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 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.

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<th>Course</th>
<th>Units</th>
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<tr>
<td>Math 1A and Math 1B and Stats 2 (10) OR Math 1A and Math 1B and Stats 2 (12) OR Math 10A and Math 10B (8)</td>
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<tr>
<td>Chem 1A, General Chemistry (3)</td>
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<td>Chem 1AL General Chemistry Lab (1)</td>
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<td>Chem 3A, Organic Chemistry (3)</td>
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<td>Chem 3AL, Organic Chemistry Lab (2)</td>
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<td>Chem 3B, Organic Chemistry (3)</td>
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<tr>
<td>Chem 3BL, Organic Chemistry Lab (2)</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)
- MCB 32L, Human Physiology Lab (2) (F) (IB 132/132L is also acceptable)
- 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 Disease (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):**
- NST 104 Food, Culture, and the
- Environment (2) (SP) or NST 104AC (3)
- NST 108A Intro & App Food Science (3) (F)
- NST 109 Toxicology (4) (F)
- NST C114 Pesticide Chem & Tox (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)
- NST 199 Independent Research (1-4)
- PMB C103 Bacterial Pathogenesis (3)
- PMB C112 General Microbiology (4) or PH 117 Medical Microbiology (4)
- PMB C114 Intro to Comp Virology (4)
- IB 117 Medical Ethnobotany (2)
- IB 123AL Exercise Physiology (5)
- IB 128 Sports Medicine (3)
- IB 131 Human Anatomy (3)
- IB 131L Human Anatomy (2)
- IB 140 Biology of Human Reproduction (4)
- MCB 104 Genetics & Cell Bio (4)
- MCB 130A Cell & Systems Bio (4)
- MCB 132 Bio of Human Cancer (4)
- MCB 135 A-V (3)
- PH 170B Toxicology (3)
- UGIS 192C Research Biological Sciences (1-4)
- Any other IB, MCB, PMB, and Chemistry lecture or lab courses also accepted

*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, EEP, or PMB.

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

http://nature.berkeley.edu

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