**Building a Program in Earth System Science at UC Davis**

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The departments of Land, Air & Water and Geology at UC Davis are in the planning stages of developing a joint major in Earth System Science, with a focus on sustainability. We’ve built a curriculum around classes that are already on the books, with three courses to be developed to fully cover the discipline. The curriculum for the B.S. in Earth System Science (ESS) is built upon a foundation of chemistry, physics, calculus, and biology. A GE-level class in ESS exposes the student to the connectedness between each component of the Earth system, biogeochemical cycling and the systems approach. The practical aspect of this introductory class is to recruit students into the major. Depth subject matter consists of 8 core courses that integrate the principles of hydrology, atmospheric sciences, geology, oceanography, ecology and climate. Majors are required to choose one course from each of the five emphases (geosphere, hydrosphere, atmosphere, biosphere & critical thinking and analysis) to encourage breadth of understanding, plus an additional 12 units from any of the emphases to enable the student to customize their coursework. A capstone course is required of all seniors that combines independent research in their chosen emphasis with aspects of policy and management.

The overarching goal of the program is to direct students away from the traditional view of our planet as a set of discrete, isolated sub-systems (e.g., the oceans, the solid earth, the atmosphere) and toward a modern perspective that concentrates on the connectedness and interactions between sub-systems. The Earth System Science approach is a modern response to understanding such swiftly developing modifications as climate change, ecosystem stress and resource depletion. We think that students are increasingly more receptive to a multi-disciplinary view of earth and environmental sciences and that we can attract more students into the sciences through this major.

The strength of the proposed program at UCD is its interdisciplinarity, merging the diverse and overlapping talents of faculty currently separated by the artificial boundaries of departments and colleges. Issues of concern include 1) a fear that we may cannibalize our own majors, weakening each department’s enrollments at the expense of the new major’s growth, 2) a softening of standards to attract students who otherwise may be wary of the rigor of majors in the geosciences and environmental sciences, 3) the lack of a direct pipeline into careers after graduation, and 4) the vague nature of the phrase ‘earth system science.’ Informal discussions with students in our current classes suggests that they don’t have a clear image of what earth systems science means or how it may help them to develop goals for their post-graduation future.

Career options for students graduating with BS degrees in ESS are comparable to those typically associated with graduates from related science programs. Graduates with the ESS degree will be prepared to enter an array of scientific careers based in private industry, government, non-governmental agencies and environmental/geotechnical consulting. ESS graduates will be well positioned to enter secondary education in a diversity of scientific disciplines. Some graduates may use their science training as a starting point for a career in environmental law. ESS graduates will have the requisite quantitative and scientific foundation for graduate study and research in environmental science, geoscience, atmospheric and hydrologic science, as well as climate science. The special talents that will differentiate ESS graduates from other science majors are 1) their broad understanding of how natural systems interact, 2) an awareness for recognizing connections between apparently disparate disciplines, and 3) the influence of human activities on natural systems.