

Environmental **TOXICOLOGY**



Established in 1974 as the first undergraduate
Environmental Toxicology program in the United States.

Advising Services

Whether you need information or just some advice, advisers in the Department of Environmental Toxicology are available to speak with you.

The Academic Program Adviser and Peer Advisers are available to answer any questions that you may have, and faculty advisers are available to help you plan out a specific course of study.

To speak with an adviser, make an appointment or drop by during office hours.

For additional information, log on to the Environmental Toxicology Web Site:
<http://etox.ucdavis.edu/>

Join the ETOX Club!

Do you want to find out more about this major and the contributions you can make to this field?? If so, the Environmental Toxicology Club is a great way to make that happen. It's also an excellent way to meet students and faculty in the major.

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A Message from the Associate Dean for Environmental Sciences...



**Professor Tjeerdema
Lake Davis, California**

Welcome to the Department of Environmental Toxicology, the first of its kind anywhere in the world! We actually pre-date Rachel Carson and the birth of the environmental movement. Our roots extend back to the late 1950s, and the seeds of our undergraduate major were first sewn in the late 1960s. Today, UC Davis is known as the world's leader in the field of environmental toxicology. While we are a relatively small department of some 12 faculty, our class sizes are also small and personalized attention from both the faculty and staff is a tradition.

Environmental toxicology encompasses the study of the toxic properties of virtually all chemicals (both natural and man made), including their effects on humans and other species as well as their movement and fate in the environment. As a graduate from our program you would be an expert on the properties of pesticides, solvents, natural toxins, PCBs, dioxins and other chemicals and on processes of environmental scope such as global warming, acid rain and ozone depletion as well as those at the molecular level such as the chemical mechanisms of cancer and other toxic actions.

Our graduates are well versed in chemistry, biochemistry, molecular biology and toxicology — and are very unique! Thus, they have a tremendous selection of career opportunities — and multiple job offers — upon graduation. Typically, our alumni pursue graduate degrees in pharmacology, toxicology, nutrition, food science and environmental chemistry as well as professional degrees in medicine, veterinary medicine, pharmacy and dentistry. They also entertain a wide range of opportunities in the chemical industry (Chevron, Exxon, Dow, DuPont, etc.), pharmaceutical industry (Eli Lilly, Merck, etc.), biotechnology (Genentech, etc.) and environmental consulting firms, and are highly sought by governmental agencies such as the US Environmental Protection Agency, Cal-EPA, the California Department of Food & Agriculture and the California Department of Pesticide Regulation.

I hope you will consider a major in environmental toxicology. With the growing environmental problems we face today, you will obtain the cutting-edge education to make a significant impact on the future of the world!

With Best Wishes,

Ronald S. Tjeerdema
Professor, Department of Environmental Toxicology
Associate Dean for Environmental Sciences
College of Agricultural and Environmental Sciences

Areas of Emphasis

Ecotoxicology & Environmental Chemistry

Topics include chemical fate, transport and degradation as well as ecology, wildlife, and aquatic toxicology.

Forensic Science & Regulatory Toxicology

Topics include forensic science, environmental policy and management, and public health.

Molecular & Biomedical Toxicology

Topics include medicine, pharmacology, veterinary medicine, food toxicology, and biotechnology.

Student Designed Option

Students can construct their own area of emphasis under the explicit direction of their faculty advisers.

Related Areas of Study

- Aquatic Toxicology
- Biology (Marine Biology, Biochemistry, etc.)
- Chemistry
- Environmental Science
- Epidemiology
- Food Science
- Forensic Science
- Hydrology

Frequently Asked Questions

What is Environmental Toxicology?

Environmental Toxicology—the science of toxic chemicals, the useful as well as the deleterious—is a relatively new academic field. However, its historical roots are ancient and its application, significance, and importance are in evidence daily.

Hardly a week goes by without hearing about a chemical that may potentially threaten our health—pesticides and other toxic substances in the food we eat, pollutants in the air we breathe, chemicals in the water we drink. *How do these chemicals work? Are these chemicals really dangerous? What are the effects of chemicals? Cancer? Birth defects?* Finding scientifically sound answers to these very important questions is what toxicologists do using the most modern chemical and biological techniques available.

Environmental Toxicology combines elements of biology and chemistry with many other disciplines to help us understand the impact chemicals have on environmental systems and in living organisms. The basic science of toxicology studies the cellular, biochemical, and molecular mechanisms by which a chemical produces toxic effects, but also uses chemicals as tools to study basic biological processes important to the health and well-being of humans and the environment. The applied science of toxicology evaluates the effects of potentially toxic chemical and physical substances in whole animals and target cells and uses the knowledge gained to extrapolate potential effects on humans and other organisms of concern.

Who should major in Environmental Toxicology?

With the diversity of majors available to undergraduates at UC Davis, the choice can be overwhelming. This major generally attracts individuals with a desire to study both chemistry and biology. It is not, however, simply a biochemistry major; rather students will apply their knowledge of biology and chemistry to real-life issues. Environmental Toxicology students learn to approach science and its affiliated social problems (eg. chemicals in the environment and the consequences of exposure to people and other organisms) with scientifically and socially integrative perspectives, rather than from just theoretical and microscopic perspectives.

The Environmental Toxicology major is not limited to just those interested in the environment. The flexibility of this major gives students a biochemical background from which they can focus on their own areas of interest, whether it is law, forensic science, medicine, more chemistry or more biology.

Career Opportunities



THE ROAD LESS TRAVELLED

Many students do not realize that Environmental Toxicology can prepare them for professional study in:

- Dentistry
- Forensic science
- Law
- Medicine
- Nursing
- Pharmacy
- Veterinary medicine

Often, degrees outside of more traditional majors can help pre-professional students stand out from the rest of the crowd.

Think of Environmental Toxicology and you may wonder what types of careers are open to environmental toxicology graduates. There are no specific career paths Environmental Toxicology graduates must follow. Because of the flexibility of this major and the diversity of courses available, past graduates have entered a variety of fields, including medicine, law, industrial, and environmental chemistry, aquatic toxicology, and pharmacology. Rather, career paths depend on one's creativity, specific interests, and motivation. All students are required to complete a set of core courses, yet the curriculum also allows students the flexibility to pursue individual interests, including the study of the environment, environmental regulations, or the health of living organisms, including humans.



Research and Advanced Degrees

University graduates interested in adding to the body of scientific knowledge or in pursuing specialized areas of interest opt to obtain advanced degrees (M.S., Ph.D.). Often, advanced degrees increase an individual's ability to advance in a field and to compete in the job market. Past graduates have entered a variety of post-baccalaureate programs

- Agricultural & Environmental Chemistry
- Aquatic Toxicology
- Biochemistry
- Biomedical Science
- Chemistry
- Environmental Toxicology
- Forensic Sciences
- Epidemiology
- Food Science

Career Development and Internship Opportunities

- The campus hosts annual **career fairs** in environmental, biological, and physical sciences.
- Internship and career information are available at the **Internship and Career Center** .
- The Internship and Career Center also offers a variety of workshops on writing resumes and on interviewing skills.
- **Graduate and Professional school advising and information is available at:**
 - **Health Professions Advising**
hpa.ucdavis.edu
 - **Academic Success Center: Pre-Graduate/ Professional School Advising**
success.ucdavis.edu

For information on post-baccalaureate degrees (M.S./Ph.D.) and programs, please meet with your faculty adviser and obtain information on electives.

Professional Degrees

Although often overlooked as potential career paths, students interested in careers in public service may go on to pursue professional degrees in:

- Dentistry
- Law
- Medicine
- Nursing
- Pharmacy
- Public/occupational health
- Veterinary medicine

Due to the major's interdisciplinary nature and flexibility, students are prepared to excel in a variety of professional fields. Students pursuing professional degrees are strongly advised to speak with both pre-professional and academic advisers to ensure fulfillment of pre-professional course requirements.

Government Agencies

As technology changes and as the population continues to grow, anthropogenic pollution in the environment will become increasingly problematic. Environmental Toxicology graduates can play vital roles in mediating these effects. With an Environmental Toxicology degree, individuals can work in governmental and regulatory agencies including, but not limited to:

Federal Agencies

- Army Corps of Engineers (USACE)
- Department of Agriculture (USDA)
- Department of Energy (DOE)
- Drug Enforcement Agency (DEA)
- Environmental Protection Agency (USEPA)
- Federal Bureau of Investigation (FBI)
- Fish and Wildlife Service (USFWS)
- Food and Drug Administration (FDA)
- Geological Survey (USGS)

State Agencies

- California Environmental Protection Agency (Cal/EPA)
- Department of Fish & Game (DFG)
- Department of Food & Agriculture (DFA)



For more information visit:

- www.toxicology.org
- www.setac.org
- www.etox.ucdavis.edu
- www.nih.gov

Those interested in utilizing research skills may choose to become forensic toxicologists, environmental chemists or laboratory technicians. Others utilize their skills to set and enforce environmental regulations.

Industry

Outside the arena of academia and government agencies, opportunities are abundant, and perhaps more lucrative. For those interested in working in the private sector, employment opportunities can be found in pharmaceutical corporations, biotechnology firms, and in environmental consulting firms.

Graduates can pursue careers as:

- Chemists
- Toxicologists
- Risk assessors
- Lab technicians
- Research managers

Job Placement

The careers and employment opportunities for graduates are not limited to those mentioned above. To develop a curriculum which will suit students' career goals, it is recommended that they work closely with their major advisers and participate in extracurricular activities.



Transfer Student Information

Transfer students have more complex scheduling needs and should see the staff adviser right away to verify articulations and to plan a workable class schedule.

Things to Remember:

- For immediate assistance on articulation agreements, please visit the following web site: www.assist.org
- Completion of the Bachelor of Science degree in Environmental Toxicology takes an average of three years. With the proper planning and preparation, it is possible to finish in two years.
- Because Environmental Toxicology courses are offered once a year, it is extremely important to complete prerequisite courses. In order to graduate on time, it is **strongly recommended** that students complete the core chemistry, math and biology courses prior to transferring to UC Davis.
- In order to fulfill the English requirement, the English courses taken at a junior college must articulate to courses at UC Davis.

The Bachelor of Science Degree

The Bachelor of Science degree in Environmental Toxicology is awarded to students completing a rigorous four year program encompassing the physical sciences, biology, and mathematics, along with specialized courses in toxicology. During the first two years, students take course work in physics, calculus, inorganic and organic chemistry, statistical and computer analysis, and the biological sciences. After the second year, students begin a series of upper division courses in biochemistry, physiology, and environmental toxicology, along with electives tailored to fit the area of specialization within the major selected by the students and their academic advisers.

Among the Environmental Toxicology offerings are (1) an introductory principles course that discusses the biological and environmental occurrence and significance of pollutants, pesticides, food additives, and natural poisons; (2) a two-quarter sequence emphasizing toxicant transport, accumulation, breakdown, and analysis, including, in the second quarter, a laboratory on techniques of sampling, sample preparation, and identification of toxic substances; and (3) a two-quarter sequence on the biological effects, metabolism, and disposition of toxicants within living organisms, including a second-quarter laboratory to demonstrate techniques for identifying and quantifying harmful effects of chemicals. Other courses emphasize the legal aspects of environmental toxicology, air pollutants and inhalation toxicology, chromatography, health risk assessment, exposure assessment and other special topics.

Further practical experience can be gained by participating either in research projects or in internships with government agencies and private laboratories (for which University credit is available). Courses in written and oral expression, social sciences, humanities, and unrestricted electives round out the program.



ETX Graduates, 2013

Degree Requirements

2012-14 UCD Catalog

Preparatory and Core course requirements for the ETX major were revised, effective Fall 2012.

All incoming Freshman and Transfer students are required to follow the updated requirements effective Fall 2015.

Major Program

Quarter Units

Preparatory Subject Matter 72-73

Biological Sciences	
Biological Sciences 2A-2B-2C.....	14-15
Chemistry	
Chemistry 2A-2B-2C or 2AH-2BH-2CH <u>and</u>	
118A-118B-118C or 128A,128B,128C, 129A	26-27
Mathematics - Calculus	
Mathematics 17A-17B-17C or 21A-21B-21C.....	12
Physics	
Physics 7A-7B-7C	12
Statistics	
Choose one course:	
Statistics 100, 102, 103, 104, 106, or 108.....	4
University Writing Program	
Upper Division Writing 101 or 104(A-I).....	4

Depth Subject Matter..... 37-47

Genetics and/or Biochemistry	
Biological Sciences 101-102 or 102-103.....	6-7
(ABI 102 and 103 are interchangeable with BIS 102 and 103)	
Environmental Toxicology	
101, 102A-102B, 103A-103B.....	22
Choose 3 upper division ETX courses from the following list:	
104, 120, 127, 128, 130, 131, 135, 138 or 146.	9-18

Area of Emphasis..... 24-26

Electives selected for area of specialization with	
Adviser approval.....	24-26

CA&ES Written/Oral Expression 0-8

See College of Agricultural & Environmental Sciences English	
Composition Requirement	

General Education/Breadth Subject Matter.....36

Satisfaction of General Education requirements to include	
courses selected to complement the major; courses in	
agricultural economics, environmental studies, political	
science, psychology, and sociology are particularly	

Minor Program

Minor courses may not be taken on P/NP grading option.

Total Unit Requirement 18-26

Required Courses..... 12

ETX 101 <i>Principles of Environmental Toxicology</i>	4
ETX 102A <i>Toxicants in the Environment</i>	4
ETX 103A <i>Biological Effects of Toxicants</i>	4

Elective Courses (2 chosen from list below) 6-14

ETX 104 <i>Nutritional Toxicants</i>	4
ETX 120 <i>Aquatic Toxicology</i>	4
ETX 127 <i>Env. Stress & Marine Organisms</i>	10
ETX 128 <i>Food Toxicology</i>	3
ETX 130 <i>Toxicology in Modern Industry</i>	3
ETX 131 <i>Air Pollutants and Inhalation Toxicology</i>	3
ETX 135 <i>Health Risk Assessment of Toxicants</i>	3
ETX 138 <i>Legal Aspects of Environmental Toxicology</i>	3
ETX 146 <i>Exposure & Dose Assessment</i>	3

Course Abbreviation Key

ABI = Animal Biology
 ANG = Animal Genetics
 ANT = Anthropology
 APC = Anatomy, Physiol. & Cell Bio.
 ATM= Atmospheric Science
 ANS = Animal Science
 BIS = Biology
 BIT = Biotechnology
 CHA = Cell Biology and Human
 Anatomy (School of Medicine)
 CHE = Chemistry
 EME= Mechanical Engineering
 ENG= Engineering
 ENT = Entomology
 EPI = Epidemiology (Graduate Group)
 ESM= Enviro. Sci. and Management
 ESP = Enviro. Sci. and Policy
 ETX = Environmental Toxicology
 EVE = Evolution and Ecology
 FAP = Family and Community
 Medicine
 FPS = Fiber and Polymer Science
 FST = Food Science and Technology
 GDB = Global Disease Biology
 GEL = Geology
 HIS = History
 HYD = Hydrology
 IDI = Internal Med-Infectious Diseases
 MCB = Molecular and Cellular Biology
 MIC = Microbiology
 MMI = Medical Microbiology and
 Immunology
 NPB = Neurobiol., Physiol., & Behav.
 NUT = Nutrition
 PLB = Plant Biology
 PLP = Plant Pathology
 PLS = Plant Sciences
 PMI = Pathology, Microbiology, and
 Immunology (School of Vet. Med.)
 POL = Political Sciences
 PSC = Psychology
 SPH = Public Health (School of
 Medicine)
 SSC = Soil Science
 VEN = Viticulture and Enology
 WFC = Wildlife, Fish, & Conservation
 Biology

ETX Emphases

The ETX Emphases are designed to give you a chance to explore a chosen area of the major more thoroughly and give you a broader sense of the material covered in the core ETX courses. Upper division courses from both ETX and other departments on campus are recommended with these goals in mind.

ETX majors are required to choose 24-26 units of Restricted Elective courses in an Emphasis area. Each student meets with his/her faculty advisor to discuss these choices and obtain approval prior to taking the classes. Courses other than those listed below may be used with faculty advisor approval.

Six Pass/No Pass units may be used toward the Restricted Electives requirement including one or more of the following type courses: ETX 199 (special study in a lab), ETX 192 (internship), ETX 190 (seminar). Similar courses in other departments may also be approved by your faculty advisor.

Note: Each student must obtain the approval signature on his/her Restricted Elective Course list and turn it into the Advising Office (4111 Meyer Hall) by no later than the first quarter of his/her senior year.

Ecotoxicology & Environmental Chemistry

Courses in Biology, Environmental Science and Policy; Wildlife, Fish, Conservation Biology; Chemistry; Hydrology; and other areas are brought together in this emphasis to give a better understanding of how different environments function, how chemicals move through them, and what organisms those chemicals affect.

Aquatic Toxicology:

BIS 122/122P—Population Biology and Ecology—3 units (S) / 5 (S) - BML*
 ESP/GEL 116N—The Oceans— 3 (W) (even years)
 ESP 151/151L—Limnology—4 (S) / 3 (S)
 ESP 124—Marine and Coastal Field Ecology—3 (SS1)BML*
 ESP 155/155L—Wetland Ecology—4 (F) / 3 (SS1)
 ETX 120—Perspectives in Aquatic Toxicology—4 (W) (odd years)
 ETX 127—Enviro. Stress & Develop. in Marine Organisms—10 (SS1)BML*
 EVE 112/112L—Biology of Invertebrates—3 (W) / 2 (W) (even years)
 NPB 141/141P—Physiological Adaption of Marine Organisms—
 3 (S) / 5 (S) - BML*
 WFC 120—Biology and Conservation of Fishes—3(F)
 WFC 121—Physiology of Fishes—4 (W Irregular)
 WFC 122—Population Dynamics and Estimation—4 (S)
 WFC 157—Coastal Ecosystems (even years)—4 (S)

Ecology:

ESM 120 — Global Environmental Interactions-- 4 units (W)
 ESP 100**—General Ecology—4 (F)
 EVE 101**—Introduction to Ecology—4 (F, W, S)
 ETX 198-003—Evolution in Human-Altered Environments—3 (S)
 GEL 130—Non-Renewable Natural Resources—3 (F, S)
 PMI 127—Medical Bacteria and Fungi —5 (S)

* BML = Bodega Marine Laboratory

** either ESP 100 or EVE 101

Ecology (continued):

WFC 122—Population Dynamics and Estimation—4 (S)

WFC 151—Wildlife Ecology—4 (F)

WFC 154—Conservation Biology—4 (F)

Chemical Fate:

ATM/ENG 149—Introduction to Air Pollution—4 units (F)

ATM 160—Introduction to Atmospheric Chemistry--4 (W)

CHE 100—Environmental Chemistry of Water (W) (alternate years)

CHE 107A/B—Physical Chemistry for the Life Sciences— A: 3 (F) / 3 (W), B: 3 (W) / 3 (S)

CHE 115—Instrumental Analysis—4 (F, W)

ESM 100—Principles of Hydrologic Science--4 (F)

ESP/GEL 116N—Oceanography—3 (W)

HYD 134—Aqueous Geochemistry—6 (S) HYD

141—Physical Hydrology—4 (F) HYD/ENG

144—Groundwater Hydrology--4 (F)

HYD 146—Hydrogeology and Contaminant Transport--5 (W)

MIC 102/ 103L or 104L--General Microbiology- **102:** (F,W,S)**103L:** (F,W,S) **104:** (F)

MIC 105—Microbial Diversity—3 (W)

SSC 100—Principles of Soil Science—5 (F)

SSC 102—Environmental Soil Chemistry-3 (W)

SSC 107—Soil Physics—5 (F)

SSC 111—Soil Microbiology—4 (W)

VEN 123—Analysis of Musts and Wines—2 (F)

Forensic Science and Regulatory Toxicology

Courses in Environmental Science and Policy, Physiology, Law, Psychology, and other areas are brought together in this emphasis to give a better look into the legal and regulatory side of toxicology with focus on environmental law, forensic science, and public health.

Environmental Policy and Management:

ESP 160—The Policy Process—4 units (S)

ESP 161—Environmental Law—4 (S)

ESP 164—Ethical Issues in Environmental Policy-- 3 (S Alternate)

ESP 179—Environmental Impact Assessment—4 (W)

ETX 135—Health Risk Assessment of Toxicants--3 units (F)

ETX 146—Exposure Assessment—3 (S alternate)

POL 150—Judicial Politics and Constitutional Interpretation—4 (F, W Alternate)

PSC 153—Psychology and Law—4 (S Alternate)

Forensic Science:

ANT 153—Human Biological Variation—5 units (F, W)

CHA 101/101L—Human Gross Anatomy—4 (W) / 3 (W)

CHE 104 — Forensic Applications of Analytical Chemistry— 3 (F)

EME 161—Combustion and the Environment—4 (F)

ENT 158—Forensic Entomology—3 (S)

ETX 110—Toxic Tragedies—2 (W, SS1)

FPS 161—Structure and Properties of Fibers—3 (F)

FPS 161L—Textile Chemical Analysis Laboratory--1 (F)

NPB 101/101L—Systemic Physiology-5 (F, W, S) / 3 (F, W, S)

NPB 168—Neurobiology of Addictive Drugs—4 (S)

PLB 102—California Floristics—5 (S)

PSC 153—Psychology and Law—4 (S)

Public Health:

BIS 101 — Genes and Gene Expression — 4 units (F, W, S)
 ETX 140 — Genes and the Environment —3 (W Alternate)
 ETX 110—Toxic Tragedies—2 (W, SS1)
 FAP 195 — Health Care to Underserved Populations-1 (F,S)
 GDB 101—Epidemiology — 4 (W)
 GDB 102 — Disease Intervention and Policy — 4 (S)
 HIS 109B— Environmental Change, Disease and Public Health-4 (F)
 IDI 141—Infectious Diseases in Humans—1 (F)
 MCB 162— Human Genetics and Genomics—3 (F)
 MMI 130—Medical Mycology—2 (W alternate years)
 MMI 188 — Human Immunology—3 (S)
 PMI 126/126L—Fundamentals of Immunology-3 (W)/ 2 (W)
 PMI 127—Medical Bacteria and Fungi—5 (S)
 PMI 129Y 001— One Health Fundamentals (Human, Animals and Environment Interfaces)-3 (F)
 SPH 101—Perspectives in Community Health—3 (W/S)
 SPH 104—Globalization and Health: Evidence and Policies—3 (F)

Molecular and Biomedical Toxicology

Courses in Biology, Microbiology, Biotechnology, Nutrition, Food Science, Physiology, Biochemistry, and other areas are brought together in this emphasis to give a better foundation in the biological effects of toxicants, effects and behavior of pharmaceuticals, and medicine.

Biotechnology:

ANG 111—Molecular Biology Laboratory Techniques (Animal Genetics)--4 units (F)
 BIS 102—Structure and Function of Biomolecules—3 (F,W,S)
 BIS 103—Bioenergetics and Metabolism—3 (F,W,S)
 BIS 104—Cell Biology—3 (F,W,S)
 BIT 160—Principles of Plant Biotechnology—3 (W)
 BIT 161A/B—Plant Genetics and Biotechnology Labs—6 (W) / 6 (S)
 BIT 171—Professionalism and Ethics in Genomics and Biotechnology—3 (F,W,S)
 NPB 101/101L—Systemic Physiology— 5 (F,W,S) / 3 (F,W,S)
 MCB 121—Advanced Molecular Biology 3 (F,W,S)
 MCB 126—Plant Biochemistry—3 (W)
 MIC 102/ 103L or 104L--General Microbiology- **102:** (F,W,S)
103L: (F,W,S) **104:** (F)
 MIC 140/155L—Bacterial Physiology—3 / 4 (offered irregularly)
 MIC 150—Bacterial Genetics—3 (offered irregularly)
 MIC 162—General Virology—4 (W)
 PLP 140—Agricultural Biotechnology, Public Policy—4 (S)
 PLS 152—Plant Genetics —4 (F)
 PMI 128—Biology of Animal Viruses—3 (S)
 PMI 126/126 L—Fundamentals of Immunology—3 (W) / 2 (W)

Food Toxicology:

ETX 128—Food Toxicology—3 units (S)
 FST 100 A/101 A—Food Chemistry—4 (F) / 2 (F)
 FST 100 B/101 B—Food Properties—4 (W) / 2 (W)
 FST 103—Physical and Chemical Methods for Food Analysis--4 (W)
 FST 104/104L—Food Microbiology—3 (W) / 4 (S)
 MIC 102/ 103L or 104L--General Microbiology- **102:** (F,W,S)
103L: (F,W,S) **104:** (F)
 MMI 130—Medical Mycology—2 (W alternate years)
 NUT 111AY—Introduction to Nutrition and Metabolism—3 (W)
 NUT 111B—Recommendations and Standards for Human Nutrition—2 (S)
 NUT 112—Nutritional Assessment—3 (S)
 NUT 114—Developmental Nutrition--4 (W)
 PLB 111—Plant Physiology—3 (F)

Medicine:

CHA 101/101L—Human Gross Anatomy—4 units (W) / 3 units (W)
 BIS 101— Genes and Expression—4 (F,W,S)
 ETX 140 — Genes and the Environment —3 (W alternate years)
 IDI 141—Infectious Diseases in Humans—1 (F)
 MIC 104/104L—General Microbiology--4 (F)/ 3 (F)
 NPB 100—Neurobiology—4 (F,W,S)
 NPB 101/101L—Systemic Physiology 5 (F,W,S) / 3 (F,W,S)
 NPB 102—Animal Behavior—3 (F,S)
 NPB 113—Cardiovascular, Respiratory, and Renal Physiology—4 (offered irregularly)
 NPB 114—Gastrointestinal Physiology—3 (F)
 NPB 121/121L—Physiology of Reproduction--4 (W)/1 (W)
 NPB 140—Principles of Environmental Physiology—3 (W)
 NPB 168—Neurobiology of Addictive Drugs—4 (S)
 PMI 126/126L—Fundamentals of Immunology--3 (W)/2 (W)
 PMI 127—Medical Bacteria and Fungi—5 (S)

Pharmacology:

BIS 103—Bioenergetics and Metabolism—3 units (F,W,S)
 BIS 104—Cell Biology—3 (F,W,S)
 CHA 101/101L—Human Gross Anatomy-4 (W)/ 3 (W)
 CHE 130A/B Pharmaceutical Chemistry--3 (W) / 3 (S)
 EVE 112/112L—Biology of Invertebrates—3 (W) / 2 (W) (even years)
 IDI 141—Infectious Diseases in Humans—1 (F)
 MCB 120L—Biochemistry Laboratory—6 (F,W,S)
 MCB 121—Advanced Molecular Biology—3 (F,W,S)
 MCB 123—Behavior and Analysis of Enzyme and Receptor Systems—3 (F,S)
 MIC 102/ 103L or 104L--General Microbiology- **102:** (F,W,S) **103L:** (F,W,S) **104:** (F)
 NPB 101/101L—Systemic Physiology 5 (F,W,S) / 3 (F,W,S)
 NPB 160—Molecular and Cellular Neurobiology—3 (S)

Veterinary Medicine:

ABI 102*—Animal Biochemistry and Metabolism--5 units (F)
 ABI 103*—Animal Biology—5 (W)
 ANG 107—Genetics and Animal Breeding—5 (F,W)
 ANG 111—Molecular Biology Laboratory Techniques--4 (F)
 APC 100 —Comparative Vertebrate Organology—4 (F)
 MCB 150—Developmental Biology—4 (W)
 MMI 116—Parasitology for Wildlife Biologists—3 (S)
 NPB 101/101L—Systemic Physiology 5 (F,W,S) / 3 (F,W,S)
 NPB 121/121L—Physiology of Reproduction—4 (W) / 1 (W)
 NUT 123—Comparative Animal Nutrition—3 (S)
 PMI 126/126L—Fundamentals of Immunology- 3 (W)/2 (W)
 PMI 127—Medical Bacteria and Fungi—5 (S)

*ABI 102 and ABI 103 are substitutes for BIS 102 and BIS 103, which are requirements for the ETX major. Talk to the major advisor if you have taken/plan to take ABI 102 or 103 instead.

Student Designed Emphases

Students can construct their own area of emphasis under the explicit direction of their faculty advisers.

This document is produced by the Department of Environmental Toxicology, Academic Advising Office: 4111 Meyer Hall, UC Davis, One Shields Avenue Davis, CA 95616.
 Please direct all questions/comments to Susan Kancir, Student Affairs Officer, at sgkancir@ucdavis.edu.

(Note: The number of units and the time classes are being offered are subject to change every quarter.)