PROGRAM IN HUMAN BIOLOGY

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Assistant Professors: Amato J. Giaccia (Radiation Oncology), Joanna Mountain (Anthropological Sciences)
Associate Professor (Teaching): Carol Boggs
Other Teaching Faculty: William Abrams, Donald Barr, Baruch Blumberg, Malcolm Cohen, Shirley Feldman, Anne Friedlander, Hill Gates, Michael Green, William B. Hurlbut, Alan Launer, Philip Lee, Anne Maggioncalda, Armin Rosencranz, Merritt Ruhlen, Ewen Wang
Student Advisers: Rita Chitkara, Sylvia Lin, Melisa Neuwelt, Nkem Ogbechie, Ganesh Shankar, John Turnbull

The Program in Human Biology is an interschool, interdepartmental, undergraduate major. It provides an interdisciplinary perspective on the relationship between the biological and social aspects of humanity's origin, development, and prospects.

The program has three goals:

1. To provide a broad and rigorous introduction to the biological and behavioral sciences and their interrelationships.
2. To relate these sciences to the problems raised by the relationships of human beings to one another and to their environment.
3. To help each student achieve a high level of understanding by focusing on one aspect of the biological and behavioral sciences, and its application.

The Human Biology curriculum draws on faculty from diverse University departments and schools. To complete the requirements for the major, students must take courses from the offerings of the program and from the listings of other University departments. The program culminates in an A.B. in Human Biology.

Human Biology majors are well prepared for advanced training in professional schools (for example, education, law, medicine, public policy) and graduate programs in the behavioral, natural, and social sciences, depending on their choice of upper-division courses. Undergraduates in Human Biology often enter coterminal master's degree programs in a number of other University departments.

Additional information about the major may be obtained from the program's offices or the web site at www.stanford.edu/dept/humbio .

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The A.B. in Human Biology (HB) requires a minimum of 87 units in the major divided between four levels of courses:

1. *Fundamental Program:* at least 38 units, to include
   Human Biology Core (30 units)
   Statistics (4-5 units)
   Internship (HB 197; 4 units)
   The Human Biology Core refers to HB 2A and 2B, 3A and 3B, and 4A and 4B. See "Required Courses" below for more information.
   Human Biology 4B fulfills the policy requirement of the major. Other courses which satisfy the policy requirement may be obtained from the program office. A course used to fulfill the program's policy requirement may not be used in the student's foundation or area of concentration or as one of the three required upper-division courses.
   Statistics may be selected from: Statistics 60 or 190, Psychology 10, Economics 80, Education 160X, or Biological Sciences 141.
   The core and a statistics course must be taken for a grade by majors.
   The internship requirement, an independent field experience project, is graded satisfactory/no credit only.
2. *Foundation Courses:* 20-unit minimum. Total units vary, depending on the focus of study selected by the student for the area of concentration. They may include practicums, labs, and introductory-level courses from across the University. A maximum of 10 premed units (from the chemistry, physics, and calculus series, and biology lab courses) and 4 research units are allowed.
3. *Area of Concentration:* a minimum of five courses totaling at least 20 units. This in-depth area of study enables the student to focus on educational and post-baccalaureate goals. Courses must be numbered 100 or above. Three or more departments must be represented in the concentration. Each course must be taken for a minimum of 3 units. Final approval of the concentration rests with the student advisers and faculty adviser. All area of concentration courses must be taken for a grade. Examples of numerous possible areas of concentration are available in the *Human Biology Student Handbook*.
4. *Upper-Division Courses:* students must take three Human Biology upper-division courses numbered 100 to 189. Students are expected to enroll in courses outside of the area of concentration for breadth. Lab courses cannot be used to fulfill the upper-division requirement. One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. All non-laboratory advanced courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement, including those that say "enroll in" another department.

A prospective major must consult with the student advisers to obtain detailed information about the program and guidance in the development of an individual course of study. At the time the major is declared, the student must submit a brief written statement of academic and long-term goals and a proposed roster of courses satisfying the requirements for the major. The proposal is reviewed by the student advisers who then help identify an appropriate faculty adviser. Final approval of the proposed course of study rests with the faculty adviser. There are three upper-division tracks offered within the program: Health Policy, Human Health and Performance, and Environmental Policy. Students with interests in these programs should contact the appropriate coordinator.

Students who plan to pursue graduate work should be aware of the admission requirements of the schools to which they intend to apply. Early planning is advisable to guarantee completion of major and graduate school requirements.

MINORS

A minor in Human Biology provides an introductory background to the relationship between the biological and social aspects of humanity's origin, development, and prospects. Many of the major problems facing human civilization today involve both biological and social aspects. Scientific approaches to these problems are essential, but they must be broadly conceived, integrating what we know of the biological with an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology will have a strong background in the integration between the biological and social aspects of humans.

To minor in Human Biology, students must take the core curriculum (Human Biology 2A, 2B, 3A, 3B, 4A, and 4B) and one additional upper-

division course (for example, any course offering by Human Biology with a number over 100, including courses cross-listed with other departments or programs). These must be taken for a letter grade of 'C-' or better. Courses that count towards the fulfillment of major requirements may not be counted towards the minor.

Students declaring a minor in Human Biology must do so no later than two quarters prior to their intended quarter of degree conferral (for example, a student must declare a minor before the end of the Autumn Quarter to graduate the following Spring Quarter).

HONORS PROGRAM

The honors program in Human Biology affords qualified majors the opportunity to work closely with faculty on an individual research project, culminating in an honors thesis. Students may begin honors research from a number of starting points including: topics introduced in the core or upper-division courses; independent interests stemming from an internship experience; or collaborating with faculty from the natural, social, or behavioral sciences. Students may apply to the honors program once they have completed the Human Biology core, have an overall Stanford grade point average (GPA) of 3.0, and meet other requirements detailed in the honors handbook. Interested students should consult resources in the Human Biology office including the *Human Biology Honors Handbook*, the honors program application available from the student services office, and appointments during office hours with the Human Biology honors chair.

Specific courses of interest to honors students include: 160A (Senior Honors Colloquium in Health Policy and Social Issues), 190 (Honors Seminar for Sophomores), 191 (Honors Seminar for Juniors), 193 (Research in Human Biology), and 194 (Honors). Most honors projects involve a total of 10 to 15 units of course work in HB 193 and 194.

Admission to the honors program is by application, normally between mid-May of the junior year and mid-October of the senior year. Students planning to conduct honors research are encouraged to attend the Honors Seminar for Juniors (191) and to begin research or preparation during their junior year. An Honors College is held for a select number of senior honor students just prior to Autumn Quarter each year. For applications, contact the program office. The honors thesis is normally completed by the middle of Spring Quarter of the senior year. Each honors student then presents a brief summary of honors research at the Human Biology Honors Symposium in May.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

The faculty and staff of Human Biology prepare a student handbook, available on the web, at www.stanford.edu/dept/humbio/ , which provides a detailed description of the Human Biology major and outlines possible areas of concentration. It reflects the most up-to-date information for the academic year, and is the definitive guide for all Human Biology majors.

REQUIRED CORE

Required Core sequences (2A and 2B, 3A and 3B, and 4A and 4B) introduce the biological and social sciences, and most importantly, relationships between the two. Classes meet throughout the academic year. Students must register concurrently for the A and B series and take the core in sequence. Students should initiate the core in Autumn Quarter of the sophomore year. Any deviation from the core sequence must first be approved by the program chair through a petition process. Freshmen are not permitted to enroll. Majors must take core courses for a letter grade.

2A,B. Genetics, Evolution, and Ecology: Culture, Evolution, and Society

2A. Genetics, Evolution, and Ecology—Introduction to the basic principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, population dynamics, and community ecology, emphasizing the genetics of the evolutionary process and applications to human populations. GER:2a (DR:5)

5 units, Aut (Boggs,)

2B. Culture, Evolution, and Society—Introduction to the evolutionary study of human diversity. Hominid evolution, the origins of social complexity, social theory, and the emergence of the modern world system, emphasizing the concept of culture and its influence on human differences. GER:3b (DR:9)

5 units, Aut (Klein)

3A,B. Cell Biology and Developmental Biology: Biology and Culture in Human Development

3A. Cell and Developmental Biology—The basic principles of the biology of cells: the principles of human developmental biology, the biochemistry of energetics and metabolism, the nature of membranes and organelles, hormone action and signal transduction in normal and diseased states (diabetes, cancer, autoimmune diseases), drug discovery, immunology, and drug addiction. GER:2a (DR:5)

5 units, Win (Mochly-Rosen)

3B. Biology and Culture in Human Development—Introduction to the research and theory on early human development. How psychobiological factors shape the developing child, and how cultural practices shape the environments of childhood and influence human cognitions, emotions, moral judgments, relationships, and social behavior from birth through adolescence. GER:3b (DR:9)

5 units, Win (A. Fernald)

4A,B. The Human Organism: The Human Predicament

4A. The Human Organism—Organ system physiology, beginning with the basic principles of neurobiology and endocrinology, and the functions of body organs. The mechanisms of control, regulation, and integration of organ systems function. GER:2a (DR:5)

5 units, Spr (R. Fernald, Heller)

4B. The Human Predicament—The relation of the biological sciences to public policy in resource management and conservation practices, the regulation of environmental and health risks, agricultural production, the delivery of health services, the protection of biodiversity, and global climate change. Assigned policy challenges in lectures and section meetings. Reading on actual cases. GER:3b (DR:9) (WIM)

5 units, Spr (Boggs, Goulder)

ADDITIONAL INTRODUCTORY OFFERINGS

2S,3S,4S. Bioethical Issues in Human Biology—Year long introductory series on the social, ethical, philosophical and religious issues associated with advances in biomedical science. Guest speakers with discussion format. Designed to parallel the Human Biology core sequence, but may be taken independently of the core. Each of series is different and may be taken in any sequence or as single courses. 1 unit S/NC, 2 units with weekly discussion section. See http://www.stanford.edu/class/bioethics .

2S. Bioethics—Topics: ethics and human origins, the Human Genome project, genetic screening and eugenics, genetic engineering, beauty and disgust as agents of evolution, religion in the age of Darwinism, and evolution and the future of humanity.

1-2 units, Aut (Hurlbut)

3S. Bioethics—Topics: in vitro fertilization, intrauterine surgery, growth hormone, cosmetic surgery, the nature of desire and sexuality, anorexia nervosa, cloning and human stem cells, natural aging and extending the lifespan.

1-2 units, Win (Hurlbut)

4S. Bioethics—Topics: terraforming Mars, psychophysiology of space travel, computer mediated surgery, virtual reality, ecology and human disease, global warming, and biowarfare.

1-2 units, Spr (Hurlbut)

3Y. Practicum in Child Development—Practicum experience at Bing Nursery School for 3.5 hours/week. Must be taken concurrently or subsequent to 3B. (AU)

1 unit, Win (A. Fernald, Hartman)

6. Human Origins—(Enroll in Anthropological Sciences 6.)

5 units, Win (Klein)

10. Human Sexuality—Broad, integrated, multidisciplinary perspective on human sexuality. The biological aspects of sex: anatomy, physiology, endocrinology, pregnancy, contraception, and diseases of the sexual organs. Sexual behavior: its development, patterns, variations, and interpersonal aspects. The relationship of sex and society in historical and cross-cultural contexts. Lecture/panel; no sections. GER:4c (DR:†)

4 units, Spr (Katchadourian)

11. Sleep and Dreams—Multimedia lecture/survey format provides a background of current information and research on how sleep affects our daily lives. Topics: the physiology of non-REM and REM sleep, dreams and dreaming, content, psychophysiological cause, lucid dreaming; sleep need, sleep debt, daytime alertness and performance; biological clock and circadian rhythms; sleep disorders, insomnia, narcolepsy, sleep apnea, sleepwalking, jet lag, sleeping pills, sleep and mental illness, sleep and memory, sleep and the impact of sleep deprivation and sleep disorders on students' academic performance and social life.

3 units, Win (Dement)

12. The Nature of Health—The concept of health from a sociologic perspective. Ways to define and measure health, and how social factors (education, standard of living, race, and ethnicity) can affect the health of an individual, a community, or a nation. Personal behavior as a determinant of health within this context. Lectures, student presentations, and discussions.

3 units, Spr (Barr)

13. The Emergence of Modern Medicine—(Enroll in History 13.)

5 units, Spr (Findlen)

16. Introduction to Anthropological Genetics—(Enroll in Anthropological Sciences 8.)

5 units, Win (Mountain)

20. Understanding the Drug Development Process—Dialogue with representatives from academia and leading pharmaceutical and biotech companies. From ideas to medical therapies (conception, clinical trials, and marketing of new pharmaceuticals). Topics: academic vs. industrial research, clinical trials, FDA approval process, role of biotechnology in the drug development process, marketing, and business development of new drugs. (AU)

1 unit, Spr (Staff)

32. Academic and Career Choice—Overview of the questions and issues regarding academic and career choice and consequences. General theories. How Stanford graduates make choices based on factors such as gender; ethnicity; social class; relationships with parents, faculty, and peers. The outcome of these choices with respect to career patterns and measures of career success and satisfaction (compensation, commitment, and competence). The relationship of careers to personal life with respect to marriage, parenthood, and intellectual and social interests.

2 units, Spr (Katchadourian)

60. Colloquium on Population Studies—(Enroll in Biological Sciences 146.)

1 unit, Win (M. Feldman)

61. Introduction to the History and Philosophy of Science—(Enroll in Philosophy 60.)

5 units, Spr (Godfrey-Smith)

STANFORD INTRODUCTORY SEMINARS

90Q. Stanford Introductory Seminar: Contemporary Issues in Human Experimentation—Preference to sophomores. Issues in using humans for experimentation in medical research. The principles of protection of subjects, the process of obtaining informed consent, organization of protocols, evaluation of experimental design, and scientific merit. Ethical/legal issues involving human subjects in terms of confidentiality, recruitment, and conflict of interest. Legislation addressing inadequate numbers of women and minorities in research projects. Focus is on research with the cognitively impaired, prisoners, and barriers to obtaining informed consent in issues of age, language, and factors that may affect the ability to give truly informed consent.

3 units, Win (Constantinou)

91Q. Stanford Introductory Seminar: Studies of Animal Behavior—Preference to sophomores. Animal behavior offers insights about evolutionary adaptations. The origins of the study of animal behavior and its development to the present. Discussion of original research papers. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.

3 units, Aut (R. Fernald)

94Q. Stanford Introductory Seminar: The Nation's Health—Preference to sophomores. A broad overview of the nation's health. Topics: trends in healthy populations; determinants of health; health policy; values, ethics, and ideology; politics of health; public health and clinical preventive services; medicine and public health collaboration; the health care system; Medicare and Medicaid; medical markets and managed care; and quality of care. Weekly presentations by students. Enrollment limited to 15.

3 units, Aut (Lee)

95Q. Stanford Introductory Dialogue: Science-in-Fiction is not Science Fiction—(Enroll in Chemistry 25Q.)

2 units, Win (Djerassi)

97Q. Stanford Introductory Seminar: Sport, Exercise, and Medicine—Exploring the Relationships—Preference to sophomores. Sports medicine is comparatively new. Some aspects of the discipline, e.g., sports traumatology, are similar to "disease-based" medicine. Sports medicine's main contribution is to assist in the creation of a "health-based" model of medicine, under the premise that physical activity and exercise are the principal determinants of health. The issues that connect sport, exercise, health, and medicine, providing critical insights into the strengths and tensions that affect these relationships. Case examples and lab study sports injuries, human performance, ethics, winning, coaching, the team physician, nutritional supplements and drugs in sport, exercise and aging, women's issues, and exercise and health.

3 units, Aut (Matheson)

ADVANCED

Open to non-majors with the proper prerequisites. Human Biology majors have preference when enrollment is restricted. All classes listed here fulfill the Human Biology upper-division requirement, including those that say "enroll in" another department.

101. The Human Hand: Evolution, Ontogeny, and Influence—The structure and function of the human hand from evolutionary, developmental, and cultural perspectives. Topics: the evolution of the five digit limb pattern, homology and analogy in vertebrate limb patterns, variation in limb patterns, variation in human patterns and their proposed developmental mechanisms; models of hand use; the evolution of true opposability; the archaeology of toll manufacture and implementation; cultural perspectives on the significance of the hand in gesture, sign language, mathematics (base ten), music, writing, symbolism, instrumentation, and art. Enrollment limited to 15. Prerequisites: Human Biology core or consent of instructor.

3 units (Porzig) not given 2000-01

102A. Children, Youth, and the Law—Analysis of the legal "rights" of children and adolescents in America and how those rights are defined, protected, and enforced through the legal process within the context of the developmental needs of children and youth and competing societal interests. Topics: the origins and definitions of children's rights; adoption; custody; the juvenile justice system (abused, neglected, and dependent children, status offenders such as runaways and truants and minors accused of crimes); education; informed consent; health care; protection from harm and child welfare; due process; and privacy, freedom of expression, and exercise of First Amendment rights. Interactive, using hypotheticals for discussion and analysis. Companion to 102B, and alternates every other year; students may take one, or both.

4 units, Win (Abrams)

103. Women, Fertility, and Work: The Biology/Culture Debate about Gender—Seminar on women's efforts to bear and rear young children while contributing to familial and community production. How women and men share and balance these aspects of social reproduction in diverse societies. Theoretical approaches to the connection between biology and culture are tested, emphasizing interactional effects. The limits of theories of the cultural construction of femaleness, connections between gender and political economy, and how these culture's differently envision individual and collective responsibilities in women's work and childcare.

5 units (Gates) not given 2000-01

104. Aging: From Biology to Social Policy—(Enroll in Anthropological Sciences 171.)

5 units, Spr (Barnett)

105. Bioethics and Anthropology—(Enroll in Anthropological Sciences 174.)

5 units, Spr (Koenig)

107. Astrobiology and Space Exploration—Evolution is cast against space and time, focusing on the emergence of life, intelligence, and civilization on Earth and, possibly, elsewhere. The phenomenon of human space exploration and the biological, psychological, sociological, and ultimately, philosophical issues that emerge. Integrates information from astrophysics, biochemistry, chemistry, evolutionary biology, geology, paleontology, physiology, psychology, and sociology. Taught by scientists from NASA Ames Research Center. Enrollment limited to 30. Prerequisites: one year college-level mathematics, physics, chemistry, biology, or psychology.

3 units, Spr (Cohen)

108. Advanced Seminar on Bilingualism and Second Language Acquisition—Theoretical issues and research pertaining to bilingual acquisition of the two languages and second-language acquisition for children and adults. Urgent practical issues relating to the growing number of children in the U.S. educated in their second language. Emphasis is on childhood bilingualism and on socio-cultural factors relating to language acquisition. The controversies surrounding bilingualism and second language acquisition. Informed opinions concerning the current debate on bilingual education in the U.S.

3 units (Wakabayashi) not given 2000-01

109. Human Behavioral Biology—(Enroll in Biological Sciences 150/250.)

6 units (Sapolsky) alternate years, given 2001-02

110. Vertebrate Biology—The evolution, form, function, and behavior of the vertebrates, from primitive fishes to birds and mammals, including humans. Prerequisite: Biological Sciences or Human Biology core.

3-4 units, Spr (Porzig)

110L. Vertebrate Biology Lab—Comparative anatomy structure of the vertebrates, with emphasis on osteology. Representatives of each of the seven vertebrate classes are available in lab. Review labs and field trips. Prerequisites: current or previous enrollment in 110.

3 units, Spr (Porzig)

111. Human Physiology—(Enroll in Biological Sciences 112/212.)

4 units (Heller, Harris) alternate years, given 2001-02

112. Hormones and Behavior—(Enroll in Anthropological Sciences 132.)

5 units (Maggioncalda) not given 2000-01

113. The Biology and Evolution of Language—(Enroll in Anthropological Sciences 5.)

4-5 units (Fox) not given 2000-01

115A. Humans and Viruses—(Same as Microbiology and Immunology 115A.) Overview of human virology. Topics illustrate concepts in biology and the social sciences, focusing on emerging infections, viral classification, transmission and prevention, vaccination and treatment, eradication of disease, viral pathogenesis, mechanisms of virally-induced cancer, and viral evolution. Topics: molecular biology of genetic shift and drift in influenza virus, cellular tropism of HIV, developmental biology of virally-induced birth defects, clinical aspects of infantile diarrhea, social aspects of the common cold, policy issues of blood antibody tests, factors in pathogenesis and transmission of prions. Prerequisites: Human Biology core or consent of instructor.

4 or 6 units (Siegel) given 2001-02

115B. Seminar: The Vaccine Revolution—(Same as Microbiology and Immunology 115B.) Advanced seminar. The human aspects of viral disease, focusing on recent discoveries, especially in the area of vaccine development and emerging infections. Journal club format: students select articles from primary scientific literature, write formal summaries, and synthesize it into a literature review on a specific topic. Emphasis is on the development of critical reading, analysis, experimental design, and interpretation of data. Students give four oral presentations and lead discussions based on their scientific journal reading. Enrollment limited to 10. Prerequisite: 115A.

5 units, Spr (Siegel)

116. Eye and Implications of Vision—The basic physiology of vision and how visual capabilities influence human endeavors. Topics: mechanisms of vision, vision in animals, illusions, visual physiology of art, the eye in history and literature, vision in sports. Lectures/seminar format with student participation, oral presentations, and a written thesis. Prerequisite: interest in mechanisms of vision and the humanities.

3 units, Win (Marmor)

117. Policy and Research in Science Education—Controversial topics in science education (e.g., the teaching of evolution, national standards and tests, gender bias, text selection, recruiting and retraining qualified teachers, the goals of science teaching for different populations). The substance and style of formulating policy for science education in the U.S., now and in the recent past. Issues for local, state, and federal authorities; appropriate government roles in the selection of content, improvement of teaching, and research. Primary, secondary, and undergraduate programs; and the use of museums and media in programs to improve science education. International comparisons where appropriate. Enrollment limited to 20.

4 units, Spr (Atkin)

118. Human Diversity: A Linguistic Perspective—The diversity and distribution of human language and its implications for the origin and evolution of the human species. The origin of existing languages and the people who speak them. Where did the languages that we currently see in the world come from and how can this diversity be used to study human prehistory? Evidence from related fields (archaeology and human genetics). Topics: the origin of the Indo-European languages, the peopling of

the Americas, and the evidence that all human languages share a common origin. GER:4a (DR:2)

3 units, Spr (Ruhlen)

119. Conservation Biology—Introduction to the science of preserving biological diversity, its principles, policy, and application. Topics: the biology of small populations, extinction, minimum viable population analysis, habitat fragmentation, reserve design and management, the Endangered Species Act, and conflict mediation. Case studies and local field trips illustrate topics. 4 units for students who take the recommended field trips. Prerequisite: 2A, Biological Sciences 33 or 51, or consent of instructor.

3-4 units, Win (Boggs, Launer)

120. Human Nutrition—Nutrient flow and interactions within the human body. Emphasis is on the pathways by which nutrients are processed, stored, remodeled, and oxidized to provide energy and functional components. How diet and physical activity affect human health and disease at the physical/biochemical levels. Do athletes have greater nutritional needs? Is fat a toxic substance or an essential nutrient? Do high insulin levels cause obesity? What happens if you don't meet the recommended dietary allowances? Is leptin the anti-obesity "drug?" What are humans designed to eat? Prerequisite: Human Biology core or consent of instructor.

4 units (Staff)

121. Ethical Issues in the Neurosciences—Multidisciplinary approach to the ethical questions raised by recent advances in the neurosciences. How these advances relate to medical therapy, social policy, and broader considerations of human nature (consciousness, free will, personal identity, and moral responsibility). Discussion format with leading research scientists, legal experts, philosophers, and theologians. Topics: neurogenetics, fetal brain tissue therapy, medicalization of criminal behavior, cosmetic psychopharmacology, and the neurobiological basis of love, sexuality, and gender. Enrollment limited to 15. Prerequisites: Human Biology core, Biological Sciences core, or consent of the instructor.

4-5 units, Spr (Hurlbut)

122. International Health Policy: Comparative National Health Care Systems—(Enroll in International Relations 129.)

3 units, Win (Lee)

123. Sexuality in Adolescence—Current research on the sexual development of young people from a developmental perspective. Critical issues related to the scientific, historical, and cultural perceptions about adolescent sexuality; social influences on sexual development; sexual risk; and the limitations and future directions of research on adolescent sexuality. Sexual identity and behavior, sexually transmitted diseases including HIV, pregnancy, abortion, gay and lesbian youth, sex education and condom availability in schools, the impact of the mass media, sexual activity that is exploitive, and the difficulties and limitations in studying adolescent sexuality. Legal and policy issues, gender differences, and international and historical trends. Texts analyze sexual issues and choices confronting adolescents; current research. Research project, including original data collection about some aspect of adolescent sexuality. GER:4c (DR:†)

3 units, Spr (Brown)

124. Neural Basis of Sleep and Circadian Rhythms—(Enroll in Biological Sciences 249.)

4 units, Aut (Heller, Edgar) alternate years, not given 2001-02

125. Environmental Policy and Law—The role of government and citizens in formulating, implementing, and enforcing environmental policy. Using case studies, background readings, law cases, and statutes, seminar investigates the formal and informal political mechanisms involved in controlling pollution and protecting the environment. Topics: the respective roles of courts, legislatures, executive agencies, and nongovernmental organizations in shaping U.S. environmental policy. The pros and cons of regulatory and economic approaches to pollution control; environmental politics and ethics; air and water pollution; environmental justice; toxic substances and risk assessment; economics and trade; hazardous wastes.

5 units, Spr (Rosencranz)

126. Adolescent Development—Adolescence from sociological, psychological, and psychiatric perspectives. Topics: physical, physiological, and cognitive development; identity; peer group; parent/child relations; impact of school; vocational development; and problem outcomes (eating disorders, violence, and teen pregnancy). Prerequisite: 3B or Psychology 1, or consent of instructor.

4 units, Win (S. Feldman)

127. Research Seminar on Adolescence—For juniors preparing to undertake honors research in their senior year. Small groups jointly design, conduct, analyze, and write up original research. Teaches research-related skills including how to design a survey, enter data on a computer, and data analysis. Enrollment limited to 12. Pre- or corequisite: Psychology 10 or equivalent, or consent of instructor.

4 units, Aut (S. Feldman)

128. The Human Gamete and Pre-Embryo—Writing-based seminar. The cultural, biological, medical, and social aspects of human gametogenesis and the earliest stages of human development. Topics: assisted reproductive technologies (including in vitro fertilization), historical and cultural perspectives on male and female gametes, pre-implantation genetic testing, and the critical analysis of current biological and medical research on gametogenesis. Enrollment limited to 12. Prerequisites: Human Biology core or consent of instructor.

3 units (Porzig) not given 2000-01

130. Adam 2000: Images of Human Life in the Age of Biomedical Technology—Interdisciplinary approach to the social, moral, and aesthetic values which guide the use of biomedical technology. How advances in biology are reshaping our relationship with nature, attitudes toward the body, and ideas about the meaning and purpose of human life. Topics: the use of medical technology to alter appearance and enhance performance, fetal tissue transplantation, biotherapy for criminal behavior, treatment of aging as a disease, and alteration of the body for space travel. Lecture/discussion format with guests from the scientific and religious communities. Limited enrollment. Prerequisites: Human Biology or Biological Sciences core, or consent of the instructor.

4 units, Win (Hurlbut)

131. Natural Resources Policy and Law—Focus is on federal public land and natural resources policy; mining, timber, and grazing law and policy; the legal aspects of forest, range, park, wilderness, wetlands, and wildlife management; recreation and preservation; and related issues. The role of the courts, administrative discretion, the Endangered Species Act, and the tension between protecting resources and respecting property rights. Students research one aspect of law and policy governing the management of natural resources.

5 units, Win (Rosencranz)

132. Seminar on Problem Behavior in Adolescence—Lecture/seminar. Aspects of adolescent problem behavior, including risk; and protective factors, treatments, and intervention programs designed to ameliorate or prevent these problems. Externalizing behaviors (violence, delinquency, drug abuse, risk taking), internalizing problems (depression, eating disorders, suicide), and sexuality-related problems (teen pregnancy, date violence, STDs/HIV). Enrollment limited to 20. Prerequisite: 126 or consent of instructor.

3 units, Spr (S. Feldman)

134. Ecological Anthropology—(Same as Anthropological Sciences 164.) The relationships between human social systems and their environments. How do environments influence the nature and form of human social systems found within them? How do human social systems influence the properties and dynamics of their environments? How can we best conceptualize and understand human social systems, the environment, and the links between them? Case studies of human societies in the Arctic, Amazon, E. Africa, the Alps, and Papua New Guinea. (HEF III)

5 units (Durham) not given 2000-01

135. Global Environmental Policy and Law—(Enroll in International Relations 134.)

5 units, Aut (Rosencranz)

136. Conservation and Development Issues in the Amazon—(Same as Anthropological Sciences 161A.) The prospects for achieving the dual goals of biodiversity conservation and community development in Amazonia. Case studies of recent efforts at biodiversity conservation, including national parks, biosphere reserves, pharmaceutical prospecting, ecotourism, extractive reserves, and agroforestry projects. The costs and benefits of conservation. To whom do these costs and benefits accrue? Critically evaluates Integrated Conservation-Development Projects (ICDPs) in the Amazon today. Optional field trip over Spring Break (at added expense, limited capacity) to selected ICDPs in the Peruvian Amazon. (HEF II)

5 units, Win (Stronza, Durham)

139. Primate Societies—(Enroll in Anthropological Sciences 131B.)

5 units, Win (Maggioncalda)

141. Race, Poverty, and the Environment—Seminar on environmental conditions and disproportionate environmental impacts in poor and minority communities in the U.S., correlating race, ethnicity, and income to exposure to environmental and public health hazards. Case studies on migrant workers and Native American subsistence fishers.

5 units (Rosencranz) not given 2000-01

142A. The Impact of AIDS—Focus is on HIV, particularly disease pathology and the spread of the virus, providing a foundation for understanding the impact of HIV on biology, medicine, and society. Biology, clinical features, cultural aspects, and intervention/prevention. Provides tools for thinking of ways to stop the transmission of HIV, emphasizing education and health policy. The cultural aspects of HIV, including perspectives from sociology, law, economics, ethics, and politics. Students use their knowledge to complete a service learning project such as teaching high school students about HIV as part of a student speaker bureau. Extensive use of guest speakers and experts on HIV.

5 units (Siegel) not given 2000-01

142C. Alternative Spring Break: AIDS and HIV in San Francisco

1 unit, Win (Siegel)

143. Globalization, Labor, and the Environment—Interdisciplinary examination of the responsibility of multinational corporations and institutions (World Bank, WTO, IMF) in the global economy, emphasizing labor and environmental standards in developing countries. Local and global case studies and research focus on social justice and empowerment for domestic and foreign victims of labor, environmental and human rights abuses, the role of certain multinational institutions and corporations in those abuses, and potential tools for holding these bodies more accountable. Service-learning component with Bay Area organizations.

4 units, Win (Rosencranz)

144. Guilt: Multidisciplinary Perspectives—The experience of guilt and shame from the perspective of the individual. The development of the sense of guilt in childhood; behaviors commonly associated with guilt; its role in interpersonal relationships; communal interactions; its psychopathology, and cross-cultural and gender differences. Conceptions of guilt and shame from the perspectives of major religious and philosophical traditions, and recent interpretations from evolutionary psychology. Prerequisite: majors in Human Biology, Religious Studies; joint majors in Religious Studies and Philosophy; or consent of instructor.

4 units, Spr (Katchadourian)

145. Children's Citizenship: Justice across Generations—(Enroll in Political Science 158R.)

5 units (Reich) given 2001-02

147. Controlling Climate Change in the 21st Century—The science, economics, and environmental diplomacy of global climate change. Topics: the science of climate change, climate change and global environmental law; economic approaches to global carbon abatement, including taxes and tradable permits; joint implementation and the clean development mechanism; the role of the European Union; gaining the support of China, India and other developing countries; prospects for support from the U.S. Congress and U.S. corporations; new energy technologies for less carbon-intensive electric power and transport. Enrollment limited to seniors.

3 units, Aut (Schneider, Rosencranz)

150. Gender-Specific Perspectives on Birth Control—In most societies, human fertility control responsibility rests predominantly with women. Is this desirable and realistic, or should changes be instituted? Groups of four to five students of diverse backgrounds and different professional interests (medicine, law, economics, religion, sociology, political science) develop a series of position papers dealing with new birth control procedures suitable for populations of different cultural and socioeconomic backgrounds with gender-specific considerations. Part I: lectures, selecting population groups and multi-disciplinary task forces, and individual discussions with each task force. Part II: library and field work, writing task force reports, and oral presentations. Limited to 20 seniors; juniors considered in exceptional circumstances. GER:4c (DR:†)

6 units (Djerassi) given 2001-02

151. The Rise of Scientific Medicine—(Enroll in History 33A.)

5 units (Lenoir) not given 2000-01

152. Environmental Policies and Institutions in Developing Countries—The tension between environmental protection and economic growth in eightdeveloping countries: Egypt, Russia (Siberia), China, India, Indonesia, Nigeria, Mexico, and Ecuador. Each student is responsible for an environmental profile of a chosen developing country. Prerequisite: 135 or consent of instructor.

5 units (Rosencranz) not given 2000-01

154. Biosocial Aspects of Cancer—Recent advances in the biology, diagnosis, and treatment of cancer. The social and economic ramifications of being diagnosed and treated for cancer. What are the present options for cancer treatment and what new technologies may change these options in the future? New diagnostic techniques for the early detection of cancer. The use of predictive assays to determine the most effective treatment modality—chemotherapy, radiotherapy, surgery, hyperthermia, immunotherapy, etc.

4 units, Spr (Giaccia)

155. Exercise Physiology—Overview of human exercise physiology. Focus is on how body systems respond to the stress of acute exercise and how those systems adapt to chronic exercise training. Topics: how the cardiovascular system adapts to optimize oxygen delivery and utilization, how muscles generate force and how they hypertrophy in response to training, how metabolic pathways are regulated to support the increased energy demand of exercise, theories on the causes of fatigue and muscle soreness, and theories on what limits human performance. How

exercise capacity is influenced by aging, gender, and environmental conditions, e.g., high altitude, heat, and cold. Prerequisite: Human Biology core or consent of instructor.

4 units, Aut (Friedlander)

156. Human Development—The biological, medical, and social aspects of normal and abnormal human development. Topics: in vitro fertilization and embryo transfer; gene and cell therapy; gametogenesis; pattern formation in the nervous system and limb development; gene activity in early development; cell recognition at fertilization; twinning and grand multiple pregnancies; prematurity, in utero effects of teratogens; sex determination and differentiation; growth control; gigantism and dwarfism; neural tube defects; cardiac morphogenesis; progress in the developmental biology of humans. Limited enrollment. Prerequisites: Human Biology or Biological Sciences core, or consent of instructor.

3-4 units (Porzig) not given 2000-01

158. Fishing for Solutions: Issues in Marine Conservation—(Enroll in Anthropological Sciences 166B.)

3-5 units, Win (Novy)

159. Sports Medicine—(Same as Medicine 260.) For medical students and upper-division Human Biology undergraduates. Overview of sports medicine and sports science topics. The themes of sports, exercise, health, and medicine are integrated throughout the entire human performance continuum, from the use of exercise as a form of therapy to the injuries and illnesses that result from sports and exercise. Content in the basic and applied sciences is from physiology, nutrition, psychology, and biomechanics. Medical topics in the problems exacerbated or caused by exercise and sport; maximizing performance in elite athletes; and population-based issues such as exercise and its relationship to health, women's issues, drugs in sport, and exercise and aging. Prerequisite: medical school enrollment or upper-division Human Biology standing or consent of instructor.

4 units, Win (Cooper)

160. Health Care in America—Overview of the health care system in the U.S., examining several key organizations and institutions that shape health policy and health care delivery. By understanding the forces that affect health and health care, students assess more critically options for health care reform.

3 units, Aut (Barr)

160A. Seminar in American Health Policy—Key issues surrounding health care reform, and the policy making process as it pertains to health care. Student presentations of assigned readings, followed by discussion. Prerequisites: 160 and consent of instructor.

3 units, Spr (Barr, Lee)

160B. Senior Honors Colloquium in Health Policy and Social Issues—Open to seniors admitted to the honors program, by consent of instructor. Assists students doing honors research pertaining to health policy. Weekly discussion centers around students' presentations of honors projects, the policy issues involved, and the structure of the proposed research. Prerequisite: consent of instructor.

1 unit, Aut, Win, Spr (Barr, Lee)

160W. Seminar in Federal Health and Environment Programs/ Agencies—Priority enrollment for students going to Stanford in Washington, Winter Quarter. Introduces health policy making in Washington, D.C., with an emphasis on understanding the agencies within the federal government responsible for developing and carrying out health policy. Weekly lectures/discussions. Enrollment limited to 25.

3 units, Aut (Lee)

161. Darwin, Evolution, and Galapagos—(Same as Anthropological Sciences 137.) Seminar on Darwinian theory as applied to the evolution of flora and fauna on the Galapagos Islands. Darwin's observations in Galapagos, and their role in the formulation of his theory of evolution; recent research in Galapagos and its implications for our understanding of evolution today. The impact of human activity in Galapagos and emerging conservation issues. Lectures, discussions, and optional field trip to Galapagos (at extra expense, limited capacity). Enrollment limited to 20.

5 units (Durham) not given 2000-01

162. Primate Evolution—(Enroll in Anthropological Sciences 131A.)

5 units, Spr (Jablonski)

163. South Asia: Environment, Development, and Security—(Enroll in International Relations 137.)

5 units, Spr (Rosencranz)

164. Ecology and Equity—(Enroll in Anthropological Sciences 168A.)

5 units, not given 2000-01

165. Environmental Justice—(Enroll in Anthropological Sciences 168B.)

5 units, Aut (Lu)

166. Evolution of Primate Intelligence—(Enroll in Anthropological Sciences 131C.)

5 units, Spr (Maggioncalda)

167. International Health—Introduction to concepts of health and wellness and the major descriptors and determinants of health status, international organizations and control programs, specific disease-related problems within particular population groups from an epidemiologic viewpoint, examples of health care delivery methods, analysis of efforts to improve health through examination of specific programs and projects currently underway and previously implemented. Emphasis is on the cultural, economic, and political context in which all questions/issues in international health exist. Prerequisites: Human Biology core or consent of instructor.

3 units, Spr (Wang)

168. Medical Anthropology—(Enroll in Anthropological Sciences 170.)

5 units, Aut (Barnett)

169. Critical Issues in International Women's Health—Overview of international women's health issues in the context of a woman's life, from childhood, through adolescence, reproductive years, and aging. The approach to women's "health" takes into account economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on those critical issues of women's health that mean life or death to women, depending on their capacity to negotiate and/or feel empowered (e.g., unwanted pregnancy, violence, HIV/AIDS, access to abortion, sex trafficking). Information about women's organizations outside the U.S.

4 units, Win (Firth-Murray)

170. Social Policy for Sustainable Resource Use—(Enroll in Anthropological Sciences 267.)

5 units (Irvine) not given 2000-01

172. Indigenous Forest Management—(Enroll in Anthropological Sciences 166A.)

5 units, Aut (Irvine)

173. Medical Ethics—(Enroll in Philosophy 78.)

4 units, Spr (Jaworska)

174. Ethics and Politics in Public Service—(Enroll in Political Science 159R.)

5 units, Win (Reich)

175. Virtual Vertebrates—Computer simulations of the biomechanics of aquatic locomotion in vertebrates such as fishes and cetaceans. Development and testing of educational software on the anatomy, physiology, and biomechanics of swimming vertebrates. Possible organisms: lungfish, eels, lamprey, tuna, sharks, rays, turtles, penguins, dolphins. Estimation and resolution of the biomechanical forces affecting lift, thrust, and drag. Computer lab-based weekly meetings. Enrollment limited to 10. Prerequisites: 110, consent of instructor.

3 units (Porzig) not given 2000-01

176. Bodies and Machines: From Descartes to Frankenstein—(Enroll in Science, Technology, and Society 131.)

3-5 units, Aut (Wilding)

179. Advanced Neurosciences Laboratory—(Enroll in Biological Sciences 209.)

4 units, Win (Heller, Grahn)

180. Beginning Osteology—(Same as Anthropological Sciences 133A.) Introduction to the study of the human skeletal system. The biology of the bone: growth and development, structure and function. Identification of the different bones in the human skeletal system. Methods for assessing age, sex, and the biological affinity of bones from archaeological and paleontological contexts. GER:2a (DR:5)

5 units, Aut (Maggioncalda)

181. Evolutionary Anthropology—Upper-division/graduate seminar focused on the concept of evolution as used in anthropology. Evolutionary theory in biological anthropology, as applied to hominid evolution and human population genetics. Evolutionary approaches to culture and social organization, including social evolution, sociobiology, and evolutionary culture theory. Enrollment limited to 20.

5 units (Durham) not given 2000-01

182. Urban Environmental Policy—(Enroll in Urban Studies 182.)

4 units, Win (Hall, Kibel)

183. Hunter-Gatherers in Archaeological Perspective—(Enroll in Anthropological Sciences 141.)

5 units, Win (Rick)

185. Science and Religion—(Enroll in Religious Studies 270.)

4 units, Aut (Bergman, Eisen)

186. Evolutionary Medicine—(Enroll in Anthropological Sciences 172.)

5 units, Aut (Cronin)

188. Anthropology of Tourism and Ecotourism—(Enroll in Anthropological Sciences 167.)

5 units, Aut (Stronza)

189. Philosophy of Biology—(Enroll in Philosophy 167A/267A.)

4 units (Godfrey-Smith) not given 2000-01

HONORS, INTERNSHIP, AND SPECIAL PROJECTS

190. Honors Seminar for Sophomores—Introduction to the process of doing honors research and writing the final thesis. Guest speakers discuss various aspects of honors research. Students attend at least one of the Honors Symposium presentations in May. Prerequisite: consent of instructor. (AU)

1 unit, Spr (R. Fernald)

191. Honors Seminar for Juniors—Open to juniors considering honors work in Human Biology. Weekly survey of faculty research areas. Writing honors proposals, research grant applications, and Human Subjects Committee approval. Speakers include honors students, faculty, and statistical and writing consultants. (AU)

1 unit, Win (Feldman)

193. Research in Human Biology—Independent research conducted under faculty supervision, taken junior or senior year, normally (but not necessarily) in pursuit of an honors project. May be taken more than one quarter for credit. Students must complete application in student services office.

1-5 units

194. Honors—Completion of the honors project, normally taken in the student's final quarter. First component: the honors thesis, a final paper providing evidence of rigorous research, fully referenced, and written in an accepted scientific style. Second component: participation in the honors symposium, including a 10-minute oral presentation followed by a brief question and answer session. Prerequisites: 193 (or 199), and acceptance into the honors program.

1-10 units (Staff)

197. Internship in Human Biology—Limited to and required of Human Biology majors. Combines course work with a supervised field, community, or lab experience of student's own choosing. Must be arranged in advance and initiated at least three quarters prior to graduation.

4 units (Staff)

197S. Service-Learning Internship in Community Health—(Fulfills the Human Biology internship requirement.) Provides 100 hours of work in service capacity with a non-profit, community health agency. Students are required to go through an orientation to their community and participate in organized reflection activities throughout their experience. Prerequisite: consent of instructor and admittance into the Human Biology Service-Learning Program.

4 units (Barr)

198. Senior Tutorial—Intensive reading course for Human Biology majors in exceptional circumstances and under sponsorship of Human Biology associated faculty. Students must apply through Human Biology Student Services before registering. Reading list, paper, and evaluation required.

1-5 units (Staff)

199. Directed Reading/Special Projects—Independent study open to Human Biology majors and non-majors. Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the academic council. Non-majors and/or students who have not declared must obtain a sponsor only from the Human Biology associated faculty. Students must complete application in student services office.

1-4 units (Staff)

200. Teaching of Human Biology—For upper-division undergraduate and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course.

1-5 units (Staff)

OVERSEAS STUDIES

Descriptions of these courses are in the "Overseas Studies" section of this bulletin or at the Overseas Studies office, 126 Sweet Hall. Students overseas are encouraged to participate in a wide range of internships and independent research as well.

106H. Man-Environment Interactions: Case Studies from Central Chile—Santiago.

5 units, Aut (Hajek)

153X. Health Systems and Health Insurance: France and the U.S.—A Comparison—(Same as Overseas Studies 111.) Paris.

4 units, Win (Giraud)

160. Changing Health Care Delivery in Britain—Oxford.

4 units, Win (Birch)