

HUMAN BIOLOGY

Emeriti: (Professors) Clifford Barnett (Anthropological Sciences), Luigi Cavalli-Sforza (Genetics), Carl Djerassi (Chemistry), Sanford Dornbusch (Sociology), Albert H. Hastorf (Psychology), Dale Kaiser (Biochemistry), Herant Katchadourian (Human Biology), Donald Kennedy (Biology), Carol Winograd (Medicine), (*Associate Director*) Shirley Feldman

Director: Carol Boggs (Biology)

Associate Director: Katherine Preston

Professors: Laurence Baker (Health Research & Policy), William H. Durham (Anthropology), Russell D. Fernald (Biology), Uta Francke (Genetics), Margaret Fuller (Developmental Biology), Lawrence H. Goulder (Economics), H. Craig Heller (Biology), Richard Klein (Biology), Tanya Luhmann (Anthropology), Michael Marmor (Ophthalmology), Gordon Matheson (Orthopedic Surgery), Roeland Nusse (Developmental Biology), Natalie Rasgon (Psychiatry and Behavioral Sciences), Thomas Robinson (Pediatrics, Medicine), Robert Sapolsky (Biology), Stephen Schneider (Biology), Matthew Scott (Developmental Biology), William Talbot (Developmental Biology), Shripad Tuljapurkar (Biology), Irving Weissman (Pathology), Jeffrey Wine (Psychology), Paul Wise (Pediatrics), Arthur B. Wolf (Anthropology)

Associate Professors: Firdaus Dhabhar (Psychiatry and Behavioral Sciences), Anne Fernald (Psychology), Paul Fisher (Neurology and Neurological Sciences, Pediatrics), James Fox (Anthropology), John Rick (Anthropology), Randall Stafford (Medicine)

Assistant Professors: Melissa Brown (Anthropology), David DeGusta (Anthropology), James H. Jones (Anthropology), Norman G. Miller (Medicine), Michael Ramscar (Psychology)

Professors (Research): David Katzenstein (Medicine), Marcia Stefanick (Medicine)

Associate Professors (Research): Christopher Gardner (Medicine), David Lyons (Psychiatry and Behavioral Sciences)

Professors (Teaching): Carol Boggs (Biology), Ellen Porzig (Developmental Biology)

Associate Professors (Teaching): Eunice Rodriguez (Pediatrics), Donald Barr (Sociology), Catherine Heaney (Psychology, Medicine), David Magnus (Pediatrics), Robert Siegel (Microbiology and Immunology)

Clinical Professor: Laraine Zappert (Psychiatry and Behavioral Sciences)

Clinical Assistant Professors: Daniel Garza (Orthopedic Surgery, Emergency Medicine), Mary Therese Jacobson (Obstetrics and Gynecology)

Other Teaching Faculty and Staff: William Abrams, Wesley F. Alles (Medicine), Judy Chu, Gerda Endemann (Biology), Anne Firth-Murray, Anne Friedlander (Stanford Center on Longevity), Renu Heller, Michaela Kiernan (Medicine), Nicole Dudukovic Kuhl, Michael Mastrandrea (Earth Sciences), Lisa Medoff, Lynn Rothschild, Norman Ruby (Biology), Merritt Ruhlen (Anthropology), Darwin Scott Smith (Microbiology and Immunology), James Truncer (Anthropology), Katherine E. Williams (Psychiatry and Behavioral Sciences), Jennifer Wolf (Education), Nathan Wolfe, Larry Zaroff (Anesthesiology, Biomedical Ethics)

Course Associates: Tom McFadden, Lindsey Merrihew, Isabel Shelton-Mottsmith, Marci Pepper, Will Peterson, Aimee Precourt, Helen Snodgrass, Michelle Wilson

Honors Chair: Katherine Preston

Program Offices: Building 20

Mail Code: 94305-2160

Phone: (650) 725-0336

Email: cacciari@stanford.edu (Student Services)

Web Site: <http://humbio.stanford.edu>

Courses offered by the Program in Human Biology have the subject code HUMBIO, and are listed in the "Human Biology (HUMBIO) Courses" section of this bulletin.

The Program in Human Biology is an interschool, interdepartmental, undergraduate major. The program's mission is to

provide an interdisciplinary approach to understanding the human being from biological, behavioral, social, and cultural perspectives.

The program seeks: (a) to provide a broad and rigorous introduction to the biological and behavioral sciences and their interrelationships, and (b) to explore how this knowledge, in conjunction with studies in other fields, can be applied to formulate and evaluate health, environmental, and other public policies that influence human welfare. To achieve these goals, all students complete a 30-unit core sequence, normally in the sophomore year, that provides the foundation for the major. Also during the sophomore year, students consult with student advisers to choose a faculty adviser and complete the declaration process. Together they plan a roadmap of course work designed to help each student focus on an area of interest within Human Biology. Early planning and subsequent refining of an individualized course of study, in consultation with student and faculty advisers, is a strength and requirement of the program. The curriculum draws on faculty from across the University. To complete a B.A. in Human Biology, students must take courses from within the program and from other University departments. Most Human Biology majors go on to advanced training in professional schools, or graduate programs in the behavioral, natural, and social sciences, including coterminal master's degree programs in other University departments. Additional information about the major may be obtained from the program's offices or at <http://humbio.stanford.edu>.

UNDERGRADUATE PROGRAMS IN HUMAN BIOLOGY

The program offers a Bachelor of Arts in Human Biology, as well as a minor and an honors program.

STUDENT ADVISERS

Human Biology has an advising program comprising faculty and student advisers. Before declaring Human Biology as their undergraduate major, each student must meet with one of six student advisers who assist them in developing a coherent study plan based on an individualized area of concentration, and the selection of foundation, concentration, and upper-division courses. They also assist students in selecting an appropriate faculty adviser and a suitable internship for their area of concentration and career goals. Student advisers offer drop-in services during scheduled office hours every weekday and some evenings. The student advisers also sponsor events including the Internship Faire, the Advising Extravaganza, Beyond HumBio, and declaration workshops. To maintain high standards of advising that respond to the needs of individual students, student advisers meet weekly with the program's faculty advising chairs and the student services coordinator to review the program's policies and specific student inquiries and petitions concerning the program.

BACHELOR OF ARTS IN HUMAN BIOLOGY

The B.A. in Human Biology (HUMBIO) requires a minimum of 84 units in the major divided among four levels of courses:

Fundamental Program: at least 38 units, to include

Human Biology Core (30 units)

Statistics (4-5 units)

Internship (HUMBIO 197; 4 units)

The Human Biology Core refers to HUMBIO 2A and 2B, 3A and 3B, and 4A and 4B. See "Human Biology Core" below for more information. Statistics may be chosen from courses such as STATS 60 or 141, PSYCH 10, SOC 181B, and BIO 141. For questions about other statistics courses that might fulfill this requirement, see the program office. The core and statistics courses must be taken for a letter grade by majors. The internship requirement, a mentored non-classroom project, is graded satisfactory/no credit only.

1. *Foundation Courses:* 20-unit minimum. Total units vary, depending on the focus of study chosen by the student for the area of concentration. They may include introductory-level courses from across the University and lab courses. A maximum of 10 premed units (from the chemistry, physics, and calculus series, and biology lab courses) are allowed. The minimum grade requirement for foundation courses is 'C-.'

2. *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 are non-introductory, theory-based, and are usually numbered over 100. Three or more departments must be represented in the concentration. Each course must be taken for a minimum of 3 units. The area of concentration is individually designed by the student in consultation with the student advisers and faculty adviser. Final approval of the concentration rests with the student advisers and faculty adviser. All area of concentration courses must be taken for a letter grade. The minimum grade requirement for area of concentration courses is 'C-'. The area of concentration generally has an emphasis in one, and sometimes more than one, of the following eight areas:

Area 1: Environment and Environmental Policy

Environment
Environmental Policy
Culture/Demography/Human Ecology

Area 2: Health and Health Policy

Health Policy
Public Health
International Health

Area 3: Human Performance

Area 4: Human Development

Biological Development
Psychological Development
Education

Area 5: Biomedical Science

Genetics
Molecular Biology
Human Physiology
Infectious Diseases

Area 6: Brain and Behavior

Area 7: Ethics and Medical Humanities

Area 8: Evolution

A non-exclusive list of possible courses for each emphasis is available at the student advisers' office or at <http://www.stanford.edu/dept/humbio/cgi-bin/?q=node/231>.

3. *Upper-Division Courses*: students must take three Human Biology upper-division courses numbered 100 to 189. These courses should be used to explore subjects outside the area of concentration. 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 HUMBIO courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement, including those listed as cognate courses from another department. A list of Human Biology cognate courses can be found at <http://www.stanford.edu/dept/humbio/cgi-bin/?q=node/1382>.

A prospective major must consult with the student and faculty 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 written statement (3-5 pages) of academic and long-term goals and the proposed list of courses satisfying the requirements for the major. The proposal is then reviewed by the student advisers who help identify an appropriate faculty adviser. Final approval of the proposed course of study rests with the faculty adviser. It is important to declare early, preferably by the end of Spring Quarter of the sophomore year, but not later than the end of Autumn Quarter of the junior year; students must petition the director to declare later than Autumn Quarter of the junior year. Petitions to declare late require additional documentation and are less likely to be approved.

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.

HUMAN BIOLOGY CORE

Required core sequences (2A,B, 3A,B, and 4A,B) 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. Freshmen are not permitted to enroll. Majors must earn a minimum letter grade of 'C-' in core courses.

For academic year 2008-09, the Human Biology core consists of the following courses:

HUMBIO 2A. Genetics, Evolution, and Ecology
HUMBIO 2B. Culture, Evolution, and Society
HUMBIO 3A. Cell and Developmental Biology
HUMBIO 3B. Behavior, Health, and Development
HUMBIO 4A. The Human Organism
HUMBIO 4B. Environmental and Health Policy Analysis

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 with a minimum GPA of 3.0, have an overall Stanford grade point average (GPA) of 3.2, 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. Courses of interest to honors students include: HUMBIO 193, Research in Human Biology, and HUMBIO 194, Honors. Most honors projects involve a total of 10-15 units of course work in HUMBIO 193 and 194. Admission to the honors program is by submission of an intention to undertake honors research in early February, followed by the application in early March of the junior year. Students planning to undertake honors begin research or preparation as early as completion of the sophomore year. 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 Poster Symposium in May. Human Biology also holds a Summer Honors College just prior to Autumn Quarter each year for students who have applied to the honors program. Students apply to Summer Honors College in April of the junior year. For applications, contact the program office.

MINOR IN HUMAN BIOLOGY

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 Human Biology Core (HUMBIO 2A, 2B, 3A, 3B, 4A, and 4B) and one additional upper-division course (for example, any course offering by Human Biology numbered 100-189). These must be taken for a minimum letter grade of 'C-'. 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 Autumn Quarter to graduate the following Spring Quarter).

STOREY HOUSE

Storey House, 544 Lasuen Mall, is an undergraduate residence for the Human Biology Academic Theme House, devoted to developing an intellectual community among Human Biology majors at Stanford, and allowing faculty and students to become acquainted and share their Human Biology interests and research. Its goals are to foster intellectual discussion in the residential lives of the students living in Storey House, mentoring relationships between upperclassmen and core students in the house, and stimulating events for all Human Biology majors facilitated by academic theme associates. Assignment is made through the regular undergraduate housing draw.

HUMAN BIOLOGY (HUMBIO) COURSES

For information on the undergraduate program in Human Biology, see the "Human Biology" section of this bulletin. The faculty and staff of Human Biology prepare a student handbook, on the web at <http://humbio.stanford.edu/>, that 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 Human Biology majors.

UNDERGRADUATE COURSES IN HUMAN BIOLOGY

Required core sequences (2A,B, 3A,B, and 4A,B) 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. Freshmen are not permitted to enroll. Majors must earn a minimum letter grade of 'C-' in core courses. Courses numbered 100 through 189 fulfill the Human Biology upper-division requirement. These courses are open to non-majors with the proper prerequisites; Human Biology majors have preference when enrollment is restricted.

HUMBIO 2A. Genetics, Evolution, and Ecology

Introduction to the 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:DB-NatSci

5 units, Aut (Boggs, C; Durham, W; Francke, U)

HUMBIO 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:DB-SocSci

5 units, Aut (Klein, R; Brown, M)

HUMBIO 2C. Introductory Chemistry Seminar

Preparation for biochemistry in the Human Biology core. Limited to students who have not previously enrolled in college chemistry classes or passed the Human Biology core chemistry exam.

1 unit, Aut (Wandless, T)

HUMBIO 3A. Cell and Developmental Biology

The principles of the biology of cells: principles of human developmental biology, 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. Prerequisite: college chemistry, a passing grade on the Human Biology core chemistry exam, or HUMBIO 2C. GER:DB-NatSci

5 units, Win (Fuller, M; Kaiser, A; Nusse, R; Scott, M; Talbot, W)

HUMBIO 3B. Behavior, Health, and Development

Research and theory on human behavior, health, and life span development. How biological factors and cultural practices influence cognition, emotion, motivation, personality, and health in childhood, adolescence, and adulthood. GER:DB-SocSci

5 units, Win (Lyons, D; Fernald, A)

HUMBIO 3Y. Practicum in Child Development

Practical experience at Bing Nursery School for 3.5 hours per week. Pre- or corequisite: 3B. (AU)

1 unit, Win (Winters, J)

HUMBIO 4A. The Human Organism

Organ system physiology: the principles of neurobiology and endocrinology, and the functions of body organs. The mechanisms of control, regulation, and integration of organ systems function. GER:DB-NatSci

5 units, Spr (Heller, C; Fernald, R)

HUMBIO 4B. Environmental and Health Policy Analysis

Connections among the life sciences, social sciences, public health, and public policy. The economic, social, and institutional factors that underlie environmental degradation, the incidence of disease, and inequalities in health status and access to health care. Public policies to address these problems. Topics include pollution regulation, climate change policy, biodiversity protection, health care reform, health disparities, and women's health policy. GER:DB-SocSci

5 units, Spr (Goulder, L; Barr, D)

HUMBIO 6. Human Origins

(Same as ANTHRO 6, ANTHRO 206, BIO 106.) The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them. GER:DB-NatSci

5 units, Win (Klein, R)

HUMBIO 14. Introduction to Anthropological Genetics

(Same as ANTHRO 14.) How genetic methods address anthropological questions. Examples include the evolutionary relationships between humans and the apes, the place of the Neanderthals in human evolution, the peopling of the New World, ancient DNA, the genetics of ethnicity, forensic genetics, genomics, behavioral genetics, and hereditary diseases. GER:DB-NatSci

3-5 units, not given this year

HUMBIO 21. Introduction to Brain and Behavior

(Same as BIO 20.) Evolutionary principles to understand how the brain regulates behavior, described in physiological terms, and is influenced by behavioral interactions. Topics include neuron structure and function, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states, the biological basis of learning and memory, and behavioral abnormalities. GER:DB-NatSci

3 units, Aut (Fernald, R), alternate years, not given next year

HUMBIO 27. Traditional Chinese Medicine

The philosophy and history behind traditional Chinese medicine. Concepts such as Qi, Yin/Yang, meridians, Chinese organs, and the 5 elements. How these concepts are applied through techniques such as acupuncture, herbal medicine, Qi gong, and massage. How traditional Chinese medicine is understood from a scientific standpoint. Political and socioeconomic implications. Observation of an acupuncturist. Readings on the integration of Eastern and Western medicine and on traditional Chinese medicine.

1 unit, Win (Golianu, B)

HUMBIO 82A. Qualitative Research Methodology

Goal is to develop knowledge and skills for designing and conducting qualitative research studies including purposes, conceptual contexts, research questions, methods, validity issues, and interactions among these facets. Each student designs a qualitative research study.

3 units, Win (Wolf, J), Spr (Wolf, J)

HUMBIO 82B. Advanced Data Analysis in Qualitative Research

For students writing up their own qualitative research. Students prepare a complete draft presenting their own qualitative research study including results, with reports drafted section by section, week by week. Class provides feedback, guidance, support.

3 units, Aut (Wolf, J)

HUMBIO 84Q. Social Justice, Responsibility, Health

Stanford Introductory Seminar. Preference to sophomores. Reducing health disparities among segments of the US population is an overarching goal of the Centers for Disease Control and Prevention (CDC). Evidence for and cause of existing health disparities; criteria for calling a health disparity unjust; and assignment of responsibility for maintaining or recovering good health.

4 units, Aut (Heaney, C)

HUMBIO 86Q. Love as a Force for Social Change

Stanford Introductory Seminar. Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of love. How love is conceptualized across cultures; love as the basis of many religions; different kinds of love; the biology of love; love as sickness; love and sex; the languages of love including art, literature, music, and poetry. Emphasis is on writing. Oral presentation.

3 units, Win (Murray, A)

HUMBIO 87Q. Women and Aging

(S,Sem Same as MED 87Q.) Stanford Introductory Seminar. Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. GER:EC-Gender

5 units, Win (Winograd, C)

HUMBIO 91Q. Neuroethology: The Neural Control of Behavior

Stanford Introductory Seminar. 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. GER:DB-NatSci

3 units, Aut (Fernald, R)

HUMBIO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine

(S,Sem Same as ORTHO 97Q.) Stanford Introductory Seminar. Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

3 units, Aut (Matheson, G), Spr (Matheson, G)

HUMBIO 99Q. Becoming a Doctor: Readings from Medical School, Medical Training, Medical Practice

Stanford Introductory Seminar. Preference to sophomores. For students considering medicine as a career. Goal is to acquaint students with medical school, training in medicine and surgery, and the practice of medicine and surgery. Topics include: how to pick a medical school and a residency; how medicine affects family life, especially children; the differences between surgical and medical specialties; the advantages and disadvantages among academic/teaching, pure research, group practice, HMO, hospital staff, or private practice; malpractice concerns; and financial considerations.

3 units, Aut (Zaroff, L)

HUMBIO 112. Conservation Biology

(Same as BIO 144.) Principles and application of the science of preserving biological diversity. Topics: sources of endangerment of diversity; the Endangered Species Act; conservation concepts and techniques at the population, community, and landscape levels; reserve design and management; conflict mediation. 4 units if taken with a service learning component. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. GER:DB-NatSci

3-4 units, Win (Boggs, C; Launer, A)

HUMBIO 114. Environmental Change and Emerging Infectious Diseases

(Same as ANTHRO 177, ANTHRO 277.) The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV. (HEF III; DA-C) GER:DB-SocSci

3-5 units, not given this year

HUMBIO 115. Long-Term Human Interaction with Environment

(Same as ANTHRO 115A.) The effects and consequences of long-term human interaction with the environment. How and why past societies adapted, or failed to adapt, to changing environmental conditions and relevance to current environmental problems. Demographic, archaeological, and environmental data assessed using case studies from around the world since the late Pleistocene. Development of agriculture, societal collapse, sustainability, and policy response. Prerequisite: Human Biology core or equivalent or consent of instructor.

3 units, Spr (Truncer, J)

HUMBIO 116. Controlling Climate Change in the 21st Century

(Same as BIO 147, BIO 247, EARTHSYS 147, EARTHSYS 247.) Global climate change science, impacts, and response strategies. Topics: scientific understanding of the climate system; modeling future climate change; global and regional climate impacts and vulnerability; mitigation and adaptation approaches; the international climate policy challenge; and decarbonization of energy and transportation systems. GER:DB-NatSci

3 units, Win (Schneider, S; Mastrandrea, M), alternate years, not given next year

HUMBIO 117. Human Behavioral Ecology

(Same as ANTHRO 361.) Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting. GER:DB-SocSci

3-5 units, not given this year

HUMBIO 118. Theory of Ecological and Environmental Anthropology

(Same as ANTHRO 90C.) Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America. GER:DB-SocSci

3-5 units, Win (Bird, R)

HUMBIO 119. Demography: Health, Development, Environment

(Same as BIO 102.) Demographic methods and their application to understanding and projecting changes in human infant, child, and adult mortality and health, fertility, population, sex ratios, and demographic transitions. Progress in human development, capabilities, and freedoms. Relationships between population and environment. Prerequisites: numeracy and basic statistics; Biology or Human Biology core; or consent of instructor. GER:DB-SocSci

3 units, Spr (Tuljapurkar, S)

HUMBIO 120. Health Care in America: The Organizations and Institutions that Shape the Health Care System

Health policy and health care delivery. Options for health care reform. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Aut (Barr, D)

HUMBIO 120A. Health Policy and Health Care System Design

The design of health care systems and their ability to improve the health of the population successfully. Concepts related to health care systems and components. Focus is on the health care systems of the U.S. and UK.

4 units, Spr (Baker, L)

HUMBIO 121A. Providing and Evaluating Health Education for Underserved Children

(Same as INDE 262A.) A service learning experience in community health. Students participate in developing health education materials for underserved middle school students based on principles of human biology and health science; become knowledgeable about logic modes and other evaluation tools available for evaluating health education modules and community interventions; develop an implementation and evaluation plan. Prerequisite for undergraduates: Human Biology core or equivalent or consent of instructor.

3 units, Aut (Rodriguez, E; Morioka-Douglas, N)

HUMBIO 121B. Providing and Evaluating Health Education for Underserved Children

(Same as INDE 262B.) Students implement the health education activities/modules developed in INDE 262A/HUMBIO 121A, solicit evaluative feedback, and present the outcomes.

3 units, Win (Rodriguez, E; Morioka-Douglas, N)

HUMBIO 122. Beyond Health Care--Seeking Health in Society

(Same as PEDS 222.) Available evidence both at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: 4B or equivalent and background in research methods and statistics.

3 units, Win (Rodriguez, E)

HUMBIO 122S. Social Class, Race, Ethnicity, Health

(Same as SOC 141A.) Socioeconomic, racial, and ethnic differences in health status. Access to care of racial and ethnic minorities and those from lower social classes. Institutional factors such as government programs, and individual factors such as unconscious racial bias on the part of care providers or distrust of providers on the part of patients. The intersection of lower social class and ethnic minority status in health status and health care access. GER:DB-SocSci, EC-AmerCul

5 units, Win (Barr, D)

HUMBIO 123. Obesity in America: Clinical and Public Health Implications

Interdisciplinary clinical, research, and policy approaches. The prevalence, predictors, and consequences of obesity and diabetes; biological and physiological mechanisms; clinical treatments including medications and surgery; and the relevance of behavioral, environmental, economic, and policy approaches to obesity prevention and control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Win (Kiernan, M; Stafford, R)

HUMBIO 124. Fat Nutrition and Current Health Concerns

Relationships between dietary fats and heart disease, cancer, obesity, diabetes, and fitness. Proposed benefits of omega-3 fats and antioxidants. Historical and economic influences on fat nutrition. Prerequisite: 3A; pre- or corequisite: 4A; preference to students who have completed 4A. Recommended: 130.

4 units, Spr (Endemann, G)

HUMBIO 125. Current Controversies in Women's Health

(Same as OBGYN 256, INDE 256.) Interdisciplinary. Focus is on the U.S. Topics include: health research; bioethical, legal, and policy issues; scientific and cultural perspectives; social influences; environmental and lifestyle effects on health; and issues related to special populations. Guest lecturers; student debates. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Spr (Jacobson, M; Stefanick, M)

HUMBIO 126. Promoting Health Over the Life Course: Multidisciplinary Perspectives

Disease prevention and health promotion topics pertinent to different stages of the life span emphasizing healthy lifestyle and reducing risk factors in both individuals and communities. Focus is on scientific investigation, the application of behavioral science to risk reduction strategies, and the importance of health promotion as a social and economic imperative. Topics include: epidemiology of chronic diseases; social determinants of health, behavior change; obesity, nutrition, and stress; young adult, mid-life and aging health issues; health care delivery and public health system; workplace wellness programs; and environmental and international issues. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Aut (Stefanick, M; Alles, W)

HUMBIO 127A. Community Health: Assessment and Planning I

Major determinants of health in a community. Working with community partners to identify health issues and plan programs and policies to prevent disease and promote health. Service learning component involving students in community health assessment techniques. Prerequisite: 4B or equivalent, or consent of instructor.

4 units, Win (Heaney, C), alternate years, not given next year

HUMBIO 127B. Community Health: Assessment and Planning II

Continuation of 127A. Service learning course with emphasis on conducting community health assessment and planning projects in collaboration with community-based organizations. Prerequisite: 4B or equivalent, 127A, or consent of instructor.

4 units, Spr (Heaney, C), alternate years, not given next year

HUMBIO 128. Community Health Psychology

(Same as PSYCH 101.) Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent.

4 units, Win (Heaney, C)

HUMBIO 129. Critical Issues in International Women's Health

Women's lives, from childhood through adolescence, reproductive years, and aging. 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 life or death issues of women's health that depend on their capacity to negotiate or feel empowered, including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. Prerequisites: Human Biology core or equivalent or consent of instructor. GER:EC-Gender

4 units, Aut (Murray, A), Win (Murray, A)

HUMBIO 129S. International Health

Concepts of health and wellness and major descriptors and determinants of health status. International organizations and control programs, disease-related problems within population groups from an epidemiologic viewpoint, health care delivery methods, efforts to improve health through examination of current and previous programs and projects. Cultural, economic, and political contexts in international health. Prerequisites: Human Biology core or equivalent or consent of instructor.

4 units, not given this year

HUMBIO 130. Human Nutrition

The study of food, and the nutrients and substances therein. Their action, interaction, and balance in relation to health and disease. Emphasis is on the biological, chemical, and physiological processes by which humans ingest, digest, absorb, transport, utilize, and excrete food. Dietary composition and individual choices are discussed in relationship to the food supply, and to population and cultural, race, ethnic, religious, and social economic diversity. The relationships between nutrition and disease; eating disorders; ethnic diets; vegetarianism; nutritional deficiencies; nutritional supplementation; phytochemicals; and food safety. Prerequisite: Human Biology core or consent of instructor.

4 units, Spr (Staff)

HUMBIO 131. Interdisciplinary Design for Agile Aging

(Same as CS 379Y, MED 279Y.) Offered by the d.school. Perspectives from computer science, design, social and behavioral sciences, physiology, geriatrics, and biodesign to develop projects that address the potential of people to maintain vitality and mobility as they age. New ways to integrate computer and device technologies with behavioral and social interventions. Focus is on small-group projects based on real-world need finding. Prerequisite: background in one of design, computing, medicine, behavioral sciences, communications, or business.

3-4 units, Win (Winograd, C; Winograd, T; Friedlander, A; Yock, P)

HUMBIO 132. Functional Anatomy of Exercise

Interdisciplinary: physiology, pathology, and biomechanics. Anatomy of the body's major joints in the context of exercise and movement emphasizing adaptations that occur with intensity and nature of exercise, age, and disease. Students work in cooperative groups with students at the Gothenburg School of Sports Science in Sweden to produce original research on an aspect of biomechanics and sport. Sources include the Stanford Human Performance Laboratory. Enrollment limited to 40. Prerequisites: 139 or consent of instructor.

4 units, Spr (Garza, D)

HUMBIO 133. Human Physiology

(Same as BIO 112, BIO 212.) The functioning of organ systems emphasizing mechanisms of control and regulation. Topics: structure and function of endocrine and central nervous systems, cardiovascular physiology, respiration, salt and water balance, exercise, and gastrointestinal physiology. Prerequisite: Biology or Human Biology core. GER:DB-NatSci

4 units, Win (Garza, D)

HUMBIO 135. Exercise Physiology

How body systems respond to the stress of acute exercise and adapt to chronic exercise training. How the cardiovascular system adapts to optimize oxygen delivery and utilization, how muscles generate force and hypertrophy in response to training, how metabolic/biochemical pathways are regulated to support the increased energy demand of exercise. Theories on the causes of fatigue and muscle soreness, and on what limits human performance. Applied topics such as the effects of aging, gender, and environmental conditions (high altitude, heat, cold) on exercise capacity will also be discussed. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

4 units, not given this year

HUMBIO 135S. Applied Topics in Exercise Physiology and Metabolism

Scientific research on topics related to exercise physiology, aging and mobility. Exercise physiology lab and field work experience. Student presentations. Summary paper. Enrollment limited to 12. Prerequisites: Human Biology core or equivalent; preference to those who have taken 135.

3 units, Spr (Friedlander, A)

HUMBIO 139. Sports Medicine

Sports, exercise, health, and medicine throughout the human performance continuum. Exercise as therapy; injuries and illnesses that result from sports and exercise; and the use of technology in modern sports science. Sources include physiology, nutrition, and biomechanics. Medical 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, drugs in sport, and aging. Prerequisite: Biology or Human Biology core, or consent of instructor. GER:DB-NatSci

4 units, Aut (Garza, D)

HUMBIO 141. Human Developmental Biology and Medicine

(Same as DBIO 156.) 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 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 Biology core, or consent of instructor.

4 units, not given this year

HUMBIO 142. Adolescent Development

Underlying changes and their consequences in everyday functioning. Physical, cognitive, social, and sexual development; how these changes influence the emerging sense of identity, autonomy, and intimacy. Contexts in which adolescents move such as family, friends and peers, school, and workplace. Focus is on normal development of boys and girls; attention to problem outcomes including eating disorders, depression, and teen pregnancy. Prerequisite: 3B or PSYCH 1, or consent of instructor.

4 units, Aut (Medoff, L)

HUMBIO 143. Adolescent Sexuality

Developmental perspective. Issues related to scientific, historical, and cultural perceptions; social influences on sexual development; sexual risk; and the limitations and future directions of research. Sexual identity and behavior, sexually transmitted diseases including HIV, pregnancy, abortion, gay and lesbian youth, sex education and condom availability in schools, mass media, exploitative sexual activity, and difficulties and limitations in studying adolescent sexuality. Legal and policy issues, gender differences, and international and historical trends. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Spr (Medoff, L)

HUMBIO 144. Boys' Psychosocial Development

(Same as EDUC 143.) From early childhood through adolescence. Emphasis is on how boys' lives and experiences are embedded within their interpersonal relationships and social and cultural contexts. Interdisciplinary approach including perspectives from fields such as psychology, sociology, anthropology, family studies, and education. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-Gender

4 units, not given this year

HUMBIO 145. Birds to Words: Cognition, Communication, and Language

(Same as PSYCH 137, PSYCH 239A.) Although the communicative abilities of animals are determined by their genetic endowment, and human communicative skills dwarf those of other species, the relation between language and genetics remains the subject of debate. Is human language genetically specified? Or are human communicative powers just one facet of human cognitive advantage? Focus is on the nature and origins of language, using evidence from studies of animals, children, and adults. GER:DB-SocSci

4 units, Aut (Fernald, A; Ramscar, M)

HUMBIO 146. Culture and Mental Illness

(Same as ANTHRO 181.) Interdisciplinary. Culture and social context on the identification, course, and outcome of psychiatric illness. What is known from psychiatry about the nature of illness as a biomedical process and from anthropology about the life course of illness within particular settings. Prerequisite: Human Biology core or equivalent or consent of instructor.

3 units, Spr (Luhmann, T)

HUMBIO 147. Population and Environment in China

Population movement and its environmental consequences from late imperial times to the present, analyzed as part of the social landscape created by radical social change. Topics include the causes of rapid population growth in late imperial times, environmental consequences, and reasons for and results of birth control programs undertaken by the Peoples' Republic. Prerequisite: Human Biology core or equivalent or consent of instructor.

5 units, Spr (Wolf, A)

HUMBIO 152. Viral Lifestyles

Contemporary topics related to microorganism. Relevance of microorganisms to disciplines beyond molecular biology and medicine. Public health implications of human/viral interactions, and the human behaviors that bring about such interactions. The ecological role played by viruses and their role in environmental health. Prerequisite: familiarity with biological systems, evolutionary biology, and microbiology.

3 units, Aut (Wolfe, N)

HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges

Parasitic and other pestilence of public health importance. Pathogenesis, clinical syndromes, complex life cycles, and the interplay among environment, vectors, hosts, and reservoirs in historical context. Public health policy initiatives aimed at halting disease transmission. World Health Organization tropical disease targets including river blindness, sleeping sickness, leishmaniasis, schistosomiasis, mycobacterial disease (tuberculosis and leprosy), malaria, toxoplasmosis, dracunculiasis, and intestinal helminthes. Guest lecturers with expertise in disease control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Win (Smith, D)

HUMBIO 154. Cancer Epidemiology

Epidemiological methods relevant to human research in cancer. The concepts of risk; case control, cohort, and cross-sectional studies; clinical trials; bias; confounding; interaction; screening; and causal inference. Social, political, economic, and ethical controversies surrounding cancer screening, prevention, and research. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Win (Fisher, P)

HUMBIO 155B. The Vaccine Revolution

(Same as MI 115B.) Advanced seminar. Human aspects of viral disease, focusing on recent discoveries in vaccine development and emerging infections. Journal club format: students choose articles from primary scientific literature, write formal summaries, and synthesize them into a literature review. Emphasis is on analysis, experimental design, and interpretation of data. Oral presentations. Enrollment limited to 10. Prerequisites: HUMBIO 155H, MI 155V.

6 units, Aut (Siegel, R)

HUMBIO 155H. Humans and Viruses I

(Same as MI 155H.) Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response.

6 units, not given this year

HUMBIO 156. Global HIV/AIDS

(Same as MED 256.) Public health, policy, and research issues. Resources at Stanford and institutions such as government, NGOs, and pharmaceutical, advocacy, and international organizations. Sources include biomedical, social, and behavioral sciences. Student projects. Guest lectures. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:DB-NatSci

3 units, Spr (Katzenstein, D)

HUMBIO 157. The Biology of Stem Cells

(Same as DBIO 257.) The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: 2A,B, or consent of instructor.

3 units, Spr (Nusse, R; Fuller, M)

HUMBIO 158. The Human Genome and Disease

(Same as BIO 109A, BIO 209A.) The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. GER:DB-NatSci

3 units, Win (Heller, R)

HUMBIO 159. Genes and Environment in Disease Causation: Implications for Medicine and Public Health

(Same as HRP 238.) The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor.

2-3 units, Win (Popat, R)

HUMBIO 160. Human Behavioral Biology

(Same as BIO 150, BIO 250.) Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness. GER:DB-NatSci

5 units, alternate years, not given this year

HUMBIO 161. The Neurobiology of Sleep

(Same as BIO 149, BIO 249. Graduate students register for 249.) Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16. GER:DB-NatSci

4 units, Win (Heller, C)

HUMBIO 162. Clinical Neuroscience in Women's Health

Mental health from the perspectives of neuroscience, psychology, human physiology, and feminist studies. Major depression, bipolar, and obsessive compulsive disorders; how the female reproductive system affects the clinical presentation and course of these disorders. Eating disorders, substance abuse and dependence, and sexual trauma within a biopsychosocial model. Pharmacologic and therapeutic treatment of illnesses. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-Gender

4 units, Win (Williams, K; Rasgon, N; Zappert, L)

HUMBIO 163. Neural Systems and Behavior

(Same as BIO 163, BIO 263.) The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Prerequisites: BIO 42, HUMBIO 4A, or equivalents. GER:DB-NatSci

4 units, alternate years, not given this year

HUMBIO 164. Critical Implications of Human Memory Research

Concepts in human memory research, emphasizing most recent debates and advances in methodology. Applications to other fields. Focus is on evaluating scientific findings and becoming critical consumers of scientific research. Topics include eyewitness memory, mood disorders, aging, testing effects, childhood amnesia, psychopharmacology, fMRI, and everyday instances of forgetting. How memory research may inform medical, educational, and legal policy.

4 units, Win (Kuhl, N)

HUMBIO 165. Promoting Behavior Change

(Same as EARTHSYS 165.) How to apply principles of behavioral change to a real world public health problem: climate change and environmental sustainability. Sources include theory, research, and practice from perspectives such as social and cognitive psychology, media and communication, education, behavioral medicine, social marketing, and consumer behavior. Student groups create an intervention to help elementary school students reduce their environmental footprint. Research performed in local high schools to develop optimally feasible, acceptable, and effective interventions. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Spr (Robinson, T)

HUMBIO 171. The Death Penalty: Human Biology, Law, and Policy

Combines academic study with student participation in forensic research and case investigation, including DNA evidence, psychological and physiological development, mental and physical disabilities, and witness interviews. The philosophy, structure, and application of capital punishment in the U.S. Goal is to examine and challenge the issues involved in the death penalty from the perspective of involvement in a real case. Course not taught from a preconceived belief or political or philosophical agenda except to involve students in an intellectual challenge of policy and philosophy. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Spr (Abrams, W)

HUMBIO 172A. Children, Youth, and the Law

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; informed consent; health care; protection from harm and child welfare; due process; and privacy and freedom of expression. Interactive, using hypotheticals for discussion and analysis. A and B alternate annually; students may take one or both. Prerequisite: Human Biology core or equivalent, or consent of instructor.

5 units, Win (Abrams, W), alternate years, not given next year

HUMBIO 172B. Children, Youth, and the Law

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; informed consent; health care; protection from harm and child welfare; due process; and privacy and freedom of expression. Interactive, using hypotheticals for discussion and analysis. A and B alternate annually; students may take one or both. Prerequisite: Human Biology core or equivalent, or consent of instructor.

5 units, alternate years, not given this year

HUMBIO 173. Science, Business, Law: How Scientific Discovery and Innovation are Protected and Brought to Market

The interaction of science, business and law: how scientific ideas are protected by law; the rights of those who invent, develop, and finance scientific discovery; and how ideas are commercialized and brought to market. What kinds of research, discovery, and innovation are protected; who has rights that can be protected; what kinds of rights can be protected, and the kinds of protections that apply; how inventions are commercialized; and the success and failure of businesses based on scientific discovery. Prerequisite:

Human Biology core or equivalent, or consent of instructor.

3 units, Aut (Abrams, W)

HUMBIO 174. Foundations of Bioethics

Classic articles, legal cases, and foundational concepts. Theoretical approaches derived from philosophy. The ethics of medicine and research on human subjects, assisted reproductive technologies, genetics, cloning, and stem cell research. Ethical issues at the end of life. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-EthicReas

3 units, Win (Magnus, D)

HUMBIO 175. Health Care as Seen Through Medical History, Literature, and the Arts

The differences between disease as pathology and as the patient's experience. Topics include: patient-doctor relationships; medical technology; the changing focus on illness; gender issues; love, sex, and illness; mental illness; sick children; and death and dying. Prerequisite: Human Biology core or equivalent or consent of instructor.

3 units, Aut (Zaroff, L)

HUMBIO 175S. Novels and Theater of Illness

Illness and disease through novels and plays by authors including Shakespeare, Miller, Sophocles, Hemingway, and Camus. How sickness involves the patient, family, community, and state. Prerequisite: Human Biology core or equivalent or consent of instructor.

3 units, Spr (Zaroff, L)

HUMBIO 180. Human Osteology

(Same as ANTHRO 175, ANTHRO 275.) The human skeleton. Focus is on identification of fragmentary human skeletal remains. Analytical methods include forensic techniques, archaeological analysis, paleopathology, and age/sex estimation. Students work independently in the laboratory with the skeletal collection. GER:DB-NatSci

5 units, Win (DeGusta, D)

HUMBIO 182. Biology, Culture, and Human Behavior

The debate between those who argue that human behavior is best understood as the product of biological evolution and those who contend that it is largely the creation of particular cultures. Is there a human nature, and, if so, what is it? Prerequisite: HUMBIO 2A, 2B or equivalent. GER:DB-SocSci

5 units, Win (Wolf, A)

HUMBIO 183. Astrobiology and Space Exploration

Evolution in the context of space and time, focusing on the emergence of life in a planetary context on Earth and possibly elsewhere. The evolution of intelligence and the search for it elsewhere. The biological, psychological, sociological, and philosophical issues of human space exploration. Integrates information from astronautics, astrophysics, biochemistry, chemistry, evolutionary biology, geology, paleontology, physiology, psychology, and sociology. Guest lectures by scientists and astronauts from NASA, Stanford, SETI, and other universities. Prerequisite: two college-level science courses such as Human Biology core, or consent of instructor. GER:DB-NatSci

3-4 units, Win (Rothschild, L)

HUMBIO 184. Darwin's Legacy

(Same as ANTHRO 163D.) New understandings that have followed on Darwinian principles; remaining frontiers of research; areas of controversy. His legacy in anthropology, biology, religion, medicine, psychology, philosophy, and literature. 3 units requires discussion section and term paper.

1-3 units, Aut (Durham, W; Boggs, C; Dirzo, R; Siegel, R)

HUMBIO 186. Biological Clocks

(Same as BIO 135.) The biological basis for endogenous timekeeping in organisms from flies to human beings. How biological clocks are constructed at the molecular, tissue, and behavioral levels; how these clocks interact with other physiological systems and allow animals to anticipate changes in their environment. Applications of circadian rhythm principles to treating human disorders and diseases such as cancer. Prerequisite: Biology or Human Biology core, or consent of instructor. GER:DB-NatSci

3 units, not given this year

HUMBIO 187. Human Diversity: A Linguistic Perspective
(Same as ANTHRO 123A.) 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 current world languages come from and how can this diversity be used to study human prehistory? Evidence from related fields such as archaeology and human genetics. Topics: the origin of the Indo-European languages, the peopling of the Americas, and evidence that all human languages share a common origin. GER:DB-SocSci. EC-GlobalCom

3 units, Spr (Ruhlen, M)

HUMBIO 193. Research in Human Biology

Independent research conducted under faculty supervision, in junior or senior year, normally but not necessarily in pursuit of an honors project. May be repeated for credit; petition required for more than 5 units. Prerequisite: application available in student services office.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

HUMBIO 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, Aut (Staff), Win (Staff), Spr (Staff)

HUMBIO 197. Human Biology Internship

Limited to and required of Human Biology majors. A supervised field, community, or lab experience of student's choosing, pre-approved by Human Biology faculty and student advisers, and initiated at least three quarters prior to graduation. Participation in a poster session on the internship experience is required during the first quarter that the student is in residence at Stanford after completion of the internship. May be repeated for credit. Prerequisite: Human Biology core.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

HUMBIO 198. Senior Tutorial in Human Biology

Reading 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. May be repeated for credit.

1-5 units, Aut (Boggs, C; Cacciari, L), Win (Boggs, C; Cacciari, L), Spr (Staff)

HUMBIO 199. Directed Reading/Special Projects

Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the Academic Council. Non-majors and 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, Aut (Staff), Win (Staff), Spr (Staff)

HUMBIO 200. Teaching of Human Biology

For upper division undergraduates and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

OVERSEAS STUDIES COURSES IN HUMAN BIOLOGY

For course descriptions and additional offerings, see the respective "Overseas Studies" courses section of this bulletin or <http://bosp.stanford.edu>. Students should consult their program's student services office for applicability of Overseas Studies courses to a major or minor program.

AUSTRALIA HUMAN BIOLOGY COURSES

OSPAUSTL 10. Coral Reef Ecosystems

3 units, Aut (Hoegh-Guldberg, O; Ward, S; Arrigo, K)

OSPAUSTL 20. Coastal Resource Management

3 units, Aut (Johnstone, R)

OSPAUSTL 30. Coastal Forest Ecosystems

3 units, Aut (Hall, J)

BERLIN HUMAN BIOLOGY COURSES

OSPBER 47. Ethics in Medicine and Everyday Life

4 units, Aut (Casper, R)

MADRID HUMAN BIOLOGY COURSES

OSPMADR 72. Issues in Bioethics Across Cultures

5 units, Win (de Lora del Toro, P)

PARIS HUMAN BIOLOGY COURSES

OSPPARIS 153X. Health Systems and Health Insurance:

France and the U.S.. a Comparison across Space and Time

4-5 units, Win (Fessler, J)

SANTIAGO HUMAN BIOLOGY COURSES

OSPSANTG 44. Human Genetic Diversity in Individuals and Populations

4-5 units, Win (Francke, U)