

PROGRAM IN HUMAN BIOLOGY

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Courses given in Program in Human Biology have the subject code HUMBIO. For a complete list of subject codes, see Appendix.

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 BACHELOR OF ARTS

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 "Required Core" below for more information. HUMBIO 4B fulfills the policy requirement of the major. Statistics may be selected from courses such as STATS 60 or 141, PSYCH 10, SOC 181B, and BIOSCI 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, an independent field experience project, is graded satisfactory/no credit only.
- 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 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.
- 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. 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. Examples of numerous possible areas of concentration are available in the program's student advisers' office or at http://humbio.stanford.edu/student_areas.html.
- 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 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.

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 (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 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 3.2, 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 March, followed by the application in April 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.

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.

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 Hum Bio, 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.

COURSES

WIM indicates that the course satisfies 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, 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.

REQUIRED 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.

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

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 3A,B. Cell and Developmental Biology: Behavior, Health, and Development

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. 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 4A,B. The Human Organism: Environmental and Health Policy Analysis

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, WIM

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

ADDITIONAL INTRODUCTORY OFFERINGS

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 (Staff)

HUMBIO 6. Human Origins—(Same as ANTHSCI 6/206, BIOSCI 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 ANTHSCI 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, Win (Jobin, M), Spr (Horsburgh, K)

HUMBIO 21. Introduction to Brain and Behavior—(Same as BIOSCI 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, alternate years, not given this year (Fernald, R)

HUMBIO 25. Human Ecology of the Amazon—(Same as ANTHSCI 25.) The diversity of peoples and cultures in the Amazon Basin and the ecosystems in which they live. Themes in ecological anthropology of Amazonia including limiting factors, the protein debate, indigenous knowledge and resource management, and anthropogenic modification. Ethnographic, historical, and archeological evidence. GER:DB-SocSci, EC-GlobalCom

5 units, not given this 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 five 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, Spr (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, 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)

STANFORD INTRODUCTORY SEMINARS

HUMBIO 84Q. Social Justice, Responsibility, Health—Stanford Introductory Seminar. Preference to sophomores. Reducing health disparities among segments of the US population is an over-arching 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: An Exploration—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—(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—(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. Write-2
3 units, Aut, 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.
4 units, Aut (Zaroff, L)

ADVANCED

Open to non-majors with the proper prerequisites. Human Biology majors have preference when enrollment is restricted. Courses numbered 100 through 189 fulfill the Human Biology upper-division requirement.

HUMBIO 111. 21st-Century Environmental Problems, Policies, Conflict, and Progress—Interdisciplinary. What environmental problems has society solved and how? What problems resist solutions and why? Ecological, legal, economic, and political analysis. Students work on a policy problem of their own choosing. Prerequisite: Human Biology core or equivalent, or consent of instructor. Recommended: courses in environmental economics, policy, and management.
3 units, Aut (Boyd, J)

HUMBIO 112. Conservation Biology—(Same as BIOSCI 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: BIOSCI 101, or BIOSCI 43 or HUMBIO 2A with consent of instructor. GER:DB-NatSci
3-4 units, Win (Boggs, C; Launer, A)

HUMBIO 113. Environmental Performance: Measuring Nature's Benefits—How to measure and report environmental outcomes. Biophysical and economic approaches to performance measurement. How environmental data and models are used in science and public policy. Students develop methods to track and communicate the benefits of nature. Prerequisite: Human Biology core or equivalent, or consent of instructor. Recommended: courses in landscape or conservation ecology, and environmental management and economics.
3 units, Spr (Boyd, J)

HUMBIO 114. Environmental Change and Emerging Infectious Diseases—(Same as ANTHSCI 179/279.) 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. GER:DB-SocSci
3-5 units, Aut (Durham, W; Jones, J)

HUMBIO 116. Controlling Climate Change in the 21st Century—(Same as BIOSCI 147/247, EARTHSYS 147/247.) The science, economics, and environmental diplomacy of global climate change. Topics: the science of climate change, climate change and global environmental law; global economic approaches to carbon abatement, taxes, and tradable permits; joint implementation, consensus, and division in the EU; gaining the support of China, other developing countries, and U.S. corporations; alternative energy and energy efficiencies for less carbon-intensive electric power and transport. GER:DB-NatSci
3 units, alternate years, not given this year

HUMBIO 117. Human Behavioral Ecology—(Same as ANTHSCI 163/263.) 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, Aut (Bird, R)

HUMBIO 118. Ecological Anthropology—(Same as ANTHSCI 164/264.) 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, not given this year

HUMBIO 119. Demography: Health, Development, Environment—(Same as BIOSCI 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; Biological Sciences or Human Biology core; or consent of instructor. GER:DB-SocSci
3 units, not given this year

HUMBIO 120. Health Care in America: Organizations and Institutions that Shape the Health Care System—Focus on health policy and health care delivery. Options for health care reform. Prerequisite: Human Biology core or equivalent, or consent of instructor.
4 units, not given this year

HUMBIO 120A. American Health Policy—Issues in health care policy making, the evolution of current systems, and theories underlying efforts for change. The national search for solutions to the problems of the uninsured, and the feasibility, options, and ramifications of universal health insurance in light of past experience and stakeholder views. Student presentations. Prerequisites: Human Biology core or equivalent, and 120, or consent of instructor. GER:DB-SocSci
3 units, Spr (Heller, G)

HUMBIO 121. Economics of Health Improvement in Developing Countries—(Same as ECON 127, MED 262.) Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: background in economics and statistics, and consent of instructor.
5 units, Win (Miller, N)

HUMBIO 122. International Health Policy: Comparative National Health Care Systems—The structure and policies of national health care systems in Europe, Canada, China, and Japan. How other countries have addressed issues of organization, finance, and allocation of scarce health care resources. Limited enrollment. Prerequisite: 120 or consent of instructor.
4 units, Win (Heller, G)

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

4 units, given next year

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. Case studies. Prerequisite: Human Biology core or equivalent, or consent of instructor.

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

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.

3 units, Spr (Endemann, G)

HUMBIO 125. Current Controversies in Women's Health—(Same as 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)

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, alternate years, not given this 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, alternate years, not given this 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, 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, Win (Wise, P)

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 (Gardner, C)

HUMBIO 131. Interdisciplinary Design for Agile Aging—(Same as CS 379Y, MED 279Y.) 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 projects. Enrollment limited. Prerequisite: application.

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 BIOSCI 112/212.) 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: Biological Sciences 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, Aut (Friedlander, A)

HUMBIO 135S. Applied Topics in Exercise Physiology and Metabolism—Reading and discussion of scientific research on student-selected topics. Emphasis is on study design. Student presentations. Summary paper. Enrollment limited to 12. Prerequisites: 135 and consent of instructor.

3 units, not given this year

HUMBIO 139. Sports Medicine—(Formerly 159.) 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: Biological Sciences or Human Biology core, or consent of instructor.

4 units, Aut (Garza, D)

HUMBIO 140. Sex Differences in Human Physiology and Disease—(Same as MED 240, OBGYN 240.) Chromosomal and hormonal influences on cells, tissues, and organs that underlie the development of reproductive organs and sexual dimorphism of the neuroendocrine system. Consequences of sex hormones and environmental factors that differ between men and women in systems including the musculoskeletal, neurological, cardiovascular, and immunological. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Win (Stefanick, M)

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 Biological Sciences 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, Win (Feldman, S; Chu, J)

HUMBIO 142A. Seminar on Problem Behavior in Adolescence—Why adolescence has such a high casualty rate. Risk and protective factors for problem outcomes; prevention and treatment programs. Focus is on externalizing behaviors (violence, delinquency, drug abuse, risk taking), internalizing problems (depression, eating disorders, suicide), and sex-related problems (teen pregnancy, date violence, STDs). Enrollment limited to 20. Prerequisite: 126 or consent of instructor.

4 units, Spr (Feldman, S)

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, Spr (Chu, J)

HUMBIO 145. Birds to Words: Cognition, Communication, and Language—(Same as PSYCH 137/239A.) 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 147. Population and Family History in Europe and China—Comparison of social and physical aspects of reproduction. Emphasis is on identifying and explaining differences in age at marriage, acceptable forms of marriage, marital fertility, and illegitimacy. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Aut (Wolf, A)

HUMBIO 148. Kinship and Marriage—Marriage as the site at which biology and culture meet and contend, and kinship as the variable outcome of the encounter. Comparative examination of societies in Oceania, Africa, and E. Asia. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Spr (Wolf, A)

HUMBIO 149. Aging: From Biology to Social Policy—(Same as ANTHSCI 171.) What people can expect when they join the ranks of the elderly. Issues include social security, medical care, lifespan, and the cultural, social, and economic consequences of a large elderly population in the U.S. and other countries. Films, service learning component. GER:DB-SocSci

5 units, Win (Barnett, C)

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 to understand public health policy initiatives aimed at halting disease transmission. Focus is on 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, Spr (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 select 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. Prerequisite: 155H, 155V (formerly 115A).

6 units, alternate years, not given this year

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, Aut (Siegel, R)

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.

3 units, Aut (Katzenstein, D)

HUMBIO 157. The Stem Cell: Science, Ethics, and Politics—(Same as DBIO 257.) The biology of stem cells. Their role in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisite: 2A,B or consent of instructor.

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

HUMBIO 158. The Human Genome and Disease—(Same as BIOSCI 109A/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 160. Human Behavioral Biology—(Same as BIOSCI 150/250.) 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, Spr (Sapolsky, R), alternate years, not given next year

HUMBIO 161. The Neurobiology of Sleep—(Same as BIOSCI 149/249.) 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, not given this year

HUMBIO 162. The Neuroscience and Psychology of Women's Health—Mental health from the perspectives of neuroscience, psychology, and human physiology. 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.

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

HUMBIO 163. Neural Systems and Behavior—(Same as BIOSCI 163/263.) 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: BIOSCI 42, HUMBIO 4A, or equivalents. GER:DB-NatSci

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

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 high 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, alternate years, not given this 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, Win (Abrams, W), alternate years, not given next 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.

4 units, Spr (Zaroff, L)

HUMBIO 176. Writing Medicine—(Same as ENGLISH 185A.) Classic and contemporary narrative prose about medicine. Focus is on illness and recovery, and good writing. Topics include being a patient, being a doctor, chronic illness, pain, modern medicine, and the modern hospital. Authors include Didion, Fadiman, Styron, Tolstoy, Williams, and contemporary doctors and patients.

3 units, Win (Zuger, A)

HUMBIO 178. Medical Anthropology—(Same as ANTHSCI 170.) The crosscultural study of the health beliefs and healing systems around the world. How social processes shape human health. GER:DB-SocSci, EC-GlobalCom

3 units, not given this year

HUMBIO 180. Human Osteology—(Same as ANTHSCI 133A/233A.) 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 181. The Evolution of Human Diet—(Same as ANTHSCI 173A/273A.) Human dietary choices and their consequences from ecological, epidemiological, and evolutionary perspectives. Topics include foraging theory, human community ecology, evidence for evolutionary design in physiological and motivational systems relating to feeding and nutrition, epidemiology of nutritional disorders, subsistence economies and modes of production, reduction diets, and health diets. GER:DB-SocSci

5 units, not given this year

HUMBIO 183. Astrobiology and Space Exploration—Evolution in the context of space and time, focusing on the emergence of life, intelligence, and civilization on Earth and possibly elsewhere. The biological, psychological, sociological, and philosophical issues of human space exploration. Integrates information from astrophysics, biochemistry, chemistry, evolutionary biology, geology, paleontology, physiology, psychology, and sociology. Guest lectures by scientists and astronauts from NASA Ames Research Center, Stanford, SETI, and Bay Area universities. Prerequisite: two college-level science courses such as Human Biology core, or consent of instructor.

3-4 units, Win (Rothschild, L)

HUMBIO 186. Biological Clocks—(Same as BIOSCI 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: Biological Sciences or Human Biology core, or consent of instructor. GER:DB-NatSci

3 units, Spr (Heller, C; Ruby, N)

HUMBIO 187. Human Diversity: A Linguistic Perspective—(Same as ANTHSCI 112.) 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 189A. The Evolution of Darwin—Intellectual and physical milieus that produced Darwin. Intellectual foundations of the development of the theory of evolution. Darwin's travels aboard the Beagle and within the UK and their impact on his ideas.

3 units, not given this year

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, Win, 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, Win, Spr (Staff)

HUMBIO 197. Human Biology Internship—Limited to and required of Human Biology majors. The internship is 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. May be repeated for credit. Prerequisite: Human Biology core.

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

COGNATE COURSES

See respective department listings for course descriptions and General Education Requirements (GER) information. See degree requirements above or the program's student services office for applicability of these courses to a major or minor program.

BIOSCI 146. Population Studies

1 unit, Win (Feldman, M)

DBIO 202. Assisted Reproductive Technologies—(Same as OBGYN 202.)

1-3 units, Win (Porzig, E; Behr, B)

EDUC 369. Human Cognitive Abilities—(Same as PSYCH 133.)

3 units, not given this year

ME 280. Skeletal Development and Evolution

3 units, Spr (Carter, D)

PHIL 60. Introduction to Philosophy of Science—(Same as HPS 60.)

5 units, Aut (Longino, H)

PHIL 78. Medical Ethics—(Same as ETHICSOC 78.)

4 units, Win (Jaworska, A)

POLISCI 131. Children's Citizenship: Justice Across Generations— (Same as EDUC 158.)

5 units, not given this year

POLISCI 133. Ethics and Politics of Public Service—(Same as ETHICSOC 133.)

5 units, Aut (Reich, R)

OVERSEAS STUDIES

Descriptions of these courses are in the "Overseas Studies" section of this bulletin, at <http://osp.stanford.edu>, or at the Overseas Studies office, 126 Sweet Hall. Students overseas are also encouraged to participate in internships and independent research.

AUSTRALIA

OSPAUSTL 10. Coral Reef Ecosystems

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

OSPAUSTL 20. Coastal Resource Management

3 units, Aut (Johnstone, R; Chiffings, T)

OSPAUSTL 30. Coastal Forest Ecosystems

3 units, Aut (Hall, J; Duke, N)

CAPE TOWN

OSPGEN 21. Public Health and Primary Health Care in a Changing Community Context

4 units, Spr (Stanton, T)

PARIS

OSPPARIS 153X. Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time

4-5 units, Win (Fessler, J)

This file has been excerpted from the *Stanford Bulletin, 2007-08*, pages 472-480. Every effort has been made to ensure accuracy; post-press changes may have been made here. Contact the editor of the bulletin at arod@stanford.edu with changes or corrections. See the bulletin web site at <http://bulletin.stanford.edu> for additional information.