99/199. Reading and Research. *Staff.* Individual programs of reading or of writing (expository or creative) for specially qualified students. Permission of department chair required. 99, lower-level; 199, advanced work. Course or half-course. May be repeated. Each semester. (Summer Reading and Research taken as 98/198.)

Courses for Seniors

190. Senior Exercise/Seminar Option. *Mr. Dettmar.* Students electing this option take a second 170-series Advanced Studies seminar to satisfy the senior exercise requirement. A grade and credit are assigned for the 170 seminar; enrollment in 190 confers no credit but will receive one of the following designations: No credit, pass or distinction. Students must receive at least a C-minus in the Advanced Studies Seminar in order to receive a pass in 190. Each semester.

191. Senior Thesis. *Mr. Dettmar.* Students choosing this option enroll both semesters of the senior year. A grade will be assigned for the fall semester based upon the completion of a chapter of thesis (or approximately 20 to 25 pages of writing toward the thesis) and for the spring semester upon completion of the thesis. Eligibility based on grade point average and permission of the department. Each semester.

Environmental Analysis Program

Professor Richard Hazlett, coordinator
Professor Char Miller, director
Additional Core Faculty: Professors Cutter, Davis
Track Advisory Committee: Professors Cutter, Davis, Elderkin, Fowler, Hazlett, Miller, Perry, Tanenbaum, Taylor, Worthington

One of the greatest challenges facing humankind in the new century is the need to develop a sustainable civilization in a world with natural systems and limits under increasing strain from economic expansion and population growth. The Environmental Analysis Program (EAP) is designed to prepare students for careers in many environmental problem-solving fields, including law, policy, medicine, chemistry, conservation, global change science, urban planning, architecture and resource management. It also provides a solid background for careers in environmental education and community environmental action.

The EAP participates in the Swarthmore-Macalester-Pomona "Globalization and the Environment" Semester at the University of Cape Town, South Africa, where students can experience firsthand the strains of development in a new democracy set in a spectacular and precariously conserved natural setting, the Cape Floristic Province. It also offers an environmental science study abroad program on the North Island of New Zealand, specializing in Maori and non-tribal land use and pollution issues, conservation and renewable energy development.

Requirements for the Major in Environmental Analysis

All EA majors take the following core courses:

50, Introduction to Environmental Studies
70, Nature, Culture, & Society
190, Environmental Seminar
191, Senior Research in Environmental Analysis

EA Major Tracks

In addition to the core requirements, students must complete the requirements for one of the following eleven EA major tracks.

A. Environmental Biology *(Track Advisor: Mr. Fowler, biology)*

1. BIOL 40, Introductory Genetics
2. BIOL 41E, Introductory Ecological and Evolutionary Biology
3. BIOL 104, Conservation Biology
3. Three from: BIOL 112, Advanced Animal Ecology; 116, Ecology and Evolution of Plants; 131, Invertebrate Biology; 132, Vertebrate Biology; 144, Comparative Endocrinology; 189L, Emerging Infectious Diseases
4. CHEM 1A,B, General Chemistry; or 51, Accelerated General Chemistry
5. CHEM 110A, Organic Chemistry 1
6. ECON 52, Microeconomics
7. One from: ECON 127, Environmental and Natural Resource Policy; 128, Energy Economics and Policy; PZ ENVS 172, Environmental Economics; CM GOVT 119, Introduction to Environmental Law and Policy; HIST 100CM: Crisis Management, National Forests and American Culture
8. One from the GEOL 20 series, Introductory Geology

B. Environmental Chemistry *(Track Advisor: Charles Taylor, chemistry)*

1. CHEM 1A,B, General Chemistry or 51, Accelerated General Chemistry
2. One from JS CHEM 70, Chemistry and the Environment; CHEM 106, Environmental Chemistry
3. CHEM 110A,B, Organic Chemistry 1 and 2
4. CHEM 158B, Physical Chemistry: Thermodynamics and Kinetics
5. CHEM 161, Advanced Analytical Chemistry
6. ECON 52, Microeconomics
7. One from BIOL 40, Introductory Genetics; one course from the GEOL 20 series, Introductory Geology
8. MATH 30 and 31, Calculus 1 and 2
9. PHYS 51A, B, General Physics 1 and 2

C. Environmental Ethics *(Track Advisor: Ms. Davis, philosophy)*

1. One from: GEOL 20 series, Introductory Geology; JS BIOL 62, Environmental Science
2. JS BIOL 146L Ecology or BIOL 40 and 41E
3. One from: PHIL 1, Problems of Philosophy; PZ PHIL 7, Introduction to Philosophy
4. One from: PHIL 31, History of Ethics, or 32, Ethical Theory
5. One from: ANTH 54, Human Interactions with the Pre-Industrial Environment; ANTH 129, Native California; PHIL 36, Values and the Environment; PZ ENVS 130, Environmental Ethics
6. Two from: PHIL 38, Bioethics; 104 or PZ PHIL 103, Philosophy of Science; RLST 40, Religious Ethics; RLST 166A, Religion and the Environment
7. One from: PZ ENVS 46, Environmental Awareness and Responsible Action; PZ ENVS 141, Progress and Oppression: Ecology, Human Rights and Development
8. Four electives from any of the EA options lists, two of which must not be in philosophy or religious studies

D. Environmental Analysis in Geology *(Track Advisor: Mr. Hazlett, geology)*

1. ECON 52, Microeconomics
2. One from: ECON 127, Environmental and Natural Resource Policy; ECON 128, Energy Economics and Policy; PZ ECON 172, Environmental Economics
3. One course from the GEOL 20 series, Introductory Geology
4. GEOL 125, Earth History
5. Any two intermediate-level geology courses numbered 110-127, except 125

6. GEOL 152, Climate Change
7. Any advanced geology course, numbered 150 through 185
8. Three non-geology electives from the EA options lists, with no more than two courses from list 2

E. Human Behavior and the Environment Track *(Track Advisor: Ms. Perry, Anthropology)*

1. One from: GEOL 20 series, Introduction to Geology; JS BIOL 62, Environmental Science
2. JS BIOL 146L, Ecology or BIOL 40 and 41E
3. ECON 52, Microeconomics
4. ANTH 54, Human Interactions with the Pre-Industrial Environment
5. Three courses from each of the following two groups (but at most two from any single department):
   (a) Policy and Economics sub-track: ECON 127, 128; HM POST 179; POLI 60, 136; PZ ENVS 33, 141, 147; SOC 55, 162
   (b) Values, Motives and Attitudes sub-track: ANTH 124, 129; EA 80; ENGL 157; HIST 127; PHIL 36; PPE 160; PSYC 78, 54; PZ ANTH 164, 168; PZ ENVS 148; RLST 166A
6. One from: BIOL 104, CHEM 106, EA 85, JS BIOL 156, JS CHEM 70, JS BIOL 109, PHYS 17

F. Mathematical Analysis for Environment Issues *(Track Advisor: Mr. Elderkin, Mathematics)*

1. ECON 52, Microeconomics
2. One from ECON 127, Environmental and Natural Resource Policy; 128, Energy Economics and Policy; PZ ECON 172, Environmental Economics
3. MATH 32, Calculus III
4. MATH 60, Linear Algebra
5. MATH 102, Differential Equations and Modeling
6. MATH 152, Statistical Theory or 158, Statistical Linear Models
7. Two from: HM MATH 136, Complex Variables and Integral Transforms; MATH 151, Probability; 181, Dynamical Systems; 183, Mathematical Modeling; 187, Deterministic Operations Research
8. Three courses from one of the following lists.
   a) Math and biology sub-track:
      BIOL 40 and 41; or JS 44 and 146L
      and one from: BIOL 104, 112, 116, 131, 132, 144, or 189L
   b) Math and economics/development sub-track:
      ECON 101, 126, 127, 128, 154, 159, 160; POLI 178; PZ ECON 172; PZ ENVS 141. (Note: selected courses may not overlap with the Category 2 requirement, above.)
   c) Math in geology sub-track:
      A course from the GEOL 20 series; GEOL 110, 115, 125 plus one additional geology course of choice
   d) Math in politics and society sub-track:
      ANTH 54, 59, 124; CM GOVT 119; HM POST 140, 178; POLI 60, 136, 139; PZ ANTH 164; SOC 55, 162

G. Environmental Policy *(Track Advisor: Mr. Worthington, Politics)*

1. One from ECON 127, Environmental and Natural Resource Policy; ECON 128, Energy Economics and Policy; PZ ECON 172, Environmental Economics

2. JS BIOL 146L, Ecology. Alternatively, students may take a two-course sequence, BIOL 40 and 41E at Pomona.
3. POLI 3, Introduction to American Politics
4. POLI 135, Policy Implementation and Evaluation or POLI 136, Politics of Environmental Justice
5. Four courses from the following: CM GOVT 119, 120; ECON 127, 128; HIST 100A, 100T; LGCS 40; HM POST 140, 178; POLI 60, 178, 189E; PPE 160; PZ ENVS 171, 146; SOC 55, 162
6. Three electives from any of the EA Options lists, not to include any courses listed above

H. Society, Development and the Environment *(Track Advisor: Ms. Grigsby, sociology)*

1. All of the courses in one of the following groups.
   (a) POLI 5; 60; 136; 178 or 189E; SOC 55 or 162
   (b) ECON 52; 126; 127 or 128
   (c)ANTH 54; 59; 124;128
2. JS BIOL 146L; or BIOL 40 and 41E
3. Three courses from the EA Options lists, not to include any course listed above

I. Race, Class, Gender and the Environment *(Track Advisor: Ms. Clark, English)*

1. JS BIOL 62, Environmental Science or GEOL 20 (any section)
2. JS BIOL 146L, Ecology; or, BIOL 40 and 41E at Pomona
3. GWS 26, Introduction to Women's Studies
4. One from: ASAM 101, Asian American Experiences; AFRI 10, Introduction to Africana Studies; CHST 60, Introduction to Chicano/a Studies
5. Four courses from the list below, with at least two courses in one department and at least two departments:
   ANTH 54, 124, 129; ECON 121, 126, 153; ENGL 157; HIST 27; PHIL 37; POLI 44, 60, 136, 139, 189E; PZ ENVS 141, 148, 162, 166; RLST 133, 166A; SOC 55, 162
6. Four electives from the options list at the end of this chapter, at least two of which should be from List 2

J. Environmental Design *(Track Advisor: Mr. Miller)*

1. Perception—two classes from:
   ART 5, Drawing I
   ART 20, Photography
   ART 25, Sculpture I
   PZ ART 037, Environments, Arts and Action
   ART 105A, Drawing II
   ART 126, Sculpture II
2. Representation—two from:
   PZ ENVR 48, A Sense of Place
   IMS 49, Introduction to Media Studies
   ARHI 51A,B,C, Introduction to the History of Art
   ARHI 148, Theories of the Visual
   ARHI 178, Black Aesthetics and the Politics of (Re)presentation
   SC ARHI 183, History of Modern Architecture
   ARHI 185, History of Photography
3. Built landscapes—one from:
   EA 27, Cities in Nature
   EA 85, Farms & Gardens

EA 100Q, Water in the West
ECON 127, Environmental Economics
PZ ENVR 143, Exhibiting Nature
PZ ENVR 144, Visual Ecology
PZ ENVS 147, Community, Ecology and Design
4. Political terrain—one from:
POLI 35, City of Angels, City of Quartz
POLI 36, Urban Politics and Public Policy
POLI 139, Politics of Community Design
SC POLI 187A, Urban Politics: Political Power in American Cities
SC POLI 187L, Los Angeles: Politics, History and Culture
SC POLI 187P, Political Geography: Politics in Space and Place
5. Engineered space—one from:
HM ENGR 4, Introduction to Engineering Design
PHYS 17, Physics in Society: Energy Policy; or JS PHYS 079L Energy and the Environment
HM IE 170, Building Los Angeles
6. Internship—one, in an area relevant to the track, with advisor approval
7. Option list—two from list, chosen in consultation with track advisor

K. Environmental Physics and Engineering *(Track Advisor: David Tanenbaum)*

1. EA 50; PHYS 190; EA191
2. One from PHYS 70 or 71; 72; or PHYS 41 and 42
3. Math 31 and 32, or 107; Math 60
4. ECON 52
5. One from PHYS 128, 174, HM ENGR 111
6. One from PHYS 175, CHEM 158B, HM ENGR 82
7. One from ECON 127, 128, 172 (PZ)
8. Two courses from EA option list 2, or HM ENGR 59; CSCI 51, CHEM 1B, 51

Requirements for the Minor in Environmental Analysis

1. 50, Introduction to Environmental Studies
2. 80 or ENGL 157
3. A choice of five from any of the courses marked with an asterisk on the options list listed after the course descriptions below

Courses

Environmental analysis (EA) courses satisfy Area 2 of the Breadth of Study Requirements.

27. Cities by Nature: Time, Space and Place. *Mr. Miller.* A cross-cultural, multi-continental examination of urbanization from the ancient world to the present, exploring the changing nature of urban life and its rituals and the impact urban development has had upon environmental systems, and political, social and economic structures. Each Fall.

50. Introduction to Environmental Studies. *Mr. Fowler, Mr. Hazlett.* Examines the history of environmental change over the past century, the environmental ramifications of economic and technological decisions, lifestyles and personal choice and the need to evaluate environmental arguments critically. Each semester.

70. Nature, Culture and Society. *Mr. Miller, Ms. Davis.* This required class for all EA majors and minors is especially designed for sophomores and juniors. It will employ case studies to help analyze some key contemporary environmental dilemmas. Topics will vary, but will draw on an interdisciplinary array of sources in the humanities and social sciences, including history, philosophy and literature; religion, art, politics and sociology. Each fall.

80. Classical Readings in Environmental Studies. *Mr. Elderkin*. Critical reading from and development of considered personal reaction to a collection of well-known and broadly respected environmental writings ("classics") of a wide variety of authors in the humanities, natural sciences and social sciences, including Carson, Cather, Colburn, Dillard, Leopold, Nash, Thoreau, Williams and Wilson. Each spring.

85. Farms and Gardens. *Mr. Hazlett*. An introduction to agroecology, the ecology of agriculture, including a component of directed field work at the Pomona Organic Farm. Topical matter includes soils and nutrient cycling, tillage, planting, horticulture and harvesting and a look at alternative, non-industrial food production systems. Each spring.

170. U. S. Environmental History. *Mr. Miller*. An examination of the idea of nature and wilderness in American history, from colonial visions to contemporary ideologies. It will draw from the work of Henry David Thoreau, John Muir and Mary Austin; Aldo Leopold, Rachel Carson and Michael Pollan, as well as environmental documentaries and material culture. Each spring.

171. Water in the West. *Mr. Miller*. Explores how communities, states and the federal government developed the legal precedents, physical infrastructure, financial mechanisms, environmental engineering, political will and social desire for the construction of a hydraulic empire in the Trans-Mississippi West. Each spring.

180. Green Urbanism. *Mr. Bardacke, Mr. Wells*. A discussion-based seminar restricted to senior EA majors. The incorporation of nature into urban design; a reassessment of traditional notions about the interrelationship of the built and natural environments with a look at environmental architecture exemplified by Green Corps, LEEDS and other radical new initiatives. Each fall.

190. EA Senior Seminar. *Mr. Hazlett, Mr. Miller*. A capstone, modular-based seminar in which senior majors focus their various curricular backgrounds on environmental issues and problems, including projects of practical nature developed by the College's Sustainability Integration Office. Exchange of interdisciplinary perspectives is encouraged throughout, with participants learning intensively from one another in the process of undertaking research. Simulates "real world" team-based investigations. Each spring.

191. Senior Research in Environmental Analysis. *Mr. Hazlett, Mr. Miller*. Production of a senior research paper or project, which culminates in a professional-quality public presentation, generally at an off-campus conference. Open to senior EA majors only. Each fall.

191H. Senior Research in Environmental Analysis. *Mr. Hazlett, Mr. Miller*. Same as 191, but taken in both semesters of the senior year for half-credit each semester; grade and credit awarded at the conclusion of the second semester.

99/199. Reading and Research. *Staff*. Prerequisite: permission of instructor. 99, lower-level; 199, advanced work. Course or half-course. May be repeated. Each semester. (Summer Reading and Research taken as 98/198,)

EA Course Options

The courses marked with asterisks (*) are electives for the minor in environmental analysis.

Option List 1

ART 125. Photography and the Politics of Representation
EA 85. Farms and Gardens*
EA 89. Classic Readings in Environmental Studies*
ENGL 157. Nature and Gender: Reading Environmental Literature*
FREN 150B. ***Le Philosophe:*** **Paradoxes of Nature***
GRMT 170. The Culture of Nature*
HIST 27. Cities by Nature: Time, Space, Place*
PPE 160. Freedom, Markets and Well-Being
PZ ART 37. Environment, Arts and Action*

PZ ENVS 10. Environment and Society
PZ ENVS 94. Building Sustainably: Pitzer
PZ ENVS 104. Doing Natural History
PZ ENVS 141. Progress and Oppression: Ecology, Human Rights and Development*
PZ ENVS 146. Environmental Education
PZ ENVS 147. Community, Ecology, Design*
PZ ENVS 148. Ethnoecology
PZ ENVS 166. Gender, Environment and Development*
PZ MS 194. Media Arts for Social Justice
PHIL103. Philosophy of Science: Historical Survey
RLST 166A. Religion and Environment*

Option List 2

BIOL 1C. Biology of Garden Plants
BIOL 40. Introductory Genetics
BIOL 41E. Introductory Ecological and Evolutionary Biology*
BIOL 104. Conservation Biology*
BIOL 112. Advanced Animal Ecology*
CHEM 106. Environmental Chemistry*
EA 85. Farms and Gardens
GEOL 20. Introduction to Geology*
GEOL 110. Looking at the Earth: Using GIS and Images from Space to Explore our Environment*
GEOL 115. Hydrogeology*
GEOL 125. Earth History
GEOL 152. Climate Change
HM BIOL 82. Topics in Biotechnology/Current Issues in Biology
HM BIOL 108. Ecology and Evolutionary Biology*
HM BIOL 110. Experimental Ecology Laboratory *
HM BIOL 121. Marine Ecology*
HM ENG 4. Introduction to Engineering Design*
JS BIOL 109. Marine Ecology*
JS BIOL 146L. Ecology*
JS BIOL 156. Tropical Ecology*
JS BIOL 159. Natural Resource Management*
JS CHEM 70. Chemistry and the Environment*
JS PHYS 79. Energy and the Environment*
PHYS 17. Physics and Society: A Critical Analysis of Energy Policies*
SOC 55. Population, Health and Environment
SOC 162. Mapping Inequality*

Option List 3:

ANTH 54. Human Interactions with the Pre-Industrial Environment*
ANTH 124. The Seacoast in Prehistory
ANTH 129. California Prehistory*
CM ECON 190. Ethics and Management
CM GOVT 119. Introduction to Environmental Law and Regulation*
CM GOVT 120. Environmental Law*
ECON 127. Environmental and Natural Resource Policy*
ECON 128. Energy Economics and Policy
GEOL 152. Climate Change

HIST 27. Cities by Nature: Time, Space, Place*
HIST 100A. Crisis Management: National Forests and American Culture*
HIST 100T. Water in the West*
HIST 127. U.S. Environmental History*
HM POST 140. Global Environmental Politics*
HM POST 178. Comparative Environmental Politics*
HM POST 179. Tropical Forests: Policy and Practice*
PHIL 36. Values and the Environment*
PHIL 38. Bioethics
POLI 60. Global Politics of Food and Agriculture*
POLI 136. Politics of Environmental Justice
POLI 139. Politics of Community Design
POLI 178. Political Economy of Development
PSYC 78. Research in Environmental Psychology*
PSYC 154. Social Psychology
PZ ANTH 140. The Desert as a Place
PZ ANTH 164. North American Archaeology*
PZ ANTH 168. Humans and Their Environment*
PZ ECON 172. Environmental Economics*
PZ ENVS 16. Environmental History*
PZ ENVS 33. Population and Society*
PZ ENVS 46. Environmental Awareness and Responsible Action*
PZ ENVS 130. Environmental Ethics*
PZ ENVS 148. Ethnoecology
PZ ENVS 159. Natural Resource Management*
PZ POLS 176. Environmental Policy*
PZ POLS 184. Science, Technology and Politics
PZ POST 198. Water: Politics, Conflict, Ecology*
PZ SOC 75. Global Media and Culture
RLST 166A. Religion and the Environment*
SOC 162. Mapping Inequality*
STS 1. Introduction to Science, Technology and Society