th</sup> Semester

- (3) EAS xxxxx EAS Env. Elective<sup>b</sup>
- (3) EAS xxxxx EAS Env. Elective<sup>b</sup>
- (3) EAS xxxxx EAS Env. Elective
- (3) XXX xxxxx Free Elective
- (3) XXX xxxxx Free Elective

15 Total Credits

**124+ credits**

<sup>a</sup> Science or Engineering Elective needs to be 2xx or above, example MA 26100.

<sup>b</sup> EAS electives for advanced courses and specialization; 30000 level and above.

<sup>c</sup> Enrollment in SCI 21000 concurrently with CS or PHYS 172 (if selected) to meet Teamwork Principles & Experience.

Capstone Experience for Environmental Major

Objective: It is well established that the most effective way of learning is by “doing the real thing” rather than by reading or hearing about subject matter. Indeed John Dewey, almost a century ago, stated “*learning is based on discovery guided by mentoring rather than on the transmission of information.*” However, as pointed out in the Boyer report, research universities rarely employ practices that encourage this type of learning because of force of habit, cost, and lack of pedagogic models on which to base such curriculum. The EAS Environmental Major capstone research experience is intended to foster independent thought and hones problem-solving skills while integrating the student’s coursework with a trying to understand a real-life environmental problem. Field work and/or rigorous laboratory research is an integral part of the capstone research project. Students can participate in ongoing research projects with faculty, including nearby field stations and localities, often in cooperation with governmental agencies, private landowners, or environmental advocacy groups. The second component of the capstone (*Capstone in communication, teamwork, and research.*) sharpens communication skills and encourages interactions between students from different majors and faculty from different environmental science areas by providing a forum for discussing, analyzing, and debating environmental issues and topics related to any branch of environmental science. It also meets the COS requirements.

#### **A. EAS XXX Capstone in Undergraduate Research**

Required: One of the following

Option 1: 4 credits EAS 497 – Undergraduate Research. Undergraduate research with any faculty at Purdue, preferably with EAS affiliated faculty. There are currently ~ 10 EAS faculty whose research would be of interest to Environmental Majors and another 20 across campus (CE, AGRI, FNR, BIOL). This faculty could accommodate 20-30 students per year.

Option 2: 4 credits EAS 41900 Internship in Environmental Geoscience. One summer of internship at national, state or local labs or companies doing applied research.

Option 3: REU, Research - Study Abroad. Conducting one summer of research through programs at other university supported by national funding agencies such as NSF, NASA and EPA; or incorporating 4 credit hours of research at one of our study abroad programs.

Option 4: 3 credits EAS 51900 Applications of Environmental Geosciences (Prof. Harbor). This original capstone uses integrated projects for engaging students across disciplines. This course could be invigorated with coupling to Option 5 and should be a long term strategic goal of the environmental major curriculum.

Option 5: (pending) Integrated-team research at an EAS-Purdue research station (Wabash, Celery Bog, Indiana Dunes, Forest Research Station). This will be a long term EAS goal to develop a site where undergraduate research site where a body of research conducted by undergrads would build over time. Something that could bridge departments and seek external support would be a priority.

#### **B. Required: EAS XXX Capstone in communication, teamwork, and research.**

Course will be developed by Prof. Michalski in 2012. 3 modules will be taught: science writing, science and technical presentation, and team work. Course would focus on presenting research accomplished in part A. Course should be taken after Part A requirement or concurrently. This could be a high enrollment for other COS students looking to meet current requirements and as a possible graduate course in writing and presenting.

## EAS Recommended COS Electives

Lab Electives: CHM 11500-11600 is the first lab sequence; 2<sup>nd</sup> lab sequence should be PHYS or BIOL.

Programming Electives: CS 15800<sup>c</sup>, CS 17700<sup>c</sup>.

Statistics Electives: STAT 30100, 35000, 50300, 51100.

### College of Science Core Requirements

Looking for what counts as Great Issues, Multidisciplinary, General Education, Culture/Diversity, etc? See

<http://www.science.purdue.edu/index.php/for-current-students>

### Requirements for Entry into the Upper Division in Earth and Atmospheric Sciences

A student pursuing a major in Earth and Atmospheric Science must satisfy the following before being permitted to enter the upper division:

- (1) Completion of MA 16100, MA 16200, CHM 11500, CHM 11600 and the first course in the second lab sequence (example: PHYS 17200, 22000 or equivalents) each with a grade of C- or better; and
- (2) Completion of required lower division courses in the student's major area each with a grade of C- or better.

For the application of these requirements, entry into the upper division is defined as registration for the semester which includes 3xxxx Env Electives (EAS 35300 or 35400 for geology/teaching programs or EAS 42100 for atmospheric science) in the course selection.

### Graduation Requirement

To graduate in any EAS major, a student must have an average grade point index of 2.00 or above in EAS courses required for the major. This requirement applies to students who enroll in their EAS major after the Fall 2001 semester.

**The University requires that at least 32 credits hours must be at the 300 level or above.**

### Recommended EAS Environmental Major Electives (5 courses)

CHM 22400 - Introductory Quantitative Analysis

CHM 32100 - Analytical Chemistry I

AGRY 25100 - Introduction to Soils

AGRY 25500 - Soil Science

AGRY 33500 - Weather and Climate

AGRY 34900 - Soil Ecology

CHM 48100 - Environmental Chemistry

CE 35000 - Environmental Engineering

CE 35200 - Biological Principles of Environmental Engineering

CE 35400 - Introduction to Environmental Engineering

CE/CHEM/EAS – Analytical Instrumentation

EAS XXX – Isotope Biogeochemistry

EAS XXX – Dating Methods in Geology

EAS 38500 – Engineering Geology

EAS XXX – Atmospheric Chemistry

Carbon, Climate and Society, EAS 391/POL429,

Global Environmental Politics, POL 491,

Environmental Politics and Policy, POL 523,

FNR 35700 - Fundamental Remote Sensing

FNR 37500 - Human Dimensions of Natural Resource Management

FNR 40600 - Natural Resource and Environmental Economics

**EAS Environmental Elective selection should be based on career objective.**