

**Nutritional Sciences: Physiology and Metabolism**  
**Department of Nutritional Sciences and Toxicology**  
**College of Natural Resources**

### Introduction

The **Physiology & Metabolism** specialization within the **Nutritional Sciences** Bachelor of Science degree program at UC Berkeley provides a strong foundation in the biological and chemical sciences. The advanced course work focuses on the biochemical and physiological study of nutrient utilization. The Physiology & Metabolism specialization explores the following topics:

- Delivery of nutrients from foods to cells and the function of nutrients in energy metabolism.
- The cellular and molecular regulatory mechanisms by which humans respond metabolically to changes in the nutritional environment.
- Dietary patterns causing nutrient imbalances and the effect these imbalances have on function and health of humans.
- The methodological and conceptual processes of nutrition and food science laboratory research.

### Career Opportunities

The Nutritional Sciences degree provides an excellent foundation for employment in research, education, industry and government— as well as advanced studies in nutrition, health and bioscience fields. Students are encouraged to pursue internships and work experiences to assess their individual interests and establish a career path. Examples of possible fields include:

- **Industry.** Developing products and conducting research for food, chemical, pharmaceutical, and biotechnology firms.
- **Health.** Working as a professional in Medicine, Dentistry, Optometry, or Pharmacology. Many of the required pre-med courses are part of our curriculum. Additional pre-med courses can be easily added to the academic plan. Our graduates who have pursued medicine find that the upper division Nutritional Science course work, which focuses on the characteristics of nutrients and how they are processed and utilized in our body, informs their medical studies and helps them to promote good health as professionals.
- **Education and Research.** Teaching in the biological, chemical, nutrition and food sciences. Participating in scientific research to advance techniques in the biological sciences.
- **Governmental Agencies.** Advising and policy making for California agencies such as Agriculture, Health Services or for Federal agencies such as the Food and Drug Administration, U.S. Department of Agriculture, and Environmental Protection Agency.

### Research Opportunities

There are many opportunities to participate in research projects conducted in faculty laboratories. Our faculty members are especially interested in the interaction among nutrition, metabolism and disease risk. Students can earn credit for laboratory work by enrolling in a Supervised Independent Study Research (NST 99 or NST 199). See the NST website 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.
- Metabolism and modes of action of vitamins.
- Molecular biology of fat cell differentiation.
- Factors controlling glucose and fat production by the liver in healthy individuals, as well as diabetic and obese patients.

**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 (13 units)**

- NST 10, Intro to Human Nutrition (3)(F,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):**

**Required Courses (16 units):**

- MCB102 Principles of Biochemistry & Molecular Biology (4) (F,SP)  
 NST 103 Nutrient Function & Metabolism (3)(F)  
 NST 160 Metabolic Bases of Human Health and Diseases (4)(SP)  
 NST 170 Experimental Nutrition Laboratory (4)(SP)  
 NST 190 Introduction to Research in Nutritional Science (1)(F,SP)

**Approved Electives List (14 Units Required):**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> NST 104 Human Food Practices (2)(SP)      | <input type="checkbox"/> NST 199 Independent Research (1-4)  | <input type="checkbox"/> MCB 104 Genetics & Cell Bio (4)  |
| <input type="checkbox"/> NST 108A Intro&AppFood Science (3)(F)     | <input type="checkbox"/> PMB C103 Bacterial Pathogenesis (3)   | <input type="checkbox"/> MCB 130A Cell&Systems Bio (4)  |
| <input type="checkbox"/> NST 110 Toxicology (4)(F)                 | <input type="checkbox"/> PMB C112 General Microbiology (4) or PH 162A Public Health Microbiology (3) | <input type="checkbox"/> MCB 132 Bio of Human Cancer (4)  |
| <input type="checkbox"/> NST C114 Pesticide Chem & Tox (3)(SP)     | <input type="checkbox"/> PMB C114 Intro to Comp Virology (4)   | <input type="checkbox"/> MCB 135 A-V (3)  |
| <input type="checkbox"/> NST 115 Principles of Drug Action (2)(SP) | <input type="checkbox"/> IB 117 Medical Ethnobotany (2)  | <input type="checkbox"/> PH 170B Toxicology (3)   |
| <input type="checkbox"/> NST 161A Med Nutrition Therapy (4)(F)     | <input type="checkbox"/> IB 123 Exercise Physiology (3)  | <input type="checkbox"/> UGIS 192C Research Biological Sciences (1-4)                               |
| <input type="checkbox"/> NST 161B Med Nutrition Therapy (4)(SP)    | <input type="checkbox"/> IB 128 Sports Medicine (3)  | <input type="checkbox"/> Any other IB, MCB, PMB, and Chemistry lecture or lab courses also accepted |
| <input type="checkbox"/> NST 166 Nutrition in Community (3)(F)     | <input type="checkbox"/> IB 131 Human Anatomy (3)  |   |
| <input type="checkbox"/> NST 193 Research in Toxicology (1)(SP)    | <input type="checkbox"/> IB 140 Biology & Sociobiology of Human Reproduction (4)                     |   |
| <input type="checkbox"/> NST H196 Honors Thesis (4)                |  |   |

**\*Students can choose up to 10 units of Dietetic courses from the Approved Elective List to count for the NS-PM Requirements. These courses are: NST 104, NST 108A, NST 161A, NST 161B, and NST 166.**

**\*All major 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.**