

Interdisciplinary Degree
Earth System Science



Earth System Science Core Courses

ESS 1000. The Earth System: 2. [I]. Not required for ESS majors. The course, which will focus on different aspects of the Earth system each semester, will include readings, invited speakers, field trips, etc. that emphasize the dynamic interconnections of Earth system components.

ESS 2000. Foundations of Geology. 4. [SE]. Introduces the Earth system, including the solid Earth, hydrosphere, biosphere and atmosphere. Emphasizes the interactions between these components of the Earth system along with past changes in the Earth system. Cross-listed with GEOL 2000. Prerequisites: a 1000-level science class with a lab and concurrent enrollment in CHEM 1020. Normally offered fall semester.

ESS 3480. Environmental Change. 3. [WB, G]. Examines changes in the bio-physical environments and landscapes of Earth during its habitation by humans. Investigates geographical variability in human-environment relationships and development of these relationships through time. Also examines integrated approaches to reconstructing past environmental conditions based on climatological, ecological, geological and archaeological evidence. Cross-listed with GEOG 3480. Prerequisites: Any USP S, SB, or SE, and any USP WA.

ESS 4001. Modeling the Earth System. 4. Students will use models to learn how Earth systems are integrated through exchanges of energy and matter, and how Earth system functioning is susceptible to human alteration. Unifying concepts focus on interactions among Earth system components (the lithosphere, hydrosphere, biosphere and atmosphere). Fundamental equations driving radiant, thermal and latent energy transfers, and elemental cycling will be examined. Students will study how coupled atmosphere/ocean/land-surface global climate models are designed, how exchange processes for each component are parameterized, and what their major uncertainties are. In the laboratory sessions, students will build or run models of increasing complexity as we progress through the semester.

ESS 4950. Earth System Exploration. 3. [WC]. The goal of this class, using a real-life situation, is the conduction of interdisciplinary research on some component of the Earth system. The class will be subdivided, and at least two ESS questions will be posed to each group, each of which will be organized across different Concentrations. Each group will collect data and conduct reading, writing, and presentations concerning those topics.

ESS 4970. Internship. 2. Academic credit for the internship. The proposal for internships requires approval of a faculty committee and the internship mentor, and the experience is overseen by a faculty advisor and the internship mentor. A written report is required.

Earth System Science
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