

## **Department of Earth Sciences program description and requirements Effective Fall 2009**

The Department of Earth Sciences offers B.A. and B.S. degrees and provides a wide range of courses accessible to the non-major interested in the Earth and our environment. Our curriculum is designed to prepare majors for careers in Earth Science-related fields as well as to provide all students with the knowledge they need to address future environmental challenges. Our website, <http://www.geology.um.maine.edu>, describes in detail career opportunities, the role of Earth Science in society, and what to expect as a major.

In our courses, we focus on the fundamental physical and chemical processes that shape the surface and interior of our planet - today, prehistorically, and into the future. Specific content areas include climate change, geodynamics (e.g., plate tectonics and mountain-building), marine geology and coastal processes, environmental geology, and Earth materials (e.g., ice, rocks, and minerals). The curriculum is designed so that many upper division courses are available to students without extensive prerequisites. We also encourage students to become involved in faculty and graduate student research projects. We welcome students in the Honors College to pursue a B.A. or B.S. degree in Earth Sciences and focus their honors thesis on an Earth Science topic.

Several of our courses satisfy General Education requirements:

Applications of Scientific Knowledge - ERS 100, 103, 104, 108, 110, 140

Lab in the Basic or Applied Sciences - ERS 101, 102, 110/111, 200

Population and the Environment - ERS 102, 103, 108, 110, 121, 441

Writing Intensive - ERS 315, 316, 441

A B.A. or B.S. Earth Sciences graduate is prepared to enter directly into education, industry, or federal and state agencies. A B.S. is typically required to enter graduate school in Earth Sciences. Completing BIO 204, CHY 251/252, CHY 253/254 and BIO 100 in addition to a B.S. in Earth Sciences satisfies the entrance requirements for most medical or dental schools. The requirements for a B.S. and a B.A. differ only in the ancillary sciences. Both majors must complete the following: ERS 100 or ERS 101 or ERS 102 or ERS 103; ERS 200; ERS 201; ERS 312; ERS 315; ERS 316; ERS 317; ERS 330; ERS 499; and 12 credits of ERS courses at the 200 level or above. Ancillary requirements for the B.A. are: MAT 126; CHY 121/123; PHY 111 or PHY 121. Ancillary requirements for the B.S. are: MAT 127; MAT 232; CHY 121/123; CHY 122/124; PHY 111 or PHY 121; PHY 112 or PHY 122; COS 120 or COS 215 or COS 220 or FTY 480. The requirements leave sufficient opportunity for students to complete a minor in another field.

The Department also offers a concentration in Environmental Geology. The concentration requires that electives be chosen from ERS 210/211, ERS 323, ERS 350, ERS 369, ERS 408,

ERS 441, and ERS 460.

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Suggested curriculum for B.S. in Earth Sciences with a load of 15 credits per semester. For students pursuing a B.A., electives can replace courses that are not required. Note that many upper division ERS courses are offered only in alternate years.

#### First Year - First Semester

- \* ERS 101 Introduction to Geology Credits: 4  
or
- ERS 102 Environmental Geology of Maine Credits: 4
- \* MAT126 Calculus I Credits: 4
- \* NFA 117 Issues and Opportunities Credits: 1
- \* ENG 101 College Composition Credits: 3
- \* General Education Requirement Credits: 3

#### First Year - Second Semester

- \* ERS 201 Global Environmental Change Credits: 4
- \* CHY 121 Introduction to Chemistry Credits: 3
- \* CHY 123 Introduction to Chemistry Laboratory Credits: 1
- \* General Education Requirements Credits: 7

#### Second Year - First Semester

- \* ERS 200 Earth Systems Credits: 4
- \* ERS 315 Principles of Sedimentology and Stratigraphy Credits: 4  
or
- ERS 316 Structural Geology Credits: 4
- \* MAT127 Calculus II Credits: 4
- \* General Education Requirement Credits: 3

#### Second Year - Second Semester

- \* ERS 330 Mineralogy Credits: 4  
or
- ERS 312 Geochemistry Credits: 3
- \* COS or FTY ancillary requirement (Computer skills) Credits: 3
- \* PHY 121 Physics for Engineers and Physical Scientists I Credits: 4
- \* General Education Requirement (if necessary) or ERS elective Credits: 4-5

#### Third Year - First Semester

- \* ERS 315 Principles of Sedimentology and Stratigraphy Credits: 4  
or

ERS 316 Structural Geology	Credits: 4
* MAT232 Principles of Statistical Inference	Credits: 3
* PHY 122 Physics for Engineers and Physical Scientists II	Credits: 4
* General Education Requirement (if necessary) or ERS elective	Credits: 4

#### Third Year - Second Semester

* ERS 330 Mineralogy and/or ERS 317 Introduction to Geophysics or ERS 312 Geochemistry	Credits: 4
* CHY 122 The Molecular Basis of Chemical Change	Credits: 3
* CHY 124 The Molecular Basis of Chemical Change Laboratory	Credits: 1
* Electives (may include ERS electives)	Credits: 4-8

#### Third Year - Summer

* ERS 499 Approved Field Course.	Credits: 6
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#### Fourth Year - First Semester

* Electives (may include ERS electives)	Credits: 12-15
* General Education Requirement (if necessary)	Credits: 3

#### Fourth Year - Second Semester

* ERS 317 Introduction to Geophysics (if not yet taken)	Credits: 3
* Electives (may include ERS electives)	Credits: 9-15
* General Education Requirement (if necessary)	Credits: 3

## New ERS curriculum and degree requirements, Fall 2009

The Department of Earth Sciences has approved new degree requirements for students beginning in Fall 2009 semester. Current majors have the option of fulfilling the previous or new requirements for graduation. Please see your advisor to ensure you schedule classes appropriately in order to complete the requirements. Note that some course offerings may change slightly due to sabbaticals or other scheduling needs.

### New B.S. degree requirements

#### **Required (core) courses (35-36 credits)**

Credits

##### *Taught every year*

100, 101, 102, or 103			3 or 4
200 Earth Systems	Fall	Koons/Gerbi	4
201 Global Environmental Change	Spring	Kreutz	4
499 Field camp			6

##### *Taught alternate years*

##### Odd-even academic years (e.g., 2009-2010)

316 Structural Geology	Fall	Johnson	4
330 Mineralogy	Spring	Gerbi	4
317 Introduction to Geophysics	Spring	Koons	3

##### Even-odd academic years (e.g., 2010-2011)

315 Principles of Sedimentology and Stratigraphy	Fall	Belknap	4
312 Geochemistry	Spring	Olsen	3

**Electives** – must choose **12 credits** from 2xx or above. Each, except 210, 441, and 498 taught every other year.

210/211 Using Earth	Spring	Reeve	3
441 Glaciers and our landscape	Fall	Hall	3
498 Student research	Fall and Spring		

##### Odd-even academic years (e.g., 2009-2010)

408 Coastal processes and coastal zone management	Fall	JKelley	3
323 Severe and Hazardous Weather	Spring	Maasch	3
350 Fresh-water flow	Spring	Reeve	3

##### Even-odd academic years (e.g., 2010-2011)

369 Energy Resources	Fall	Johnson/Kreutz	3
433 Igneous and Metamorphic Petrology	Fall	Lux	4
209 Geology of Maine	Spring	JKelley/Lux	3
451 Tectonics	Spring	Gerbi	3
420 Computer Applications in Earth Science	Spring	Reeve	3
460 Marine Geology	Spring	JKelley	3

#### **Ancillary courses for B.S. (26 credits)**

MAT127	Calculus II	4
MAT232	Statistics	3
CHY121/123 and 122/124	Intro to Chemistry; Chemical Change	8
PHY111/112 or 121/122	General Physics; Physics for Eng. and Phys. Scientists	8
COS120 or 215 or 220 or FTY480	Programming; GIS	3

**Total: 73-74 credits**

## **New B.A. degree requirements**

### **Required (core) courses (35-36 credits)**

same as for B.S.

**Electives** – must choose **12 credits** from 2xx or above.

### **Ancillary courses for B.A. (12 credits)**

MAT126

CHY121/123

PHY111 or 121

Calculus

Intro to Chemistry

General Physics; Physics for Eng. and Phys. Scientists I

**Total: 59-60 credits**