

Doctor of Philosophy in Earth and Environmental Science with Dissertation in Geobiology

Students of exceptional ability as demonstrated in previous courses or in a master's degree program may pursue a program leading to the doctoral degree.

The prospective doctoral candidate in earth and environmental science with specialization in geobiology should develop a good background in chemistry, geology, mathematics, physics, and biology in addition to achieving a high level of competence in the field of specialization. Ph.D. students must include three credit hours of GEOB 592 and at least six credit hours of GEOB 593, unless the degree is completed in a shorter time. Additional information is found under the Graduate Program (page 28).

Fields of doctoral dissertation research include geomicrobiology, biogeochemical cycling, biologically mediated diagenesis, biological mineral precipitation and dissolution, isotopic geochemistry of biologically mediated processes, origin and early evolution of life, paleobiology, paleontology, and astrobiology. Interdisciplinary programs in the earth science fields are encouraged.

New courses:

GEOB 5XX, Advanced Geobiology, 3 cr, 3 cl hrs

Prerequisites: EARTH 201, CHEM 121 and 122, BIOL 111 and 112, or consent of instructor.

Offered on demand

Consideration of the interactions between biology and the earth sciences on an advanced level. Microorganisms and metazoans have exerted enormous impact on the development of Earth's crust, oceans, and atmosphere over the course of the planet's history. In turn, the physical and chemical components of the planet have shaped the development of the biota and its evolution. In depth treatment of multiple lines of evidence including geochemical traces, fossil remains, molecular phylogenies, atmospheric and aqueous chemistries, and numerical modeling of relevant processes.

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GEOB 592, Graduate Seminar, 1 cr, 1 cl hr

Prerequisite: Graduate standing

Offered spring semesters

Seminar presentations by graduate students on their current research topics. M.S. students must present at least one seminar; Ph.D. students must present at least one seminar in each of two different semesters. Graded on S/U basis; credits earned may not be applied towards the 30 credits required for the M.S. degree (same as GEOC 592, GEOL 592, GEOP 592, HYD 592)

GEOB 593, Seminar, 1 cr, 1 cl hr

Prerequisite: Graduate standing

Offered fall and spring semesters

Seminar presentations by faculty, students, and outside speakers. Graded on S/U basis. Satisfactory performance consists of regular attendance at approved seminars. Credit earned may not be applied towards the 30 credits required for the M.S. degree. (Same as GEOC 593, GEOL 593, GEOP 593, HYD 593)

GEOB 595, Dissertation (doctoral degree program), cr to be arranged.

Geobiology Faculty

Geobiology Coordinators

Penelope Boston – EES

Thomas Kieft – Biology

To serve as an advisory group for the program we have assembled a roster of *Geobiology Associated*

Faculty. These individuals will help guide the development and progress of the program. Each brings specially relevant perspectives to the broad spatial and temporal sweep of Geobiology.

Geobiology Associated Faculty

Michael Pullin – Chemistry
Peter Mozley – EES
David Johnson – EES
Kent Condie - EES

Existing courses of possible relevance to Geobiology

BIOL 511, Advanced Genetics, 3 hrs
BIOL 531 Virology, 3 hrs
BIOL 542 Advanced Microbiology, 3 hrs
BIOL 560 Population and Community Ecology, 3 hrs
BIOL 564 Molecular Ecology, 3 hrs
BIOL 566 Biotechnology, 4 hrs
BIOL 587 Advanced Virology, 3 to 4 hrs
BIOL 549/EES 549/PHYS 589 Astrobiology, 3 hrs (co-taught by Boston, Kieft, and Creech-Eakman in Physics)
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GEOL 508 Introduction to Soils, 3 hrs
GEOL 509 Soil Geomorphology, 3 hrs
GEOL 524 Sedimentary Petrography, 3 hrs
GEOL 525 Carbonate Sedimentology and Diagenesis, 3 hrs
GEOL 532 Interdisciplinary Field Research, 3 hrs
GEOL 540 Clastic and Carbonate Diagenesis, 3 hrs
GEOL 547 Depositional Systems and Basin Analysis, 3 hrs
GEOL 550 Cave and Karst Systems, 3 hrs
GEOL 550L C&K Lab, 1 hr
GEOL 555 Advanced Aqueous Geochemistry, 3 hrs
GEOC 516 Geochronology, 4 hrs
GEOC 517 Advanced Geochronology, 3 hrs
GEOC 543 Mineral Equilibria, 3 hrs
GEOC 565 Stable Isotope Geochemistry, 3 hrs
GEOC 566 Practical Aspects of Mass Spectrometry, 3 hrs (mostly lab)
GEOC 575 Theory and Practice of Electron Microprobe Analysis, 1 hr
HYD/GEOC 507 (CHEM 531) Hydrogeology, 3 hrs
HYD/GEOC 555 Advanced Aqueous Geochemistry, 3 hrs
HYD/GEOC 558 Environmental Tracers in Hydrology, 3 hrs
HYD 531 Hydrogeology, 1 hr (1st 5 wks of semester)
HYD 543 Ecohydrology, 1 hr (3rd 5 wks of semester)
HYD 554 Environmental Physics for Evapotranspiration, 3 hrs
HYD 558 Environmental Tracers in Hydrology, 3 hrs
CHEM 513 Separation Science, 3 hrs
CHEM 523 Advanced Topics in Biochemistry and Biophysical Chemistry, 3 hrs
CHEM 531 Hydrogeochem (see listing above)
CHEM 532 Atmospheric Chemistry, 3 hrs
CHEM 533 Global Biogeochemical Cycles, 3 hrs
PHYS 532 Atmospheric Remote Sensing, 3 hrs
PHYS 533 Advnced Topics in Atmospheric Physics, 1-3 hrs
PHYS 536 Atmospheric Convection, 3 hrs.