# HUMAN BIOLOGY

Courses offered by the Program in Human Biology are listed under the subject code HUMBIO on the Stanford Bulletin's ExploreCourses web site.

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

## Mission of the Undergraduate Program in Human Biology

The mission of the undergraduate program in Human Biology is to provide students with an interdisciplinary approach to understanding human beings from biological, behavioral, social, and cultural perspectives. Courses in the major allow students to see connections and parallels with other fields as they learn to formulate and evaluate health, environmental, and other public policy issues that influence human welfare. The program prepares majors to pursue advanced training in professional or graduate programs.

To achieve these goals, all students complete a 30-unit core sequence, normally in the sophomore year, which 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 road map of course work designed to help each student focus on an Area of Concentration 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. or B.S. in Human Biology, students must take courses from within the program and from other University departments. Many 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 the Program in Human Biology (https://humanbiology.stanford.edu.) web site.

## Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes:

### Communication

Because Human Biology is an interdisciplinary program with an emphasis on both empirical inquiry and applied knowledge, excellent communication skills are critical to majors. Successful students must be able to engage with literature and audiences not only from multiple disciplines but also with varying levels of subject expertise and to communicate information and ideas clearly, precisely, concisely, and purposefully in any setting. Toward this end, all Human Biology majors by time of graduation should be able to:

- listen to any speaker and pose questions
- deliver an oral presentation and respond to audience questions
- summarize a scientific article
- synthesize and criticize a body of scientific literature
- write, revise, and re-write effectively and with quality
- write collaboratively and incorporate peer review
- present information visually (in the form of charts, graphs, figures, and posters) for print and oral presentation
- write an abstract, literature review, research proposal, and policy proposal
- apply concepts developed in one setting to a novel setting employ quantitative and qualitative data to support a conclusion
- frame a research question and formulate a hypothesis

### Data Analysis

Data is used in the social and biological sciences to make observations and judgments regarding patterns of human behavior and function. These data are sometimes imperfect or incomplete, but they are used nevertheless to make decisions and policies regarding humans individually and in groups within the worlds they inhabit. Thus students should cultivate a capacity within the Human Biology major to examine and analyze data. A graduate of Human Biology should be able to:

- distinguish quantitative from qualitative data
- understand the concepts of independent variable, dependent variable, and covariate
- differentiate categorical from continuous variables
- understand basic quantitative methods and statistical models for analysis, interpretation, and presentation of data
- apply quantitative methods to address original questions and hypotheses
- understand the role of rigorous qualitative analysis
- identify empirical support for causation, as distinct from association
- distinguish primary analysis from meta-analysis and contrast their roles
- manage large sets of data
- recognize when available evidence is too weak to decide a matter
- recognize mistakes commonly made in empirical reasoning and quantitative data analysis

### Scientific Literacy

Human Biology prepares students to join a broad scientific community with a culture of building and sharing knowledge. A goal of the major is to cultivate judicious consumers of research in the natural and social sciences, irrespective of their individual career paths. Every Human Biology major should be able to:

- appreciate the distinct roles of common genres of scientific writing, including peer-reviewed research papers, review articles, commentaries, and popular science writing
- acknowledge and apply the normative and ethical standards of conducting and publishing research, including accuracy, transparency, and responsibility to colleagues and subjects
- evaluate the credibility and importance of a published article and its relevance within a field
- engage with peer-reviewed scientific literature actively and critically
- identify research questions, understand their theoretical or practical importance, and assess methodologies and experimental design in relation to those questions
- evaluate evidence presented in support of claims
- interpret data presented graphically and learn to use common graphical displays

## Student Advisers

Human Biology has an advising program comprising faculty and student advisers. Before declaring Human Biology as the undergraduate major, each student must meet with student advisers who assist in developing a coherent study plan based on an individualized Area of Concentration, and the selection of breadth, depth, and upper-division courses. The student advisers also assist students in selecting an appropriate faculty adviser and a suitable capstone experience for their Area of Concentration and career goals. Student advisers offer drop-in services during scheduled office hours every weekday.

# Storey House

Storey House, 544 Lasuen Mall, is an undergraduate resident theme house for Human Biology, devoted to developing an intellectual community among Human Biology majors at Stanford and allowing faculty and students to become acquainted and to 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 pre-assignment and the regular undergraduate housing draw.

# Declaring the Major

The program offers a Bachelor of Arts and Bachelor of Science in Human Biology. 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.

It is important to declare in the sophomore year, and planning may begin once a student in good academic standing has passed two of six courses in the core. The University requires students to declare a major by the end of Spring Quarter of the sophomore year.

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.

# Fundamental Program Requirements (34+ units)

Both degree programs, B.A. and B.S., require that the student complete all three of the Human Biology Fundamental Program requirements which include the Human Biology core, statistics and capstone.

## Human Biology Core (30 units)

The required core sequence introduces 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. 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. The Human Biology core consists of the following courses:

| | | Units |
|---|---|---|
| HUMBIO 2A | Genetics, Evolution, and Ecology | 5 |
| HUMBIO 2B | Culture, Evolution, and Society | 5 |
| HUMBIO 3A | Cell and Developmental Biology | 5 |
| HUMBIO 3B | Behavior, Health, and Development | 5 |
| HUMBIO 4A | The Human Organism | 5 |
| HUMBIO 4B | Environmental and Health Policy Analysis | 5 |
| Total Units | | 30 |

## Statistics (3-5 units)

The statistics course must be taken for a letter grade by majors. The minimum grade requirement is 'C-'. (*Note:* Students who did not declare before September 21, 2015, may not use STATS 60 to fulfill the statistics requirement.) Statistics may be chosen from courses such as:

| | | Units |
|---|---|---|
| BIO 141 | Biostatistics | 3-5 |
| CS 109 | Introduction to Probability for Computer Scientists | 3-5 |
| ECON 102A | Introduction to Statistical Methods (Postcalculus) for Social Scientists | 5 |
| EDUC 200C | Introduction to Statistical Methods in Education | 3-4 |
| HUMBIO 85A | Essential Statistics for Human Biology | 4 |
| HUMBIO 88 | Introduction to Statistics for the Health Sciences | 4 |
| HUMBIO 89 | Statistics in the Health Sciences | 3 |

## Capstone (1-7 units)

The following options fulfill the Capstone (https://humanbiology.stanford.edu/capstone) requirement:

1. *Human Biology Practicum:* HUMBIO 191 Human Biology Practicum (1 unit total, S/NC grading). Allows students to integrate their academics with their community-engaged learning, research or pre-professional experiences through reflective written work and presentation; well-suited for career-enhancing project presentations or expressions of personal values and purpose. Required for students who wish to enroll in the Human Biology Synthesis (HUMBIO 192). Students can take workshops over several quarters, and enroll in one unit of 191 for the quarter they complete their five workshops.
2. *Human Biology Synthesis (by application):* This sequence should be taken for 2-3 units in Autumn (HUMBIO 192A Human Biology Synthesis), Winter (HUMBIO 192W Human Biology Synthesis) and/or Spring (HUMBIO 192S Human Biology Synthesis) for 6 units total, letter grade (corequisite HUMBIO 191 Human Biology Practicum). The sequence expands upon the work of the Human Biology Practicum, although the student may also focus on a different aspect of the area of concentration topic. It allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. The work must be exhibited during senior year.
3. *Honors in Human Biology (by application):* HUMBIO 194 Honors also satisfies the Capstone requirement.
4. Non-Human Biology activities that fulfill the Capstone requirement:
   a. Biology Senior Reflection
   b. Notation in Science Communication
   c. Interdisciplinary Honors

# Bachelor of Arts in Human Biology

The B.A. in Human Biology (HUMBIO) requires 81+ units in the major divided among four levels of courses: fundamental program requirements, breadth requirement, depth requirement and upper-division.

The B.A. degree is designed for students who prefer a traditional liberal arts degree with a curriculum based across the natural sciences, social sciences, and humanities. The degree is suitable regardless of whether a student plans to attend graduate or professional school. The B.A. degree gives students a solid foundation in biology, while allowing students more flexibility and breadth in the social sciences and humanities.

For the B.A. degree, majors take 10 or more units of breadth courses and 5 or more classes in the upper-division and depth courses from a set of pre-approved Social Sciences and Humanities courses. Many pre-approved courses satisfy University Ways of Thinking and Doing requirements, specifically Aesthetic and Interpretive Inquiry, Creative Expression, Engaging Diversity, Ethical Reasoning, and Social Inquiry. Students still also take courses in the natural sciences, although fewer than for the B.S. degree.

# Bachelor of Science in Human Biology

The B.S. in Human Biology (HUMBIO) requires 81+ units in the major divided among four levels of courses: fundamental program requirements, breadth requirement, depth requirement and upper-division.

The B.S. degree allows students a more scientific and technical focus for their studies, and requires completion of course work and specialization in the biological sciences, physical sciences, mathematics, and/or computer science and engineering.

For the B.S. degree, majors take 10 or more units of breadth courses and 5 or more classes in the upper-division and depth courses from a set of pre-approved Life and Natural Sciences courses. Many pre-approved courses satisfy University Ways of Thinking and Doing requirements, specifically Applied Quantitative Reasoning, Formal Reasoning, and Scientific Methods and Analysis. Students still also take courses in the social sciences or humanities, although fewer than for the B.A. degree.

# Breadth and Depth Requirement

These courses inform the student's chosen area of concentration topic. The student selects courses for these two requirement categories, in consultation with the student advisers and faculty adviser who approve the final course selections. A Human Biology area of concentration topic generally falls within one (or a combination of 2) of the following areas of emphasis:

- Environment and Environmental Policy
- Health and Health Policy
- Human Performance
- Human Development
- Biomedical Science and Biocomputation
- Brain and Behavior
- Ethics and Medical Humanities
- Evolution

## Breadth Requirement (20+ units)

20-unit minimum, consistent with the student's chosen area of concentration topic. This requirement allows the student to explore the topic with a broad focus. Courses may include introductory-level courses from across the University and lab courses, and may be taken for credit or letter grade. The minimum grade requirement is 'C-.'

## Depth Requirement (20+ units)

A minimum of five courses totaling at least 20 units consistent with the student's chosen area of concentration topic. This requirement allows the student to gain expertise on the topic and to focus on educational and post-baccalaureate goals. Courses are non-introductory and are usually numbered over 100. Three or more departments must be represented in the depth requirement. Each course must be taken for a letter grade and at least three units. The minimum grade requirement is 'C-'.

# Upper-Division Requirement (9+ units)

Students must take three Human Biology upper-division courses numbered 100 to 189. These courses should be used to explore subjects outside the depth requirement. One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. Minimum grade requirement for upper-division courses is 'C-'. All non-laboratory advanced HUMBIO courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement. A list of Overseas Studies courses that satisfy upper-division requirements and are given in 2016-17 can be found on the Overseas tab (p. 4) of this section of this bulletin.

# Honors Program

The honors program in Human Biology provides 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 if they have completed the Human Biology core with a minimum GPA of 3.0, have an overall Stanford GPA of 3.2, and meet other requirements detailed in the honors handbook. Interested students should consult the Human Biology Honors web site (http://humanbiology.stanford.edu/academics/honors) and meet with the Human Biology Associate Director or student services officer.

Most honors projects involve a total of 10-15 units of course work in HUMBIO 193 and 194:

| | | Units |
|---|---|---|
| HUMBIO 193 | Research in Human Biology | 1-5 |
| HUMBIO 194 | Honors | 1-10 |

Admission to the honors program is by preliminary application in early February, followed by the full 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. Honors students present summaries of their 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.

# 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 future. 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 is known of the biological with an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology are expected to develop a strong background in the integration between the biological and social aspects of human beings.

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).

To minor in Human Biology, students must take the Human Biology Core:

- 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
- and one additional upper-division course (for example, any HUMBIO course numbered 100-189).

The student must earn a minimum letter grade of 'C-'. Courses that count towards the fulfillment of major requirements may not be counted towards the minor.

*Emeriti:* (Professors) Doug Brutlag (Biochemistry), Stanley Falkow (Microbiology/Immunology), A. Dale Kaiser (Biochemistry), Herant Katchadourian (Human Biology), Donald Kennedy (Biology), Gordon Matheson (Orthopaedic Surgery), Ellen FitzSimmons Porzig (Developmental Biology), Carol Winograd (Medicine)

*Director:* Paul Fisher (Neurology)

*Associate Director:* Katherine Preston

*Professors:* Laurence Baker (Health Research and Policy), Ben Barres (Neurobiology), Donna Bouley (Comparative Medicine), William H. Durham (Anthropology), Heidi Feldman (Pediatrics: Neonatology), Russell D. Fernald (Biology), Paul Fisher (Neurology), Margaret Fuller (Developmental Biology), Garry Gold (Rad/Musculoskeletal Imaging), Lawrence H. Goulder (Economics), James J.Gross (Psychology), H. Craig Heller (Biology), Jill Helms (Surgery: Plastics), Richard Klein (Anthropology and Biology), Tanya Luhrmann (Anthropology), Yvonne Maldonado (Pediatrics: Infectious Diseases), Michael Marmor (Ophthalmology), Roeland Nusse (Developmental Biology), Julie Parsonnet (Medicine: Infectious Diseases), Rob Reich (Political Science), Allan Reiss (Interdisciplinary Brain Science Research), Thomas Robinson (Pediatrics), Robert Sapolsky (Biology), Walter Scheidel (Classics and History), Randall Stafford (Stanford Prevention Research Center), William Talbot (Developmental Biology), Shripad Tuljapurkar (Biology), Jeffrey Wine (Psychology), Paul Wise (Pediatrics: Neonatology)

*Associate Professors:* M. Kate Bundorf (Health Reserach and Policy), Firdaus Dhabhar (Psychiatry and Behavioral Sciences), Anne Fernald (Psychology), Jeremy Goldhaber-Fiebert (Medicine/PCOR), Brenda Golianu (Anesthesia), Joachim Hallmayer (Psychiatry and Behavioral Sciences - Child and Adolescent Psychiatry and Child Development), Peter Kao (Med/Pulmonary and Critical Care Medicine), Norman G. Miller (Medicine/PCOR), Matthew Smith (German)

*Assistant Professors:* Sanjay Basu (Medicine: Stanford Prevention Research Center), Eran Bendavid (General Internal Medicine), Jorah Dannenberg (Philosophy), Alvan Ikoku (Comparative Literature), Michelle Monje-Deisseroth (Neurology), Jelena Obradovic (Education), Jamie Zeitzer (Psychiatry and Behavioral Sciences)

*Professor (Research):* Christopher Gardner (Stanford Prevention Research Center), David Lyons (Psychiatry and Behavioral Sciences), Marcia Stefanick (Stanford Prevention Research Center)

*Associate Professors (Research):* Karen Parker (Psychiatry and Behavioral Sciences)

*Professors (Teaching):* Donald Barr (Pediatrics), David Magnus (Pediatrics/SCBE), Robert Siegel (Microbiology and Immunology)

*Associate Professors (Teaching):* Catherine Heaney (Psychology), Lianne Kurina (Med/General Internal Medicine), Eunice Rodriguez (Pediatrics), Kristin Sainani (Health Research and Policy – Epidemiology)

*Clinical Associate Professors:* Rita Popat (Health Research and Policy, Epidemiology), Daryn Reicherter (Psych/Public Mental Health & Population Sciences)

Clinical Assistant Professor: Jennifer Baine (Orthopaedic Surgery)

*Senior Research Scholar:* Wesley F. Alles (Med/HIP/BeWell)

*Other Teaching Faculty and Staff:* William Abrams, Maya Adam (Pediatrics - Infectious Diseases), Judy Chu, Sophia Colamarino (Psychiatry and Behavioral Sciences), Anne Firth-Murray, Anne Friedlander, Ronald Garcia (Center for Excellence), Renu Heller (Biology), Lisa Medoff , Joe Nation (Public Policy), Katherine Preston, Lisa Goldman Rosas (Medicine: Stanford Prevention Research Center), Annette Salmeen, Clea Sarnquist (Pediatrics), Darvin Scott Smith (Microbiology and Immunology), Julie Thompson, Jennifer Wolf (Graduate School of Education), Nathan Wolfe

*Course Associates:* Nicholas Hansen, Annie Kaufman, Hannah Kay, Leigh Kinney, Julia Menzies, Kamaria Taylor, Patrick Tran, Olivia Wu

*Honors Chair:* Katherine Preston

# Overseas Studies Courses in Human Biology

The Bing Overseas Studies Program (http://bosp.stanford.edu) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (https://undergrad.stanford.edu/programs/bosp/explore/search-courses) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (http://explorecourses.stanford.edu) or Bing Overseas Studies (http://bosp.stanford.edu).

| | | Units |
|---|---|---|
| OSPAUSTL 10 | Coral Reef Ecosystems | 3 |
| OSPAUSTL 25 | Freshwater Systems | 3 |
| OSPAUSTL 30 | Coastal Forest Ecosystems | 3 |
| OSPCPTWN 43 | Public and Community Health in Sub-Saharan Africa | 4 |
| OSPCPTWN 63 | Socio-Ecological Systems | 3 |
| OSPFLOR 85 | Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era | 4 |
| OSPMADRD 57 | Health Care: A Contrastive Analysis between Spain and the U.S. | 4 |
| OSPMADRD 72 | Issues in Bioethics Across Cultures | 4 |
| OSPPARIS 98 | Global Health Systems: the Future | 5 |

## Courses

**HUMBIO 2A. Genetics, Evolution, and Ecology. 5 Units.**
Introduction to the principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, biodiversity, and ecology, emphasizing the genetics and ecology of the evolutionary process and applications to human populations. HUMBIO 2A and 2B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines.

**HUMBIO 2B. Culture, Evolution, and Society. 5 Units.**
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. HUMBIO 2A and 2B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines.

**HUMBIO 3A. Cell and Developmental Biology. 5 Units.**
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. HUMBIO 3A and 3B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Prerequisite: college chemistry or completion of the HumBio Core on-line chemistry lecture series during the fall quarter.

**HUMBIO 3B. Behavior, Health, and Development. 5 Units.**
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. HUMBIO 3A and 3B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines.

**HUMBIO 3Y. Practicum in Child Development. 1 Unit.**
Practicum experience at Bing Nursery School for 1 1/4 hours of observation per week, class meeting every other week for 1 hour. Pre- or corequisite: 3B.

**HUMBIO 4A. The Human Organism. 5 Units.**
Integrative Physiology: Neurobiology, endocrinology, and organ system function, control, and regulation. HUMBIO 4A and 4B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines.

**HUMBIO 4B. Environmental and Health Policy Analysis. 5 Units.**
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. HUMBIO 4B satisfies the Writing in the Major (WIM) requirement for students in Human Biology. HUMBIO 4A and 4B are designed to be taken concurrently and exams for both sides may include material from joint module lectures.Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines.

**HUMBIO 5E. Science Education in Human Biology. 1 Unit.**
In this seminar, students will become familiar with current research on science education. They will use this knowledge to create and analyze teaching material such as section plans, exams, and problem sets. Material produced in this course will be related to the topics covered in the core course of the Program in Human Biology. Students will experience and practice various teaching styles. Prerequisite: HumBio Core or equivalent.

**HUMBIO 6. Human Origins. 5 Units.**
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.
Same as: ANTHRO 6, ANTHRO 206

**HUMBIO 8P. Pre-field Course for Bolivia Impact Abroad in Child Family Health International. 1 Unit.**
Enrollment restricted to undergraduates participating in Impact Abroad's Boliva Program. Focus is on understanding service-learning principles and the historical, social and political context of Bolivia's health system.

**HUMBIO 9. Public Service Internship Preparation. 1 Unit.**
Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is primarily designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do the assignments for 1 unit of credit.
Same as: ARTSINST 40, EARTHSYS 9, EDUC 9, PUBLPOL 74, URBANST 101

**HUMBIO 16SC. The Stanford Safari: Field Observations in Our Own Backyard. 2 Units.**
Although Stanford is renowned as a place of learning and research, the goal of this class is to approach Stanford University as a subject worthy of study in and of itself. Students will study Stanford in terms of the built environment (e.g. architecture; how buildings and styles interact; how the landscape shapes the flow of people, plants, and animals), the human interactions (e.g. sociology of tourism, the politics of land use), and the ecology (flora, fauna, geology, climatology, and pest control) of campus.nThe students in this course will defamiliarize themselves with their campus environment and approach Stanford with new eyes-the eyes of the anthropologist, the photographer, the historian, the artist, and the tourist. We will explore its edifices, gardens, sculptures, open spaces, and commercial areas. Moreover, we will use Stanford as a lens to discuss a variety of disciplines: architecture, educational theory, California history, climatology, and natural history. But more than anything, we will focus on the human component, including the vision, drive, and serendipity that shaped the University.nIn taking the course students will hone their skills in field observation that will carry over to future field work in more distant locales, develop an interdisciplinary approach to analyzing complex institutions, and gain a deeper appreciation for the complexity and richness of Stanford that will enhance all aspects of their remaining time as undergraduates. On a daily basis, the class will consist of three components: class presentations and discussions, formal and informal talks by many of the local experts at Stanford, and topical field trips. Students will select a theme that is of personal interest and develop field observation techniques useful for their particular topics. Course assignments will be to give two presentations on specific aspects of Stanford. In addition, each student will keep a field note-book with daily observations and field notes, post a collection of photographic observations, and complete pertinent readings. Plan to work intensely and have a great time in the process.

**HUMBIO 18SC. Conservation and Development Dilemmas in the Amazon. 2 Units.**
This course explores the human dimensions of conservation efforts under way in the Amazon Basin of South America. It has two specific goals: (1) to introduce the human ecology of Amazonia; and (2) to assess the prospects for joint efforts at biodiversity conservation and community development. We will draw on case studies to investigate such topics as the causes and consequences of deforestation, the social impact of parks and protected areas, and the potential for "Integrated Conservation and Development Projects" (ICDPs) such as extractive reserves, natural forest management, biodiversity prospecting, and community-based ecotourism. The course views Amazonia as a microcosm of the challenges facing conservation and development efforts today in the Third World. nPart of the course is an intensive 11-day expedition to the Peruvian Amazon, at no extra cost, to observe firsthand the conservation and development dilemmas discussed in class. We will visit ecolodges in the rainforest, walking miles of trails to learn about local flora, fauna, and conservation efforts. We will also visit Machu Picchu in the upper reaches of the rainforest. For the travel portion of the class, undergraduates will be joined by a group of Stanford alumni and friends. nStudent contributions and presentations are emphasized throughout the course. Students are expected to come well-prepared to each session, to lead discussions, and to carry out literature research. The final assignment is a 6 to 8 page paper on a case study of your own choosing¿or an equivalent piece of a longer collaborative paper¿that offers a critical assessment of one particular conservation and/or development project in or near the region we will visit. Students will present the main findings of their papers in a joint seminar of undergraduates and alumni as we travel in the Peruvian Amazon. n nNote: Students will arrive on campus and will be housed at Stanford until we leave for the Amazon. Travel to and from Peru¿organized by the Travel/Study Program of the Stanford Alumni Association¿is included; costs are defrayed by the Stanford Field Seminar Fund and generous donors.
Same as: ANTHRO 11SC

**HUMBIO 19SC. Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa. 2 Units.**
The world-famous landscapes of East Africa, including Serengeti National Park, Ngorongoro Conservation Area, and the Rift Valley lakes of Tanzania form the backdrop for this special course on protected area conservation and its impacts on local people. The course is designed to explore the pros and cons of parks and protected areas as they affect flora, fauna, and human inhabitants, and to address the dilemma of how to achieve conservation in a manner that creates local community benefits and promotes social justice. We will use a case study approach to ask: (1) What approach to protected area (PA) conservation has been taken in each case? Who are the key proponents and what are their main social and ecological objectives? (2) How successful has the protected area been at achieving its conservation goals? (3) What are the benefits of the PA to people and who receives them? (4) What are the costs of the PA to people and who pays them? (5) Where benefits are not commensurate to costs, what, if anything, is being done to address the imbalance? How well is it working? (6) Are there alternative conservation models that would make the interests of parks and people more compatible, and reduce the tradeoffs between them? What is needed to operationalize these alternative models, and how do they incentivize conservation behavior among local residents?nThis course includes an intensive 12-day expedition to Tanzania to observe firsthand the dilemmas of parks and peoples we have discussed in class. We are scheduled to visit Tarangire, Lake Manyara, Mt. Meru, and Serengeti National Parks, the Ngorongoro Conservation Area, and nearby Maasai villages. Both on campus and in Tanzania, the course emphasizes student contributions and presentations. Students are required to read one or two books a month over the summer, and to come to campus in the fall well-prepared to discuss each one, including co-leading the discussion of one of the readings. Students are also expected to carry out literature research on a particular conservation dilemma in East Africa that is of interest to them for the final assignment of the seminar, a 6- to 8-page paper, and to present the main findings of that paper during evening seminars as we travel in East AfricanNote: Students will arrive on campus and will be housed at Stanford until we leave for the travel portion of the course. A group of 20-some Stanford alumni will join us for the last 2 days on campus and for the travel portion of the course.
Same as: ANTHRO 12SC

**HUMBIO 25SI. Diverse Perspectives on Disabilities. 1-2 Unit.**
This class investigates definitions and the complexities of life with a disability through discussion and panel based learning. Through student and parent panels, speakers, professors, and professionals in the field of disability, this class looks at the different perspectives and ways that disability interacts with the world. In addition to learning about the scientific, social and legal backgrounds students can also participate in a community volunteering project for an additional unit through Kids with Dreams or another community or student organization.

**HUMBIO 26. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**
The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.
Same as: AFRICAST 135, AFRICAST 235, EDUC 135, EDUC 335, HRP 235, MED 235

**HUMBIO 27. Traditional Chinese Medicine. 1 Unit.**
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.

**HUMBIO 28. Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse. 1-3 Unit.**
Cross-listed with SOMGEN 237 and FEMGEN 237. HumBio students must enroll in HumBio 28 or AFRICAAM 28. An overview of the acute and chronic physical and psychological health impact of sexual abuse through the perspective of survivors of childhood, adolescent, young and middle adult, and elder abuse, including special populations such as pregnant women, military and veterans, prison inmates, individuals with mental or physical impairments. Also addresses: race/ethnicity, gender identity, sexual orientation, and other demographic and societal factors, including issues specific to college culture. Professionals with expertise in sexual assault present behavioral and prevention efforts such as bystander intervention training, medical screening, counseling and other interventions to manage the emotional trauma of abuse. Undergraduates must enroll for 3 units. Medical and graduate students should enroll in SOMGEN 237 for 1-3 units. To receive a letter grade in any listing, students must enroll for 3 units. This course must be taken for a letter grade and a minimum of 3 units to be eligible for Ways credit.
Same as: AFRICAAM 28

**HUMBIO 29A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 3 Units.**
This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.
Same as: CHILATST 177A, CSRE 177E, EDUC 177A

**HUMBIO 50SI. Computational Frontiers in Biology. 1 Unit.**
The advent of modern computing has brought forward a myriad of practical applications to the world of biology. From Nex-Gen Sequencing to machine learning in diagnostic medicine, advances in computational sciences have forever changed the way we approach the life sciences. This survey course will be a breadth-wise exploration into this biotech revolution; each week, we will cover one simple computational topic, one simple biological process, and show how putting these concepts together gives rise to extremely powerful new analytical tools.

**HUMBIO 57. Epidemic Intelligence: How to Identify, Investigate and Interrupt Outbreaks of Disease. 4 Units.**
We will cover: the components of public health systems in the US; principles of outbreak investigation and disease surveillance; different types of study design for field investigation; visualization and interpretation of public health data, including identification and prevention of biases; and implementation of disease control by public health authorities. Students will meet with leaders of health departments of the state and the county and will be responsible for devising and conducting their own investigation of a health problem. HUMBIO students must enroll in HUMBIO 57. HRP students must enroll in HRP 247.
Same as: HRP 247

**HUMBIO 65. Biosocial Medicine: The Social, Psychological, and Biological Determinants of Behavior and Wellbeing. 2-3 Units.**
Explores how social forces, psychological influences, and biological systems combine to affect human behavior in early childhood, in the educational experience, and throughout the life course. Examines how behaviors are linked to well-being. Uses a flipped classroom model, in which a series of lectures are available for students to view on-line before class. In-class time then focuses on case studies from published research. Undergraduates enroll for 3 units. Students enrolling for 3 units attend two meetings per week; students enrolling for 2 units attend one meeting per week.This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.
Same as: EDUC 205, SOMGEN 215

**HUMBIO 74. Ethics in a Human Life. 4 Units.**
Ethical questions pervade a human life from before a person is conceived until after she dies, and at every point in between. This course raises a series of ethical questions, following along the path of a person's life - questions that arise before, during, and after she lives it. We will explore distinctive questions that a life presents at each of several familiar stages: prior to birth, childhood, adulthood, death, and even beyond. We will consider how some philosophers have tried to answer these questions, and we will think about how answering them might help us form a better understanding of the ethical shape of a human life as a whole.
Same as: PHIL 74A

**HUMBIO 79Q. Sexuality and Society. 3 Units.**
This course will explore how sexual identity, attitudes, and behaviors are shaped by the messages sent by the various agents of society such as schools, family, peers, media, and religious, medical, and political institutions. The interaction of biology, psychology, and socio-cultural factors, such as gender roles and sexual/relationship scripts will be discussed, as will the intersection of sexuality and notions of love, romance, and commitment. Critical developmental periods, such as adolescence and emerging adulthood will be examined in depth. Students will explore their own values and feelings about sexuality and come to an understanding of how their beliefs were formed. We will discuss how information about sexuality is disseminated in our society and what we can do to help ensure that such information is used in a way that promotes healthy self-conceptions, behavior, and relationships.

**HUMBIO 82A. Qualitative Research Methodology. 3 Units.**
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.

**HUMBIO 82B. Advanced Data Analysis in Qualitative Research. 3 Units.**
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.

**HUMBIO 84. Practical Analysis of Epidemiologic and Biological Data. 3 Units.**
This course will teach students how to think about and analyze quantitative data. Students will learn to apply univariate and multivariable methods (using Stata software) to either their own data or data from publicly available sources. A central part of the course will consist of the joint planning and execution of an epidemiologic analysis of real-world data and the production of a manuscript for submission to a scientific journal. This course focuses on health-related data, although these methods can be applied much more broadly.

**HUMBIO 85A. Essential Statistics for Human Biology. 4 Units.**
Introduction to statistical concepts and methods that are essential to the study of questions in biology, environment, health and related areas. The course will teach and use the computer language R and Python (you learn both, choose one). Topics include distributions, probabilities, likelihood, linear models; illustrations will be based on recent research.
Same as: BIO 108

**HUMBIO 86Q. Love as a Force for Social Justice. 3 Units.**
Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of agape love. How love is conceptualized across cultures; agape love as the basis of many religions; different kinds of love; the biology of love; love in action for social justice; the languages of love, including art, literature, music, and poetry. Emphasis is on blog writing, participation, and oral presentation.
Same as: FEMGEN 86Q

**HUMBIO 88. Introduction to Statistics for the Health Sciences. 4 Units.**
Students will learn the statistical tools used to describe and analyze data in the fields of medicine and epidemiology. This very applied course will rely on current research questions and publicly available data. Students will gain proficiency with Stata to do basic analyses of health-related data, including linear and logistic regression, and will become sophisticated consumers of health-related statistical results.

**HUMBIO 89. Statistics in the Health Sciences. 3 Units.**
This course aims to provide a firm grounding in the foundations of probability and statistics, with a focus on analyzing data from the health sciences. Students will learn how to read, interpret, and critically evaluate the statistics in medical and biological studies. The course also prepares students to be able to analyze their own data, guiding them on how to choose the correct statistical test, avoid common statistical pitfalls, and perform basic functions in R deducer.

**HUMBIO 91Q. Neuroethology: The Neural Control of Behavior. 3 Units.**
Preference to sophomores. Animal behavior offers insights about evolutionary adaptations and this seminar will discuss the origins of the study of animal behavior and its development to the present. How does the nervous system control behavior and how is it changed by behavior? We will analyze and discuss original research papers about the neural basis of behavior. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.
Same as: BIO 32Q

**HUMBIO 94Q. Law, Lawyers and Justice in Cinema. 4 Units.**
Examination of how the law, justice and lawyers are depicted in film, how real the depictions are, and the social issues that are the subjects of the film and the effect of film on change, attitudes and policy.

**HUMBIO 96Q. Injustice, Advocacy and Courage: The Path of Everyday Heroes. 3 Units.**
This course will study the paradigms of people of courage, action and energy who have fought against injustice by advocating for causes against great odds and at personal risk. The focus will be on everyday people who have taken action, often at great personal risk, not for ambition, but because of their convictions and steadfast commitment to their beliefs.

**HUMBIO 96SI. Big problems, big solutions? tackling difficult issues in today's healthcare system.. 1-2 Unit.**
It is impossible to innovate in healthcare without first understanding the context in which these innovations take place. The course aims to allow students an intimate setting to debate issues that plague healthcare today, and work with guest speakers (from Stanford Medicine, Stanford Biodesign, RockHealth to Apple Health and more!) to gain insight into what's actually being done about it. Some controversial topics highlighted include: Healthcare Legislation (especially in the context of the last tow administrations), Artificial Intelligence in Healthcare, Gene Therapy, and in-depth analysis of Failed Medical Devices and Innovations.

**HUMBIO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine. 3 Units.**
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.
Same as: ORTHO 97Q

**HUMBIO 111. Human Dimensions of Global Environmental Change: Resilence, Vulnerability, and Environmental Justice. 3 Units.**
The complexity of social and political issues surrounding global environmental change. Emphasis is on synergies precipitated by human-induced climatic change. Case studies and scenarios to explore the vulnerability and resilience in households, communities, regions, and nationmstates most affected by extreme weather conditions. Their concerns, livelihood changes, and diverse responses of rural smallholders, indigenous communities, the state, and local and regional migrants. Central theme is environmental justice.
Same as: ANTHRO 173

**HUMBIO 112. Conservation Biology: A Latin American Perspective. 3 Units.**
Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.
Same as: BIO 144, BIO 234

**HUMBIO 113. The Human-Plant Connection. 3 Units.**
The intertwined biologies of humans and plants, particularly the ways in which people and plants have imposed selection pressures and ecological change on one another. Topics include evolution and basic plant structure; plant domestication; effects of agriculture on human health and physiology; plants in traditional and contemporary diets; and human influences on plant biology through genetic manipulation and environmental change. Class meetings center on journal articles. Final project includes written and multimedia presentations. Prerequisites: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 113S. Healthy/Sustainable Food Systems: Maximum Sustainability across Health, Economics, and Environment. 4 Units.**
Focus on problems with and systems-based solutions to food system issues. Four particular settings are addressed: University, worksite, hospital, and school food. Traditional vs. disruptive food system models compared and contrasted. The goal is to determine how best to maximize sustainability across several dimensions, including health, economics, and the environment. Underlying class themes include social justice and the potential for changing social norms around food production and consumption. Discussion-based seminar. Prerequisite: Human Biology Core or equivalent or consent of instructor.
Same as: CHPR 113

**HUMBIO 114. Environmental Change and Emerging Infectious Diseases. 3-5 Units.**
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.
Same as: ANTHRO 177, ANTHRO 277

**HUMBIO 117H. Human Behavioral Ecology. 3-5 Units.**
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.
Same as: ANTHRO 161, ANTHRO 261

**HUMBIO 118. Theory of Ecological and Environmental Anthropology. 5 Units.**
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.
Same as: ANTHRO 90C

**HUMBIO 120. Health Care in America: An Introduction to U.S. Health Policy. 4 Units.**
Health policy and health care delivery from a historical and a current policy perspective. Introduces cost, quality, and access as measures of health system performance. Considers institutional aspects of health care reform. Upper division course with preference given to upperclassmen.

**HUMBIO 120A. American Health Policy. 3 Units.**
Issues in health care reform and the policy making process, 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 alternative proposals for health care reform. Student presentations. Prerequisite: Human Biology 4B or equivalent, Human Biology 120, or consent of instructor.

**HUMBIO 121. Critical Issues in Child Health. 4 Units.**
Integrated picture of the physical and psychosocial health factors that result in a healthy child building on principles taught in the Human Biology core. Students apply basic human physiology to the physiology of the child to develop perspective on global pediatric health challenges and how the cultural context influences and defines the child living within it. Prerequisite: Human Biology Core or equivalent or consent of instructor. Enrollment will be limited and preference given to Seniors.

**HUMBIO 121E. Ethnicity and Medicine. 1-3 Unit.**
Weekly lecture series. Examines the linguistic, social class, and cultural factors that impact patient care. Presentations promote culturally sensitive health care services and review contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans, Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. 1 unit requires weekly lecture attendance, completion of required readings, completion of response questions; 2 units requires weekly lecture attendance and discussion session, completion of required readings and weekly response questions; additional requirement for 3 units (HUMBIO only) is completion of a significant term paper
Only students taking the course for 3 units may request a letter grade. Enrollment limited to students with sophomore academic standing or above.This course must be taken for a minimum of 3 units to be eligible for Ways credit.
Same as: FAMMED 244

**HUMBIO 122. Beyond Health Care: the effects of social policies on health. 3 Units.**
Available evidence 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: HumBio 4B or equivalent, and some background in research methods and statistics, or Instructor permission.
Same as: PEDS 222

**HUMBIO 122M. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations. 3 Units.**
(Undergraduate students must enroll in HUMBIO 122M. MD and Graduate students enroll in PEDS 212) An emerging area of inquiry. Topics include: global migration trends, health Issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students. Upper division course with preference given to upperclassmen.
Same as: PEDS 212

**HUMBIO 122S. Social Class, Race, Ethnicity, and Health. 4 Units.**
Examines health disparities in the U.S., looking at the patterns of those disparities and their root causes. Explores the intersection of lower social class and ethnic minority status in affecting health status and access to health care. Compares social and biological conceptualizations of race and ethnicity. Upper division course with preference given to upperclassmen.
Same as: AFRICAAM 132

**HUMBIO 123. Obesity in America: Clinical and Public Health Implications. 3-4 Units.**
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. Undergraduate prerequisite: Human Biology core or equivalent, or consent of instructor. HumBio students must enroll in HumBio 123. CHPR Master's students who are not medical students enroll in CHPR 223 for a letter grade. Priority for enrollment given to CHPR master's students.
Same as: CHPR 223

**HUMBIO 124C. Global Child Health. 3 Units.**
This course will introduce key challenges to the health and wellbeing of children worldwide, with a particular focus on children in low- and middle-income countries. It will review the leading causes of morbidity and mortality, identify interventions to address some of the biggest child health problems, and provide an overview of the roles of culture, gender, and civil society on child health and health policy. Upper division course with preference given to upperclassmen.

**HUMBIO 124E. Economics of Infectious Disease and Global Health. 3 Units.**
Introduction to global health topics such as childhood health, hygiene, drug resistance, and pharmaceutical industries from an economic development perspective. Introduces economic concepts including decision-making over time, externalities, and incentives as they relate to health. Prerequisite: Human Biology Core or equivalent or consent of the instructor.
Same as: MED 236

**HUMBIO 125. Current Topics and Controversies in Women's Health. 2-3 Units.**
Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. HUMBIO students must enroll in HumBio 125 for 3 units. PhD minor in FGSS, enroll in FEMGEN 256 for 2 - 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units.
Same as: FEMGEN 256, OBGYN 256

**HUMBIO 126. Promoting Health Over the Life Course: Multidisciplinary Perspectives. 3 Units.**
(HUMBIO students must enroll in HumBio 126. CHPR students must enroll in CHPR 226 for a letter grade.) 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; children, young adult, mid-life and aging health issues; health care delivery and public health system; workplace wellness programs; and other additional issues. Students enrolled in CHPR 226 must complete additional assignments appropriate for its Masters level listing.
Same as: CHPR 226

**HUMBIO 126A. Advanced Seminar in Health and Security. 3 Units.**
In this course, we explore the growing interconnections between health and security. Global health can no longer be addressed without some important consideration of international security as war, civil conflict and political instability have increasingly defined the health challenges in major parts of the world. This course will address the interaction of three types of security: human, national, and international. Health is obviously a component of human security. However, it has also been raised as a concern of national and international security, particularly in areas where HIV/AIDS and Ebola have been prevalent and where the risk of pandemic outbreaks is high. This course will bring together a cross-disciplinary examination of these issues and address the opportunities and potential risks of tightly linking the provision of essential health services to security considerations. We will use case studies to explore both the conceptual and technical issues inherent in health and security. The challenges of Ebola, HIV, complex humanitarian emergencies, and pandemics will be explored in detail. As part of each discussion, the intense interaction of biology, service delivery, political legitimacy, human rights, and international relations will be examined. Upper division course with preference given to upperclassmen.

**HUMBIO 127A. Community Health: Assessment and Planning I. 4 Units.**
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. Final grade given upon completion of HUMBIO 127B. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, or consent of instructor.

**HUMBIO 127B. Community Health: Assessment and Planning II. 4 Units.**
Continuation of 127A. Service learning course with emphasis on conducting community health assessment and planning projects in collaboration with community-based organizations. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, 127A, or consent of instructor.

**HUMBIO 128. Community Health Psychology. 4 Units.**
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.
Same as: PSYCH 101

**HUMBIO 129. Critical Issues in International Women's Health. 4 Units.**
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 women's capacity to exercise their human rghts including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor.
Same as: FEMGEN 129

**HUMBIO 129S. Global Public Health. 4 Units.**
The class is an introduction to the fields of international public health and global medicine. It focuses on resource poor areas of the world and explores major global health problems and their relation to policy, economic development and human rights. The course is intended for students interested in global health, development studies, or international relations, and provides opportunities for in-depth discussion and interaction with experts in the field. Upper division course with preference given to upperclassmen.

**HUMBIO 129W. Health Care Systems Around the World. 4 Units.**
This course will explore the role of health care systems in societies around the world, identifying the common challenges facing health care systems and how different institutional structures in different countries perform in response to these challenges. We will structure the course around general conceptual frameworks related to key health system institutions (including financing, insurance, provider payment, patient cost-sharing, and the regulation of medical technology). From this foundation, we will draw on the experience of individual countries (high and low income, with heavy chronic disease and infectious disease burdens) to illustrate the function of these institutions under real-world circumstances observed around the globe. Prerequisite: Human Biology Core or equivalent or consent of instructor.
Same as: MED 129

**HUMBIO 130. Human Nutrition. 4 Units.**
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; ethnic diets; vegetarianism; nutritional deficiencies; nutritional supplementation; phytochemicals. HUMBIO students must enroll in HUMBIO 130. CHPR master's students must enroll for a letter grade. Undergraduate prerequisite: Human Biology Core or equivalent or consent of instructor.
Same as: CHPR 130

**HUMBIO 131. Kinesiology. 3 Units.**
This course covers the basic principles governing human movement with an emphasis on sports applications. The course spends roughly equal amounts of time on the applied anatomy and biology, meaning both the large and small-scale body structure and function. The applied anatomy portion includes body structure (the muscles and their connections) and mechanics (e.g. forces, torque, momentum and power), which together describe macroscopic movement. The applied biology portion includes the molecular and cellular basis of movement, mainly muscle contraction, nerve signaling, and the mechanisms of exercise damage, cramping, muscle memory, delayed-onset muscle soreness, and fatigue.

**HUMBIO 133. Human Physiology. 4 Units.**
Human physiology will be examined by organ systems: cardiovascular, respiratory, renal, gastrointestinal and endocrine. Molecular and cell biology and signaling principles that underlie organ development, pathophysiology and opportunities for regenerative medicine are discussed, as well as integrative control mechanisms and fetal development. Prerequisite: Biology or Human Biology core.
Same as: BIO 112

**HUMBIO 135. Exercise Physiology. 4 Units.**
Explore the amazing capacity of your body to move and adapt within your everyday world. You will learn: how your body systems respond to the stress of acute exercise and adapt to chronic exercise training, how your cardiovascular system adapts to optimize oxygen delivery and utilization, how your muscles generate force and hypertrophy in response to training, and how your metabolic/biochemical pathways are regulated to support the increased energy demand of exercise. We will discuss 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, microgravity) on your body will be emphasized in the second half of the course. Portions of the class will be taught through videos that use online lectures and engaging stories to illustrate physiology concepts. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

**HUMBIO 135S. Applied Topics in Exercise Physiology and Metabolism. 3 Units.**
Discussions of controversial topics in exercise physiology, sports performance, aging and environmental physiology. Special focus on how to read/evaluate research papers, how to get science out of the lab through better communication, and how basic and applied science is used to develop novel training programs and new medical devices. Students will learn the fundamentals of science storytelling and mixed media presentation of ideas. Requirements of this class include participating in blogs & in-class discussions, evaluations of physiology research, writing a research paper, and creation of a science-based story to share with the class. If class is full, contact instructor for an application. Enrollment limited to 10. Prerequisites: B+ or higher in HB135 and/or consent of instructor.

**HUMBIO 136. Human Physiology Laboratory. 4 Units.**
This laboratory course is active and inquiry based. Aspects of exercise and temperature are explored; however, the specific questions the class tackles differ each quarter. Samples of past questions: Does lactic acid accumulation correlate with exercise fatigue at different exercise and body temperatures? Does palm cooling during exercise mitigate the effect of body temperature on fatigue with or without evaporative cooling? Students participate both as experimenters and as subjects of the experiments in two-person teams. Participants must be in good physical condition, though not necessarily athletes, and must be willing to participate in strenuous exercise routines under adverse environmental conditions. Varsity athletes concurrently participating in a spring sport must consult the instructor before applying. Discussion sessions include student presentations of journal articles, data analyses, and feedback on individual WIM research proposals. By application only, see sites.stanford.edu/bio107humbio136 for the application form. Prerequisite: Bio 42 or HumBio 4A. Satisfies WIM for Biology.
Same as: BIO 107

**HUMBIO 139S. Sport and Exercise Medicine. 3 Units.**
This is an upper division course taught by the course directors and guest lecturers (experts from the field of sports and exercise medicine), with a common theme of injury and illness prevention in sport and physical activity. The course is organized into three modules: Disease Prevention by Design, Concussion in Sport, and Injury Prevention in Sport and Exercise. The topics include wellness and the prevention of chronic disease, the balance point between health and harm in sports, clinical and sports biomechanics, injury prevention theories, ethical issues in return-to-play decisions, the role of sports medicine in the prevention of chronic disease through exercise, and common sports injuries and illnesses. Students will develop critical reading and thinking skills as well as oral presentation skills and the confidence to engage in verbal exchange. Every other class session is a discussion class involving hands-on activities and group discussions. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 140. Sex and Gender in Human Physiology and Disease. 2-3 Units.**
(HumBio students must enroll in HumBio 140.) Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. HUMBIO students must enroll for 3 units.
Same as: FEMGEN 241, MED 240

**HUMBIO 142. Adolescent Development. 4 Units.**
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.

**HUMBIO 142M. Special Topics in Adolescent Mental Health. 4 Units.**
Includes the study of aspects of common disorders seen in adolescent populations, such as prevalence, developmental course, gender differences, theoretical explanations, and therapeutic interventions. Topics will include mood/anxiety disorders, eating disorders, learning disabilities and ADHD, sexual risk behaviors, developmental disorders, substance abuse, and self-harm. Goals of this course include getting students to think critically about the unique mental health needs of adolescents, collaborating on devising ways to improve the way our society meets those needs, and strengthening writing and communication skills applicable to this area of inquiry. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 143. Adolescent Sexuality. 4 Units.**
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.

**HUMBIO 144. Boys' Psychosocial Development. 4 Units.**
Focusing on early childhood through adolescence. Examining boys' lives and experiences as embedded within interpersonal relationships as well as social and cultural contexts. Including perspectives from psychology, sociology, gender studies, and education. Prerequisite: Human Biology core, Developmental Psychology, or consent of instructor.

**HUMBIO 145L. The Biology and Evolution of Language. 4-5 Units.**
Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.
Same as: ANTHRO 171, ANTHRO 271

**HUMBIO 146. Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness. 3-5 Units.**
Unusual mental phenomena have existed throughout history and across cultures. Taught by an anthropologist and psychiatrist, this course explores how different societies construct the notions of "madness": What are the boundaries between "normal" and "abnormal", reason and unreason, mind and body, diversity and disease? The course will be taught in conjunction with a two unit engaged learning component which will place students in relevant settings.nnOptional: The course will be taught in conjunction with an optional two-unit engaged learning component.
Same as: ANTHRO 186, ANTHRO 286

**HUMBIO 146D. Developmental Disabilities: From Biology to Policy. 3 Units.**
Fifteen percent of US children have disabilities. While advances in medicine and technology have increased life expectancy for these children, health care delivery, education, and public attitudes have not kept pace. Students in this course will learn the possibilities and limitations of new biomedical treatments of Down syndrome, cerebral palsy, and autism. Students will also evaluate the impact of public policy initiatives, such as the Individuals with Disabilities Education Act and Americans with Disabilities Act on inclusion and participation in society. Prerequisite: HUMBIO 25SI or Human Biology Core or equivalent.
Same as: PEDS 246

**HUMBIO 147. Biology, Culture and Family in Early Development. 3-4 Units.**
Early childhood is a time of both enormous promise and vulnerability. Parents differ widely in their practices and beliefs about their role in enabling children to avoid risk and to achieve their potential for a healthy and productive life in the particular physical, social and cultural contexts of the communities and societies in which they live. In this seminar we will evaluate evidence from the biological and social sciences showing how experiences in infancy have profound and enduring effects on early brain architecture, with consequences for later language, cognitive, and socio- emotional development in childhood and adulthood. We will also consider the challenges of designing more effective social policies and programs to provide support for families in diverse socioeconomic and cultural contexts, who all want to help their children thrive. A community-service learning option, working with children as a reading tutor, is included for students taking this class for 4-units. Enrollment is limited and consent of instructor is required. Please send a brief statement of your interests, goals, and academic preparation relevant to the themes of this class to Prof. Fernald (afernald@stanford.edu). Pre-requisites: Psych 01 and Psych 60, or Human Biology 3B.
Same as: PSYCH 176

**HUMBIO 148W. Women, Fertility, and Work. 5 Units.**
How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places.
Same as: ANTHRO 151, ANTHRO 251

**HUMBIO 149. Psychological and Educational Resilience Among Children and Youth. 4 Units.**
Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.
Same as: EDUC 256

**HUMBIO 149L. Longevity. 4 Units.**
Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.
Same as: NENS 202, PSYCH 102

**HUMBIO 150A. Assisted Reproductive Technologies. 1-3 Unit.**
Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation.Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors.
Same as: OBGYN 202

**HUMBIO 151R. Biology, Health and Big Data. 3 Units.**
We are living in the midst of a revolution in the accessibility and availability of biological and medical data. How can all this data be used to improve human health? In this course, students will look at case studies from diabetes and cancer research to learn how to access publicly available data ranging from gene or protein level datasets to information about clinical trials. Students will apply what they learn from the case studies to develop a research proposal and presentation on a biology-related topic of their choice. The class will have a small group workshop-type format. Students will gain skills in research methods including accessing, analyzing and presenting data. There will be exercises using the statistical package R. Prior programming experience is not required. Prerequisites: HumBio 2A, 3A or equivalent.

**HUMBIO 152. Viral Lifestyles. 3 Units.**
Viral lifestyles is a seminar devoted to exploring contemporary topics in microbiology with a focus on the examination of the major transitions in evolution. The course includes lectures and will provide an opportunity for students to interact with each other, the instructor and guest lecturers to explore novel research areas in microbiology that are still being formed. The course will begin with lectures on topics such as the major transitions framework, postulated by John Maynard Smith and Eors Szathmary, proposes that major leaps in evolution follow the same roadmap, where individual entities come together to form complex individuals, in the process giving up their ability to reproduce independently. and will transition to presentation and discussion led by student groups. A significant percentage of class will be devoted to presentation and discussion focused on group projects. Prerequisite: Human Biology core or Biology core or equivalent, or consent of instructor.

**HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges. 4 Units.**
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, dracunculiais, and intestinal helminthes. Guest lecturers with expertise in disease control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

**HUMBIO 154A. Engineering Better Health Systems: modeling for public health. 4 Units.**
This course teaches engineering, operations research and modeling techniques to improve public health programs and systems. Students will engage in in-depth study of disease detection and control strategies from a "systems science" perspective, which involves the use of common engineering, operations research, and mathematical modeling techniques such as optimization, queuing theory, Markov and Kermack-McKendrick models, and microsimulation. Lectures and problem sets will focus on applying these techniques to classical public health dilemmas such as how to optimize screening programs, reduce waiting times for healthcare services, solve resource allocation problems, and compare macro-scale disease control strategies that cannot be easily evaluated through randomized trials. Readings will complement the lectures and problem sets by offering critical perspectives from the public health history, sociology, and epidemiology. In-depth case studies from non-governmental organizations, departments of public health, and international agencies will drive the course. Prerequisites: A course in introductory statistics, and a course in multivariable calculus including ordinarily differential equations. Open to upper-division undergraduate students and graduate students. Human Biology majors enroll in HUMBIO 154A.
Same as: CHPR 254, HRP 234

**HUMBIO 154B. Principles of Epidemiology, with an emphasis on women's health. 3 Units.**
Epidemiology is the study of the distribution and determinants of health and disease in human populations. Utilizing the lens of women's health, this course will introduce students to the basic principles of epidemiological study design, analysis, and interpretation. The course will draw on critical topics in women's health for lectures, discussions, readings and assignments. Research articles from epidemiology as well as other social science disciplines will be utilized to offer students multiple perspectives on contemporary women's health issues. Human Biology 154 courses can be taken separately or as a series. Prerequisite: Human Biology core or equivalent or consent of instructor.

**HUMBIO 154C. Cancer Epidemiology. 4 Units.**
Clinical epidemiological methods relevant to human research in cancer will be the focus. The concepts of risk; case control, cohort, and cross-sectional studies; clinical trials; bias; confounding; interaction; screening; and causal inference will be introduced and applied. Social, political, economic, and ethical controversies surrounding cancer screening, prevention, and research will be considered. Human Biology 154 courses can be taken separately or as a series. Prerequisite: Human Biology core or equivalent, or instructor consent.

**HUMBIO 155B. The Vaccine Revolution. 6 Units.**
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 8. Prerequisite: prior enrollment in HumBio 155H Humans and Viruses or MI 116, The Human Virosphere.
Same as: MI 115B

**HUMBIO 155C. Human and Viruses Part III. 3 Units.**
Comprehensive survey of human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Prerequisite: prior enrollment MI 155A/HUMBIO 155H and MI 155B/HUMBIO 155V and concurrent enrollment with MI 155D.
Same as: MI 155C

**HUMBIO 155D. Human and Viruses Part IV. 3 Units.**
Comprehensive survey of human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Prerequisite: prior enrollment in MI 155A/HUMBIO 155H and MI 155B/HUMBIO 155V and concurrent enrollment with MI155C.
Same as: MI 155D

**HUMBIO 155H. Humans and Viruses I. 3 Units.**
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. Prerequisite: Concurrent enrollment in MI 155B or HUMBIO 155V.
Same as: MI 155A

**HUMBIO 155V. Humans and Viruses II. 3 Units.**
Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Topics: measles and viral epidemiology, rotavirus and world health, rabies and infections of the brain, HPV and cancer -causing viruses, herpes simplex and viral latency, CMV and viral teratogenesis, retrovirology and endogenous viral sequences, HIV and viral treatement, viral hepatitis and chronic infections, prions and diseases of life style. Prerequisite: Concurrent enrollment with MI155A or HUMBIO 155H.
Same as: MI 155B

**HUMBIO 157. The Biology of Stem Cells. 3 Units.**
The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites:HumBio 2A and 3A, or the equivalent in the BioCore in Biological Sciences.

**HUMBIO 158. The Human Genome and Disease. 3 Units.**
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. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both.
Same as: BIO 109A, BIOC 109A, BIOC 209A

**HUMBIO 158S. Genetics and Society. 3 Units.**
This course will focus on social science engagement with developments in genetic research, focusing on two key issues. First, social scientists are trying to figure out how genetic data can be used to help them better understand phenomena they have been long endeavoring to understand. Second, social scientists try to improve understanding of how social environments moderate, amplify, or attenuate genetic influences on outcomes.
Same as: EDUC 373, SOC 232

**HUMBIO 159. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.**
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. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.
Same as: HRP 238

**HUMBIO 160. Human Behavioral Biology. 5 Units.**
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.
Same as: BIO 150

**HUMBIO 161. The Neurobiology of Sleep. 4 Units.**
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.
Same as: BIO 149, BIO 249

**HUMBIO 162H. Hysteria and Modern Culture. 3-5 Units.**
The term "hysteria" has been used for centuries to categorize the mysterious ailments of others. This course will focus on the history of hysteria's representation and production from the late nineteenth century through WWI. Readings will include medical writings (Charcot, Bernheim, Freud), plays (Ibsen, Strindberg, Toller), and feminist theory (Cixous, Clément, Diamond). We will also devote some attention to the ongoing influence of the discourse of hysteria on contemporary medical and popular cultures.
Same as: TAPS 169

**HUMBIO 162L. Psychosis and Literature. 3-5 Units.**
One of the great gifts of literature is its ability to give us insight into the internal worlds of others. This is particularly true of that state clinicians call "psychosis." But psychosis is a complex concept. It can be terrifying and devastating for patients and families, and yet shares characteristics with other, less pathological states, such as mysticism and creativity. How then can we begin to make sense of it? In this course, we will examine the first-hand experience of psychosis. We will approach it from multiple perspectives, including clinical descriptions, works of art, and texts by writers ranging from Shakespeare, to the science fiction writer Philip K. Dick, to patients attempting to describe their experience. This class is not only for students thinking of careers in medicine, psychology or anthropology, but also readers and writers interested exploring extraordinary texts. There are no prerequisites necessary; all that is needed is a love of language and a curiosity about the secrets of other minds.
Same as: ANTHRO 82P, PSYC 82, PSYC 282

**HUMBIO 163. Neural Systems and Behavior. 4 Units.**
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. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.
Same as: BIO 263

**HUMBIO 164. Autism Spectrum Disorder. 3 Units.**
Abnormal social deficits, language development and repetitive behaviors, are the core symptoms of Autism Spectrum Disorder (ASD), a group of neurodevelopmental disorders that affect about 1% of all children and costs society an estimated $268B annually. This interactive seminar course will provide an overview of our understanding of ASD, from genetics through epidemiology, biology and treatment, and the many implications for society, including the principles and problems of diagnosis, its impact upon family and across the lifespan, and controversies regarding its etiology, perception and care. Preference given to Seniors. Prerequisite: HumBio or Bio core or consent of instructor.

**HUMBIO 165. Frontiers in Global Mental Health. 3 Units.**
This class will increase awareness of global mental health issues and social disparities while developing tools to address associated challenges both at home and abroad. Special attention will be placed on human rights issues including access to mental health care and the mental health of survivors of human rights abuses. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 166. Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context. 4 Units.**
The material in this course is an introduction to the field and the target audience is undergraduates. It may be of interest to graduate students unfamiliar with the field. The class examines the array of forces that affect the foods human beings eat, and when, where, and how we eat them, including human labor, agriculture, environmental sustainability, politics, animal rights/welfare, ethics, policy, culture, economics, business, law, trade, and ideology, and psychology. The class addresses the impact of current policies and actions that might be taken to improve human nutrition and health; macro-scale influences on food, nutrition, and eating behavior. . Undergraduate Prerequisite: Human Biology Core or equivalent or consent of instructor.
Same as: CHPR 166

**HUMBIO 167. The Art of Vision. 3 Units.**
This course is about eyes and art. We explore how eyes are built, how they process visual information, and how they are affected by disease. And we explore how fine art and famous artists (from all eras, ancient to modern) have depended upon vision, both normal and abnormal. There are short diversions into animal eyes and the role of vision in music, literature, and sports. Prerequisite: HumBio 4A or BIO 42 or consent of Instructor.

**HUMBIO 168. Multidisciplinary Perspectives on Guilt. 3 Units.**
The seminar encompasses the personal and cultural components of guilt from multidisciplinary perspectives. At the individual level, it explores behaviors that induce guilt; their relational aspects; genesis in evolutionary and developmental terms: and its normal and pathological manifestations. The cultural section includes cross-cultural perspectives on guilt and its conceptions in Christianity, Judaism, Islam, Hinduism, Buddhism, and Confucianism; as well as in the philosophy of Aristotle, Kant, J. S Mill and Nietzsche, and culpability in the law. Derived from this material, the course will also focus on the nature of ethical reasoning and the ways we make ethical choices and judgments in our lives. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 170. The World Is Flat, The Sun Revolves Around The Earth, and Alternative Facts. 5 Units.**
The role of science in civil rights, justice, policy, criminal justice, evidence, education, and disabled rights. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 170A. Sex and the Law. 5 Units.**
This course uses an interdisciplinary approach to examine the laws and regulation of sex in the United States by considering the legal, policy, social, political and scientific bases (or lack thereof) of such laws, the context and objectives of sex regulation, and the political dynamics of contemporary and controversial issues presented by this subject. Some laws reflect policies to protect persons from harm related to sexual conduct, such as rape, assault and pedophilia. Other laws impose notions of morality, such as sodomy, incest or polygamy, or homosexuality, or reflect policy or social judgments regarding abortion, contraceptives, and sexual activity of minors. Regulation often concern consensual conduct. This course will consider these topics from varying perspectives and policy objectives, and in the context of Constitutional and other liberty interests. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 171. The Death Penalty: Human Biology, Law, and Policy. 3 Units.**
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.

**HUMBIO 172B. Children, Youth, and the Law. 5 Units.**
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; freedom of speech; and sex. The class is interactive, using hypotheticals for discussion and analysis. A and B alternate; students may take one or both. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 173. Science, Innovation and the Law. 5 Units.**
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; the kinds of protections that apply; and how ideas are commercialized and brought to market. Guest speakers will include investors, start-up founders, scientists and inventors, and other relevant experts from IT, medical, pharma and biological sectors. The history of Silicon Valley will be examined as a paradigm for innovation, including a tour of historical landmarks in Silicon Valley. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 174. Foundations of Bioethics. 3 Units.**
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.

**HUMBIO 175H. Literature and Human Experimentation. 3-5 Units.**
This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's Frankenstein (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's Beloved, David Feldshuh's Miss Evers Boys, Hannah Arendt's Eichmann and Vivien Spitz's Doctors from Hell, Rebecca Skloot's Immortal Life of Henrietta Lacks, and Kazuo Ishiguro's Never Let Me Go. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care.
Same as: AFRICAAM 223, COMPLIT 223, CSRE 123B, MED 220

**HUMBIO 175L. Literature and Global Health. 3-5 Units.**
This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of The Lancet for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremgba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health.
Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, FRENCH 229, MED 234

**HUMBIO 176A. Medical Anthropology. 4 Units.**
Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.
Same as: ANTHRO 82, ANTHRO 282

**HUMBIO 177C. Culture, Narrative, and Medicine. 5 Units.**
This course examines the ways in which medicine is practiced in diverse cultural contexts with narrative skills of recognizing, interpreting and being moved by the stories of illness. It is an examination of the human experience of illness and healing through narratives as presented in literature, film, and storytelling. We explore how cultural resources enable and empower healing and how narrative medicine can guide the practice of culturally competent medical care.
Same as: ANTHRO 178A

**HUMBIO 178. Ethics and Politics of Public Service. 3-5 Units.**
Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.
Same as: CSRE 178, ETHICSOC 133, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

**HUMBIO 178T. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.**
(Same as History 105C. History majors and others taking 5 units, enroll in 105C.) Interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, especially for forced prostitution, labor exploitation, and organ trade, focusing on human rights violations and remedies. Provides a historical context for the development and spread of human trafficking. Analyzes the current international and domestic legal and policy frameworks to combat trafficking and evaluates their practical implementation. Examines the medical, psychological, and public health issues involved. Uses problem-based learning. Students interested in service learning should consult with the instructor and will enroll in an additional course.
Same as: CSRE 5C, EMED 5C, FEMGEN 5C, HISTORY 5C

**HUMBIO 179S. Spirituality and Healing. 3-5 Units.**
The puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? Shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.
Same as: ANTHRO 184

**HUMBIO 180. Human Skeletal Anatomy. 5 Units.**
Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual¿s age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.
Same as: ANTHRO 175, ANTHRO 275, BIO 174, BIO 274

**HUMBIO 182. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years. 3-5 Units.**
Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis.
Same as: ANTHRO 18, ARCHLGY 12, EARTHSYS 21

**HUMBIO 191. Human Biology Practicum. 1 Unit.**
Restricted to Human Biology majors. For students who have undertaken supervised community-engaged service, research (e.g. HB-REX, Bio-X) or pre-professional experiences related to their Area of Concentration topic. Includes a series of five required workshops, written reflection and presentation. Satisfies the Capstone Requirement of the major.

**HUMBIO 192A. Human Biology Synthesis. 2-3 Units.**
Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 192S. Human Biology Synthesis. 2-3 Units.**
Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 192W. Human Biology Synthesis. 2-3 Units.**
Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 193. Research in Human Biology. 1-5 Unit.**
Independent research conducted under faculty supervision, in junior or senior year, normally but not necessarily in pursuit of an honors project. May be taken for a maximum 3 quarters of credit. Prerequisite: Faculty approval; application available in student services office.

**HUMBIO 194. Honors. 1-10 Unit.**
Restricted to Human Biology majors. 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.

**HUMBIO 197. Human Biology Internship. 1-4 Unit.**
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 and a total of 4 units accumulatively. Prerequisite: Human Biology core.

**HUMBIO 198. Senior Tutorial in Human Biology. 1-5 Unit.**
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.

**HUMBIO 199. Directed Reading/Special Projects. 1-4 Unit.**
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.

**HUMBIO 200. Teaching of Human Biology. 1-5 Unit.**
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.