Introduction

The Physiology & Metabolism specialization within the Nutritional Science 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 Science 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 units Entry Level Writing American History American Institutions American Cultures

LOWER DIVISION 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.

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<td>Physical Sciences and Math (26-28 units)</td>
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<tr>
<td>Math 16A and Math 16B and Stats 2 (Intro to Statistics)</td>
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<td>Chem 1A, General Chemistry (3)</td>
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<td>Chem 3A, Organic Chemistry (3)</td>
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<td>Chem 3B, Organic Chemistry (3)</td>
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<td>Physics 8A Introductory Physics (4)</td>
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Biological and Natural Resource Science (13 units)
NST 10, Intro to Human Nutrition (3)(F,SP)
MCB 32, Human Physiology (3)(F)
Bio 1A, General Biology (3)(F,SP)

UPPER DIVISION REQUIREMENTS (36 units total):
15 of the 36 upper division units must be taken in the College of Natural Resources
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 (20 Units Required):
NST 104 Human Food Practices (2)(SP)
NST 108A Intro & App Food Science (3)(F)
NST 110 Toxicology (4)(F)
NST 114 Pesticide Chem & Toxic (3)(SP)
NST 115 Principles of Drug Action (2)(SP)
NST 161A Med Nutrition Therapy (4)(F)
NST 161B Med Nutrition Therapy (4)(SP)
NST 166 Nutrition in Community (3)(F)
NST 193 Research in Toxicology (1)(SP)
NST H196 Honors Thesis (4)

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<td>NST 199 Independent Research (1-4)</td>
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<td>PMB C103 Bacterial Pathogenesis (3)</td>
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<td>PMB C112 General Microbiology (4) or PH</td>
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<td>162A Public Health Microbiology (3)</td>
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<td>PMB C114 Intro to Comp Virology (4)</td>
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<td>IB 117 Medical Ethnobotany (2)</td>
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<td>IB 123 Exercise Physiology (3)</td>
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<td>IB 128 Sports Medicine (3)</td>
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<td>IB 131 Human Anatomy (3)</td>
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<td>IB 140 Biology &amp; Sociobiology of Human Reproduction (4)</td>
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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 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 16 units of independent student research may count towards graduation. 15 of the 36 upper division biology units must be taken in the College of Natural Resources.

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

For more information
Undergraduate Major Advisor, Nutritional Science & Toxicology
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University of California Berkeley, CA 94720
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