Nutritional Sciences: Toxicology
Department of Nutritional Sciences and Toxicology
College of Natural Resources, University of California Berkeley

The **Toxicology** specialization within the **Nutritional Sciences** Bachelor of Science degree program at UC Berkeley provides a strong foundation in the biological and chemical sciences. This specialization combines a strong foundation in the biological and chemical sciences with specialized advanced course work focusing on the hazardous and beneficial effects of natural and human-made toxic agents. From industrially produced environmental contaminants and designer drugs to naturally occurring herbs and food products, this field of study applies molecular and computational methods to better understand how these agents interact with living organisms and what should be done to ensure human health and safety.

Career Opportunities • Medical School • Health Professions

The Toxicology specialization prepares students for careers in many applications of biological or computer sciences, including environmental protection, public health, pharmacology, forensic sciences, biotechnology, the food industry, and related businesses.
It is also ideal preparation for medical school and other professional health programs

Public and Non-Profit Sector Jobs

- **Community or Public Health Organizations:** Coordinate programs aimed at improving health and preventing disease. Develop consumer education materials regarding food and nutrient supplement products. Consult for agencies providing humanitarian assistance. Conduct forensic work related to establishing cause of death or important clues to solve crimes. Investigate public health concerns by working with Poison Control Centers.
- **Governmental Agencies:** Develop laws and policies to ensure product safety, proper chemical production and disposal, and environmental protection. Conduct forensic work related to establishing a cause of death or important clues to solve crimes. Investigate public health concerns by working with Poison Control Centers. Conduct lab and field research for municipal departments (e.g., water, utilities, parks) or for governmental agencies, such as the Food and Drug Administration or Environmental Protection Agency.
- **Education:** Teach the biological sciences in educational institutions. Conduct research in the biological sciences for universities or governmental organizations.
- **Research and Public Service:** Characterize the mode of action of naturally occurring carcinogens and cancer protective agents in food. Study food-borne illness and the microbiological safety of our food and water supply. Investigate environmental and cellular toxins and DNA damage. Identify the anti-microbial activity of natural products.

Private Sector Jobs

- **Health organizations:** Become a health professional in medicine, dentistry, pharmacy, optometry, physical therapy, and so on.
- **Pharmaceutical Industry:** Work on regulation of drugs or other chemicals to determine safety for the consumer market.
- **General Consumer Businesses:** Develop new and useful products such as pharmaceuticals, industrial chemicals, and consumer products such as soaps, paints, cosmetics, and food additives.
- **Biotechnology firms:** Conduct research and development for new applied technologies.

Research Opportunities

Students can earn credit for laboratory work by enrolling in a Supervised Independent Study Research (NST 99 or NST 199). See the major advisor for more information.

- Characterizing the mode of action of naturally occurring cancer protective agents in food.
- Foodborne illness and the microbiological safety of our food and water supply.
- Environmental and cellular toxins and DNA damage.
- Identifying the antimicrobial activity of natural products.
- Iron and copper metabolism and the role of these minerals in human health and disease states.

Nutritional Sciences: Toxicology – Curriculum Effective Fall 2016

UNIVERSITY/CAMPUS REQUIREMENTS:

☐ 120 total units ☐ 36 upper division units ☐ Entry Level Writing ☐ American History ☐ American Institutions ☐ American Cultures

LOWER DIVISION MAJOR REQUIREMENTS:

Humanities and Social Science (22 units)

☐ English R1A (or equivalent Reading and Composition course) (4)
☐ English R1B (or equivalent Reading and Composition course) (4)
☐ 14 additional units of course work in American Cultures, Arts & Literature, Historical Studies, International Studies, Philosophy & Values, Social & Behavioral Sciences, or Foreign Language.

Course	Units	Course	Units	Course	Units

Physical Sciences and Math (26-28 units)

☐ Math 16A and ☐ Math 16B and ☐ Stats 2 (10) **OR** ☐ Math 1A and ☐ Math 1B and ☐ Stats 2 (12) **OR** ☐ Math 10A and ☐ Math 10B (8)
☐ Chem 1A, General Chemistry (3) ☐ Chem 1AL General Chemistry Lab (1)
☐ Chem 3A, Organic Chemistry (3) ☐ Chem 3AL, Organic Chemistry Lab (2)
☐ Chem 3B, Organic Chemistry (3) ☐ Chem 3BL, Organic Chemistry Lab (2)
☐ Physics 8A Introductory Physics (4)

Biological and Natural Resource Science (11-13 units)

☐ NST 11, Introduction to Toxicology (3)(SP)
☐ MCB 32, Human Physiology (3)(F) ☐ MCB 32L, Human Physiology Lab (2)(F) (IB 132/132L is also acceptable)
☐ Bio 1A, General Biology (3)(F,SP) ☐ Bio 1AL, General Biology Lab (2)(F,SP)

UPPER DIVISION MAJOR REQUIREMENTS (30 units total):

Required Courses (19 or 20 units):

☐ MCB 102 Biochemistry &Molecular Biology (4)(F,SP)
☐ NST 103 Nutrient Function & Metabolism (3)(F) or MCB 136 Physiology (4)(F)
☐ NST 110 Toxicology (4) (F)
☐ NST 121 Computational Toxicology (3) (SP)
☐ NST 171 Nutrition and Toxicology Laboratory (4) (F)
☐ NST 193 Introduction to Research in Toxicology (1)(SP)

Students are required to earn a total of 30 upper division biological units (required courses above plus selecting additional courses from the Approved Electives List).

Approved Electives List (10 or 11 Units):

☐ Civ Eng 114 Environmental Microbiology (3)
☐ Civ Eng 115 Water Chemistry (3)
☐ ESPM 100 Environmental Problem Solving (4)
☐ ESPM 119 Chemical Ecology (2)
☐ ESPM 126 Environmental Soil Chemistry (3)
☐ ESPM 162 Bioethics (4)
☐ ESPM C180 Air Pollution (3)
☐ IB 117 Medical Ethnobotany (2)
☐ IB 131 Human Anatomy (3)
☐ IB 152 Environmental Toxicology (4)
☐ NST 103 Nutrient Function and Metabolism (3)(F)
☐ NST C114/ESPM C148 Pesticide Chemistry & Toxicology (3)(SP)
☐ NST C115 Principles of Drug Action (2)(SP)
☐ NST 160 Metabolic Bases of Human Health & Diseases (4)(SP)
☐ NST H196 Honors Research (4)
☐ NST 199 Independent Study Research (1-4)
☐ PH 150A Introduction to Epidemiology & Human Disease (3)
☐ PH 150B Introduction to Environmental Health (3)
☐ PH 170B Toxicology (3)
☐ UGIS 192C Research Biological Sciences (1-4)
☐ **Any other Approved NS-PM Elective Courses**
☐ **Other IB, MCB, PMB and CHEMISTRY lecture or lab courses also accepted**

***All courses must be taken for a letter grade with the exception of research courses that are only offered on a Pass/No Pass basis and courses not being applied for the major.**

***There is a maximum limit of 4 units of independent study research per semester and only 8 units can count towards the 30 units of the major, but 16 units of independent student research may count towards graduation.**

***15 of the 36 upper division units must be taken in a CNR department such as NST, ESPM, or PMB.**

***You must receive at least a C- in all courses required for the major.**