TOXICOLOGY

Established in 1974 as the first undergraduate Environmental Toxicology program in the United States.
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, please make an appointment via e-mail or drop by during office hours.

For additional information, please visit the our website: http://etox.ucdavis.edu/

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**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.

For more information, please e-mail Brian Kerfs (bekerfs@ucdavis.edu)

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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
**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 ETX?**

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.

### 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, Biochemistry, etc.)
- Chemistry
- Environmental Science
- Epidemiology
- Food Science
- Forensic Science
- Hydrology
Career Opportunities

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.

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.

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:

<table>
<thead>
<tr>
<th>Federal Agencies</th>
<th>State Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Corps of Engineers (USACE)</td>
<td>California Environmental Protection Agency (Cal/EPA)</td>
</tr>
<tr>
<td>Department of Agriculture (USDA)</td>
<td>Department of Fish &amp; Game (DFG)</td>
</tr>
<tr>
<td>Department of Energy (DOE)</td>
<td>Department of Food &amp; Agriculture (DFA)</td>
</tr>
<tr>
<td>Drug Enforcement Agency (DEA)</td>
<td></td>
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<tr>
<td>Environmental Protection Agency (USEPA)</td>
<td></td>
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<tr>
<td>Federal Bureau of Investigation (FBI)</td>
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<tr>
<td>Fish and Wildlife Service (USFWS)</td>
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<tr>
<td>Food and Drug Administration (FDA)</td>
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<tr>
<td>Geological Survey (USGS)</td>
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</tbody>
</table>
Those interested in utilizing research skills may choose to become forensic toxicologists. 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.

**For more information visit:**

- Society of Toxicology  
  [www.toxicology.org](http://www.toxicology.org)
- Society of Environmental Toxicology and Chemistry  
  [www.setac.org](http://www.setac.org)
- National Institute of Health  
  [www.nih.gov](http://www.nih.gov)
- ETOX Website  
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.

Transfer Student Information

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

Things to Remember:

- For immediate assistance on articulation agreements, please visit the following website: www.assist.org
- Completion of the B.S. 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 perquisite 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.
## Major Program (effective Fall 2018)

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences (BIS 2A-2B-2C)</td>
<td>14-15</td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>1. For 1st years admitted Fall 2018 and after</td>
<td>25</td>
</tr>
<tr>
<td>CHE 3A-3B-3C and 103A-103B</td>
<td></td>
</tr>
<tr>
<td>2. For all students admitted prior to Fall 2018 and Transfer students admitted Fall 2018 and after</td>
<td>26-27</td>
</tr>
<tr>
<td>CHE2A-2B-2C or 2AH-2BH-2CH and 118A-1118B-118C or 128A-128B-128C-129A</td>
<td></td>
</tr>
<tr>
<td>Mathematics – Calculus (MAT 17A-17B-17C or 21A-21B-21C)</td>
<td>12</td>
</tr>
<tr>
<td>Physics (PHY 7A-7B-7C)</td>
<td>12</td>
</tr>
<tr>
<td>Statistics (STA100, 103, 104, 106, or 108)</td>
<td>4</td>
</tr>
<tr>
<td>University Writing Program (UWP101 or 104(A-I)</td>
<td>4</td>
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</table>

<table>
<thead>
<tr>
<th>Depth Subject Matter</th>
<th>Quarter Units</th>
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</thead>
<tbody>
<tr>
<td>Genetics and/or Biochemistry (BIS101-102 or 102-103)</td>
<td>6-7</td>
</tr>
<tr>
<td>Environmental Toxicology ETX 101, 102A-102B, 103A-103B</td>
<td>22</td>
</tr>
<tr>
<td>AND 2 upper division ETX courses of your choice from the following list (ETX 104, 120, 128, 130, 131, 135, 138, or 146) OR ETX127</td>
<td>6-10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area of Emphasis</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives selected for area of specialization with Adviser Approval</td>
<td>12-16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CA&amp;ES Written/Oral Expression</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>See College of Agricultural and Environmental Sciences English Composition Requirement</td>
<td>0-8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Education/Breadth Subject Matter</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction of General Education requirements to include courses selected to complement the major; courses in agricultural economics, environmental studies, political science, psychology, and sociology for example.</td>
<td>36</td>
</tr>
</tbody>
</table>

## Minor Program

<table>
<thead>
<tr>
<th>Total Unit Requirement</th>
<th>18-26</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETX 101 Principles of Environmental Toxicology</td>
<td>4</td>
</tr>
<tr>
<td>ETX102A Toxicants in the Environment</td>
<td>4</td>
</tr>
<tr>
<td>ETX103A Biological Effects of Toxicants</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Courses (Choose 2 courses)</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETX 104 Nutritional Toxicants</td>
<td>4</td>
</tr>
<tr>
<td>ETX120 Aquatic Toxicology</td>
<td>4</td>
</tr>
<tr>
<td>ETX127 Env. Stress &amp; Marine Organisms</td>
<td>10</td>
</tr>
<tr>
<td>ETX128 Food Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>ETX130 Toxicology in Modern Industry</td>
<td>3</td>
</tr>
<tr>
<td>ETX131 Air Pollutants and Inhalation Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>ETX135 Health Risk Assessment of Toxicants</td>
<td>3</td>
</tr>
<tr>
<td>ETX138 Legal Aspects of Environmental Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>ETX146 Exposure &amp; Dose Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>
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 approval signature on their Restricted Elective Course List and turn it into the Advising Office (4111 Meyer Hall) no later than the first quarter of 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)
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)
** BML = Bodega Marine Laboratory

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)
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)

ETX 110 – Genes and the Environment – 3 (W Alternate)
ETX 140 – Genes and Gene Expression – 4 units (F, W, S)
ETX 128 – Food Toxicology – 3 units (S)
ETX 100 A/101 A – Food Chemistry – 4 (F) / 2 (F)
ETX 100 B/101 B – Food Properties – 4 (W) / 2 (W)
FAP 195 – Health Care to Underserved Populations-1 (F,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)
FST 103 – Physical and Chemical Methods for Food Analysis – 4 (W)
FST 104/104L – Food Microbiology – 3 (W) / 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)

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)
NAP 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 120/ 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.

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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.)