Terrascope

The Terrascope Program (http://web.mit.edu/terrascope/) is a learning community for first-year students built around the idea that the Earth system provides a valuable context for learning basic concepts in science and engineering. Students are encouraged to apply those concepts in creative ways to understand the interdependent physical and biological processes that shape our planet and to design strategies to ensure a sustainable environment for the future. Terrascope was established in academic year 2003 as one of the educational components of MIT's Earth System Initiative (http://web.mit.edu/esi/) and is a collaborative effort by the Departments of Earth, Atmospheric, and Planetary Sciences and Civil and Environmental Engineering.

Each year, Terrascope students enroll in a fall-semester subject, 12.000 Solving Complex Problems (also known as Mission), in which they work in teams to propose solutions to a complex problem that requires a multidisciplinary approach. In spring, they then broaden and deepen their understanding of the problem in 1.016 Communicating Complex Environmental Issues: Designing and Building Interactive Museum Exhibits. An optional one-week credit-bearing subject on museum design and construction is offered during Independent Activities Period as a way of jump-starting the spring semester. A new subject, SP.360 Terrascope Radio (offered for the first time in spring 2005) provides students with an introduction to the use of radio documentaries to communicate scientific and engineering concepts. A highlight of the year is a one-week field experience over spring break during which students have a chance to complement class work with on-site exploration of the topic they have studied in the two semesters. In addition to coursework, Terrascope students and faculty meet each week over lunch to hear about current research in Earth system science and engineering. Faculty in Civil and Environmental Engineering and Earth, Atmospheric, and Planetary Science, as well as Terrascope staff, serve as freshman advisors for Terrascope students, providing strong mentoring opportunities. Students may continue work begun during their freshmen year in Undergraduate Research Opportunity Program (UROP) projects.

Program Highlights

In fall 2004, 45 Terrascope students (joined by 34 non-Terrascope freshmen) enrolled in 12.000 Mission 2008, in which they were asked to study ecotourism in the Galapagos and recommend strategies to protect the delicate ecosystems while allowing for economic and social development. Students worked in teams, using expert mentors as resources. Each team also worked with two undergraduate teaching fellows who had been students in Mission in a previous year. The semester culminated with students presenting their solutions in two ways: a content-rich website of their own design and a formal two-hour presentation in which they defended their solution before an international panel of experts. The presentation was open to the public and was also webcast live. (Links to the site and a video archive of the presentation may be found at the following address: http://web.mit.edu/12.000/www/m2008/finalpresentation/.)

In the spring subject, 1.016 Communicating Complex Environmental Issues, small teams of students, working with undergraduate teaching fellows, designed, engineered,

and built interactive exhibits to teach about aspects of the Galapagos. New this year, the exhibits were displayed in a high-traffic, public space (Lobby 13), where they were viewed by hundreds of people. Another important change in 1.016 this year involved the participation of a group of local high school students. The high schoolers tested and critiqued the Terrascopers' early prototypes, and they also served, along with local museum professionals, on the panel that evaluated the final exhibits. The exhibits were extremely successful. A number of them have been adopted for use as prototypes in museums and aquariums nationwide.

In 2004, the program received a four-year grant from the Henry Luce Foundation for the annual Terrascope Field Expedition that enables Terrascope students to visit the site of each year's research focus. During the March 2005 spring break, 41 freshmen, 16 undergraduate teaching fellows, two graduate student teaching assistants, and four faculty and academic staff members visited Ecuador's Galapagos Archipelago. Their itinerary included organized lectures on relevant topics, land- and sea-based visits to sites of interest, audiences with government officials and representatives of key nongovernmental organizations, and informal meetings with residents. In addition to inspiring students to reexamine their solutions to fall's complex problem, the visit also helped them to enhance their plans for spring's museum exhibits. A subset of this group was also enrolled in Terrascope Radio and made sound recordings for use in a radio segment to be aired at the end of the semester.

Eight students undertook Terrascope-sponsored UROP projects during the year as a way to expand their interest in Earth systems research.

New Developments

In spring 2005, SP.360 Terrascope Radio, a 12-unit subject, was offered for the first time. In this class, developed in collaboration with MIT's program in Comparative Media Studies, students explored radio as a medium of expression and communication. The final product of the class was a radio documentary on the Galapagos that was written, recorded, produced, and delivered entirely by Terrascope Radio students. The program aired on MIT's campus radio station, and it has since been picked up and broadcast by KFAI, a public radio station in Minneapolis-St. Paul. (A link to the program can be found at http://web.mit.edu/terrascope/.) The Humanities, Arts, and Social Sciences (HASS) Overview Committee granted permission for Terrascope students to use SP.360 as a communication-intensive subject in HASS, a decision that will be reviewed for possible permanent status in fall 2005.

Staff and Enrollment

The program's directors are Professors Sallie Chisholm (Civil and Environmental Engineering and Biology) and Kip Hodges (Earth, Atmospheric, and Planetary Sciences). Subject 12.000 Mission 2008 was taught by Professor Hodges together with Professor Rafael Bras (Civil and Environmental Engineering), with help from two teaching assistants, Jeremy Boyce and Elke Hodson. Professor Bras and Dr. Ari Epstein, lecturer in the School of Engineering, taught 1.016 Communicating Complex Environmental Issues, with significant help from Steven Rudolph. Dr. Epstein, assisted by graduate teaching assistants Joellen Easton and Rekha Murthy, was in charge of SP.360 Terrascope Radio.

Debra Aczel is the program administrator, and Ruth Weinrib is the administrative assistant.

More students applied to Terrascope than could be accepted in fall 2004 (85 applicants, with 45 accepted). Forty-two students completed the semester (28 female and 14 male). Spring's enrollment was 38 (24 female and 14 male).

The distribution of majors declared in spring 2005 was as follows:

Major	Students
Course 12	6
Course 10	5
Course 2	4
Course 6	4
Course 7	3
Course 18	3
Course 3	3
Course 1	2
Course 5	2
Course 8	2
Undesignated	2
Course 15	1
Course 16	1
Total spring 2005 enrollment	**38**

Kip Hodges
Codirector
Professor of Earth, Atmospheric, and Planetary Sciences

Sallie Chisholm
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More information about Terrascope can be found online at http://web.mit.edu/terrascope/.