

B.S. in Global Environmental Science 2004-2005 Assessment Report

Defined learning outcomes:

1. Grasp of fundamentals of chemistry, biology, physics, and calculus
2. Basic understanding of derivative science fields of Geology & Geophysics, Meteorology, and Oceanography
3. Understanding of earth system science and the tools used to describe and quantify the interactions of the atmosphere, hydrosphere, lithosphere, and biosphere, including humans.
4. Knowledge of the scientific approach to problem solving and hypothesis formation and testing; experience in conducting scientific research.
5. Ability to express themselves clearly and concisely in written form and in oral presentations.

Learning outcomes are available in the GES Student Services office.

Mapping of learning outcomes onto curriculum:

CATEGORY	COURSES	LEARNING OUTCOMES
Basic Sciences Requirements	BIOL 171, 171L, 172, 172L	1,5
	CHEM 161, 161L, 162, 162L	1
	PHYS 170, 710L, 272, 272L	1
	MATH 241, 242, 243 (or GG312), 244 (or ECON 321)	1
Derivative Sci. Require.	GG 101, 101L or GG170	1,2,3
	MET 200	1,2,3
	OCN 201, 201L	1,2,3
Foundation Courses Require.	OCN 100	3
	GEOG 410 or 411	3
	OCN 310, 310L	3,4
	OCN 315	3,5
	OCN 320	3,5
	OCN 363	3
	OCN 401	3,5
Coupled System Electives	3 upper division courses	3
Senior Research Courses	OCN 490	3,4,5
	OCN 499	3,4,5

Aspects of the program that were assessed:

1. Success of graduates: employment status; pursuit of graduate degrees
2. Diversity of student population: gender; balance of local, mainland US, and foreign students
3. Degree completion rates: time to degree; attrition rates
4. Curriculum: evaluation of courses offered and need for new courses
5. Capstone experience: senior research thesis and oral presentation

Type of instrument or data-gathering approach:

1. Exit interviews with graduating seniors are conducted by Leona Anthony, SOEST Student Services Specialist. All seniors were asked to participate. Students were asked for feedback on the following categories: Faculty, Faculty Advising, Courses, Research Experiences, Resources, Other, After Graduation Plans.
2. All graduates are tracked by email contact through Rene Tada, GES Student Services Specialist, to determine success in graduate programs and employment and to receive additional feedback on how the major prepared them for life after the B.S.
3. Statistics on the entire student population are maintained by Rene Tada.
4. Informal information from individual students via advisors and from president of GES student club to chair. This is volunteer information usually pertaining to specific courses/faculty/advisors.
5. Annual meeting of GES course instructors to discuss curricular problems and needs.
6. Mid-fall-semester oral survey of all new majors (all enrolled in OCN 100) for feedback on courses/advising/other problems. This population includes freshmen and transfer students.
7. Course evaluations maintained by Oceanography Department secretary. For lower division courses, this includes majors and non-majors. For upper division courses, most students are majors.
8. Information collected was assessed by the SOEST and GES Student Services Coordinators and the GES Executive Committee (Chair and 2 other faculty in GES program).

Response rates:

1. Response rate on exit surveys for all SOEST undergraduates was about 96%.
2. Out of 39 graduates to date, we are in contact with 38 (97%).
3. Response rate on course evaluations is nearly 100%.

How the assessment was used to improve program quality:

1. Curriculum changes: additions to the curriculum.
Two required courses were added to the curriculum in Fall 2003, OCN 100, Seminar in Global Environmental Science, and OCN 490, Communication of Research Results. We have monitored course evaluations and both courses have been very well received. We are incorporating additional material into OCN 490 to help prepare

students for job and/or graduate school applications/interviews. Three new Coupled Systems electives have been added: OCN 403, Environmental Microbial Biotechnology (first offered Spring 2005) ; OCN 470, Air Pollution; and OCN 480, Dynamics of Marine Ecosystems: Biological-Physical Interactions (both to be first offered Spring 2006).

2. Curriculum changes: changes to existing courses.
Discussions are underway to develop a means to incorporate field measurements and data collection in a GES Foundation Course (probably OCN 310L).
3. Changes to requirements:
No changes have been made in 2004-05. We are considering replacement of one Foundation Course with another to be developed.
4. Curriculum development:
Working groups have been organized to address the following issues: a) integration of modeling efforts through several GES courses, b) improvements to OCN 315 in response to critical course evaluations, c) problems with math instruction, d) incorporation of GIS training in the curriculum.
5. We are making industry/employment contacts to increase options for use of internships for senior thesis research, and for subsequent employment of graduates. Contacts have been made with the Navy, EarthTech, Shaw Environmental, STI, Inc., URS, and the US Geological Survey.
6. Contacts have been established with other universities (University of Technology, Sydney, Australia; University of Tasmania; University of Wales; University of Sofia, France; and Pomona College, CA) to discuss student exchange programs.

General Education Assessment within the GES Major:

1. Students gain experience in information-accessing and – processing through projects in the following required classes: GEOG 410, OCN 310L, OCN 315, OCN 320, and OCN 401. OCN 363 is largely dedicated to learning techniques of computer data access and processing. Additionally, students gain substantial experience during completion of their senior research theses.
2. Problem-solving is a focus of OCN 310L, a required course. OCN 490, Communication of Research Results, also required, helps students develop necessary skills in oral communication. All students present their senior research results in a public seminar.
3. GEOG 410, OCN 310L, OCN 315, OCN 320, and OCN 401 (all required courses) all include projects that provide students with active learning experiences in formulation of scientific questions, information and data accumulation and analysis. The senior thesis provides a year-long exposure to the processes of scientific research.