

NUTRITION (NTRN)

NTRN 200. Case Cooks: Ethnic Eats. 1 Unit.

In a world as connected as ours, it is important to learn about others' cultures; and what better way to learn than through the medium of food! Something as simple as food can be interpreted thousands of ways and can serve as a link from our culture to ethnicities around the world. This half-semester class focuses on exploring cultural diversity in a way that everyone can relate to while also incorporating healthy, simple, budget friendly cooking skills. Course is geared towards the beginner skill level. Each week we will explore a different region of the world including Africa, South America, Europe, Asia, and the Middle East! Note: Please email instructor before registering if you have food allergies. Counts as a Understanding Global Perspectives course.

NTRN 200C. Case Cooks: Community. 1 Unit.

According to 2022 data from Feeding America, at least 44 million people experience hunger and/or food insecurity, including 1 in 5 children. In addition, in 2023, the National Center for Education Statistics (NCES) at the U.S. Department of Education released for the first time a major federal report confirming that students in higher education are struggling to meet their basic needs and are experiencing food insecurity. The data confirm that more than 4 million students in higher education are experiencing food insecurity, and 2.3 million more students have marginal food security. This course is designed to provide students with an introduction to hunger and food insecurity, community resources, basic nutrition principles and culinary skills. Through a combination of classroom instruction and hands-on cooking experiences, students will learn basic culinary techniques, meal planning, and food preparation strategies to create healthy, budget-friendly meals. Students will learn about community resources and interventions aimed at addressing food insecurity including the importance of nutrition and cooking skills in promoting food security and overall well-being. Students will have the opportunity to utilize their nutrition knowledge and culinary skills while preparing a congregate meal at a local community organization. In addition, students will visit the CWRU food pantry and become familiar with the resources available to the CWRU community. Note: Please email instructor before registering if you have food allergies or sensitivities. Also, remind instructor prior to each class. It is YOUR responsibility to be vigilant and be aware of recipes and preparations to avoid. Counts as a Half-Semester Wellness/Non-movement course.

NTRN 200H. Case Cooks: Healthy Lifestyles. 1 Unit.

Studies say that those who frequently cook meals at home eat healthier, consume fewer calories and are happier than those who eat out. Isn't it time you learn to cook? Join your classmates for a fun, edible education. This half-semester class focuses on healthy, simple, budget friendly cooking skills to increase your confidence in the kitchen. Course is geared towards the beginner skill level. Weekly cooking topics include, Treasures from the earth, Keep it simple & Make it quick, Protein power, Grocery game plans & Mastering Student Meals, Make it lighter. Note: Please email instructor before registering if you have food allergies. Counts as a Half-Semester Wellness/Non-movement course.

NTRN 200S. Case Cooks: Sports and Performance. 1 Unit.

Proper nutrition and hydration have a major impact on health and sports performance across all levels of training and competition. When active individuals/sports enthusiasts/athletes want to improve their performance, whether it is strength, speed, endurance, or power, they need to train and eat with proper guidance. Investing time to develop eating plans that are mindful of your type of activity and performance goals will optimize training, refuel and rehydrate faster, and decrease risk of illness and injury. This half-semester class focuses on healthy, simple, budget-friendly cooking skills that will help develop an understanding of healthy food and fluid choices to fuel an athlete/sports enthusiast/active individuals' body before, during and after activity when training, competing, recovering or traveling. Weekly cooking topics include: Overall Athlete Nutrition, Carbohydrates, Protein, Recovery & Immunity, Antioxidants & Inflammation, Hydration & Traveling/On-The Go. Counts as a Half-Semester Wellness/Non-movement course.

NTRN 201. Nutrition. 3 Units.

A study of the fundamental concepts of nutrition with an emphasis on nutrients, their functions, food sources, and how nutrition can be used to improve health and wellness. Counts as a Full-Semester Wellness/Non-movement course.

NTRN 220C. Case Cooks: Community. 1 Unit.

According to 2022 data from Feeding America, at least 44 million people experience hunger and/or food insecurity, including 1 in 5 children. In addition, in 2023, the National Center for Education Statistics (NCES) at the U.S. Department of Education released for the first time a major federal report confirming that students in higher education are struggling to meet their basic needs and are experiencing food insecurity. The data confirm that more than 4 million students in higher education are experiencing food insecurity, and 2.3 million more students have marginal food security. This course is designed to provide students with an introduction to hunger and food insecurity, community resources, basic nutrition principles and culinary skills. Through a combination of classroom instruction and hands-on cooking experiences, students will learn basic culinary techniques, meal planning, and food preparation strategies to create healthy, budget-friendly meals. Students will learn about community resources and interventions aimed at addressing food insecurity including the importance of nutrition and cooking skills in promoting food security and overall well-being. Students will have the opportunity to utilize their nutrition knowledge and culinary skills while preparing a congregate meal at a local community organization. In addition, students will visit the CWRU food pantry and become familiar with the resources available to the CWRU community. Note: Please email instructor before registering if you have food allergies or sensitivities. Also, remind instructor prior to each class. It is YOUR responsibility to be vigilant and be aware of recipes and preparations to avoid.

NTRN 300. Healthy Lifestyles as Preventive Medicine. 3 Units.

Decades of research have shown that a healthy lifestyle will significantly reduce the risk of chronic disease, improve health and quality of life. Because of this research, support has emerged that healthy lifestyles are in fact the "best preventive medicine". This course will focus on learning the key components of these healthy lifestyle principles and developing the skills necessary to practice and advocate a healthy lifestyle. It is designed for any student interested in learning how to practice and promote healthy lifestyles, but it is particularly helpful for all pre-health, public health, and nutrition majors. *A unique feature of this course is the opportunity for enrolled students, (who are interested), to pair with advanced nutrition students throughout the semester for 'healthy eating' guidance. Enrolled students will have healthy eating coaches! Counts as a Full-Semester Wellness/Non-movement course.

NTRN 310. Understanding Plant-Based Diets in Health and Disease. 3 Units.

This course presents a holistic understanding of plant-based diets in human health, including influence on disease risk, as well as controversies and confusion associated with these plant-based diets. Students will also learn how to plan budget friendly, easy to prepare plant-based diets.

NTRN 320. Women's Wellness: From Food and Nutrition to Reproductive Health and Aging. 3 Units.

An understanding of the impact and role of food, nutrition and one's lifelong dietary and lifestyle patterns is essential to positively impact and optimize the health and well-being of women across the lifespan. In this course, students will be immersed in learning about the importance of these factors on an array of women's wellness topics that range from fad diets, weight management and dietary supplements to reproductive health, healthy aging, female athlete concerns, and mental well-being, stress/anxiety. This course is intended for undergraduate students of all majors, class rank and gender. Counts as a Full-Semester Wellness/Non-movement course. Counts as a Human Diversity & Commonality course.

NTRN 328. Child Nutrition, Development and Health. 3 Units.

The relationship between nutrition and physical/cognitive growth and development of the child from the prenatal period through adolescence, including individuality, maturation and biological needs. Nutritional influences (nutrient requirements, food choices, and nutritional/feeding problems) and effects on health are emphasized. Counts as a Full-Semester Wellness/Non-movement course. Counts as a Human Diversity & Commonality course.

NTRN 337. Nutrition Communication, Counseling and Behavior Change Strategies. 3 Units.

How do we help someone make a dietary behavior change, such as choosing a side salad instead of fries when eating a hamburger? Yes, it is a very challenging task and most often, providing just nutrition education is not sufficient. Therefore, the focus of this course is to prepare students for their future career by providing fundamental knowledge about human decision making and developing communication skills that can help improve others nutritional well-being. In addition, the course will critically evaluate and interpret nutrition information for the consumer. Changes in food marketing and sources of nutrition information for consumers over the past five decades will be analyzed and discussed. Furthermore, the impact of nutrition labeling, the food industry and food marketing on the dietary intake of Americans and various demographic groups in the U.S. will be studied. Offered as NTRN 337 and NTRN 437 Counts as a Human Diversity & Commonality course. Prereq: NTRN 201 or Requisites Not Met permission.

NTRN 338. Dietary Supplements. 3 Units.

An examination of dietary supplements specific to health promotion and disease prevention/treatment throughout the life cycle. Topics and concepts include regulation, controversies, safety, efficacy, and the surrounding scientific evidence for dietary supplement use. For NTRN 338, preference will be given to senior level Nutrition majors. Offered as NTRN 338 and NTRN 438. Prereq: Junior or Senior Standing.

NTRN 340. Global Food Systems: Environmental Issues, Sustainability, and Health. 3 Units.

Environmental changes impact humans worldwide, with an influence lasting many generations into the future. An in-depth understanding of the interplay between food systems - global food production, distribution, and selection - and environment and sustainability issues, as related to human nutrition, health, and well-being has never been more important. This course will provide an in-depth analysis regarding how food systems and the environment are interconnected in a multitude of ways. Additionally, the course will examine how issues of sustainability effect food production, distribution, and quality. Further, how environmental and sustainability issues directly affect the nutritive qualities of foods. Course topics initially include a review of environmental factors impacting food systems, types of sustainable food systems, historical perspectives, and aspects of human nutrition. Once students master the initial concepts, then into more detailed topics related to production approaches, biotechnology, soil/water quality, and food security on a local, national, and global level will be studied. Counts as a Moral & Ethical Reasoning course. Counts as a Understanding Global Perspectives course.

NTRN 341. Food as Medicine: How What We Eat Influences How We Feel, Think, and Our Health Status. 3 Units.

This course will discuss key aspects of the interplay between food and health/wellness and in particular food synergy - interactions among dietary components and the effects on health. What are "whole foods" vs. basic nutrients? Emphasis will be placed on evaluating human diets and dietary components that optimize health, minimize disease, across diverse cultures and groups as influenced by race, ethnicity, class, and age, to provide new understandings of ethno-cultural practices, variations. What are the most common nutrient deficiencies in men, women and children, including the elderly? Students will learn to interpret dietary recommendations/guidelines and which foods are used to improve digestion, optimize cardiovascular health and immune function, and help prevent cancer. Basic discussion of importance of gut microflora. Diet and body weight; also pros and cons of different dieting strategies. Increasing awareness of "culinary medicine" (i.e. how food acts as an integrated therapy). How what we eat influences how we feel, think and our general health status. There is an integrated culinary experience. Counts as a Human Diversity & Commonality course. Prereq: NTRN 201 or requisites not met permission.

NTRN 342. Food Science. 3 Units.

Chemical, physical and biological properties of food constituents and their interactions in food preparation and processing and practical application of processing methods, their effect on nutritional quality and acceptability, and differences in the use of foods, ingredients, and food constituents based on cultural assumptions, traditions, and experiences; global food biodiversity. Counts as a Understanding Global Perspectives course. Prereq: CHEM 105.

NTRN 342L. Food Science Lab. 2 Units.

Apply knowledge of the physical, chemical, and biological aspects of food and food ingredients to actual experimentation with foods. Acquire understanding of how food ingredients and their interactions and the preparation process influence acceptability of the final food product. Enhance familiarity with safe food handling during preparation and post-preparation. Prereq: CHEM 106. Coreq: NTRN 342.

NTRN 343. Dietary Patterns. 3 Units.

Examination of the food supply in the United States as it is affected by production, processing, marketing, government programs, regulation, and consumer selection. Nutritional evaluation, exploration and appreciation of dietary patterns of the US and different cultures around the globe. Counts as a CAS Global & Cultural Diversity course. Counts as a Human Diversity & Commonality course. Counts as a Understanding Global Perspectives course. Prereq: NTRN 201.

NTRN 344. Nutrigenomics. 3 Units.

This course deals with the understanding, assessment, implementation, and evaluation of nutritional genomics. The emerging discipline of nutritional genomics, or nutrigenetics is the study of the effects of diet on the activity of an individual's genes and health and the study of how different genetic make-ups metabolize nutrients. This course provides the basic concepts and fundamental knowledge of the science that supports the application of nutrigenomics, as well as an understanding of the technologies and strategies for conducting and understanding nutritional genomic research. Prereq: BIOL 214 and NTRN 201.

NTRN 350. Community Nutrition. 3 Units.

This course is an introduction to the field of public health/community nutrition with a focus on four key themes: (1) The role of nutrition in population based health, (2) the multilevel nature of key influences on dietary behavior, (3) moral and ethical considerations in public health nutrition research and practice and (4) written, oral, and multimodal skills needed to be a successful public health nutrition practitioner. Counts as a Communication Intensive course. Counts as a Moral & Ethical Reasoning course. Prereq: Nutrition major and Senior standing or Requisites Not Met permission.

NTRN 351. Food Service Systems Management. 3 Units.

The application of organizational and management theory and skills in the preparation and service of quantity food, including principles of foodservice math. Graduate students will analyze one aspect of food service management policy in depth. This course will count for Social Sciences & Management breadth for students under the Unified General Education Requirements; it will NOT count as STEM & Nursing breadth Offered as NTRN 351 and NTRN 451. Prereq: NTRN 343.

NTRN 355. Molecular Nutrition. 3 Units.

Students will analyze, present, and discuss peer-reviewed research articles that focus on the molecular mechanisms underlying nutrient actions. Students will gain in-depth understanding of the basic science and translational aspects of 'hot topics' that relate nutrition and health. Class will be conducted through interactive discussion of assigned primary research articles. Offered as NTRN 355 and NTRN 455. Prereq: BIOC 307 or BIOC 407 or NTRN 452 or Requisites Not Met permission.

NTRN 360. Clinical Assessment and Diagnosis: Nutritional, Functional, Physical. 3 Units.

Methods for the provision of nutrition services to individuals and groups. Principles of professional practice including ethics, standards, and regulatory issues. Prereq: NTRN 201 and NTRN 363 or MS in Nutrition or MS in Public Health Nutrition.

NTRN 361. Metabolic Dysregulation of Energy from Obesity to Anorexia. 3 Units.

Energy imbalance and the implications on health will be explored in this course. Key concepts covered in this class include: 1. Energy imbalance refers to positive and negative states of energy balance and occurs when energy intake does not match energy expended in metabolic processes, daily living activities, and physical activity; 2. Obesity is a result of chronic positive energy balance whereas anorexia nervosa is a condition of chronic negative energy balance; 3. Energy metabolism is controlled by a complex array of neural and hormonal signaling; 4. Energy imbalance disrupts the neural and hormonal signaling pathways of energy metabolism resulting in unfavorable health consequences such as pro-inflammatory state, oxidative stress, immune dysregulation, menstrual dysfunction, sarcopenia, and low bone mineral density; and 5. Exercise training can impact energy imbalance health-related outcomes. Learning Outcomes: Students will be able to 1. define energy balance and explain the components of energy expenditure; 2. define disordered eating, female athlete triad, and disordered eating; 3. explain the relationship among energy intake, energy expenditure, and body composition in energy imbalance; 4. describe alterations in skeletal muscle and adipose physiology in energy imbalance; 5. diagram neural control of feeding and energy homeostasis and hormonal control of energy metabolism; 6. explain the neural and hormonal changes that occur in chronic energy imbalance and describe current theories in how it results in menstrual dysfunction, inflammatory response, oxidative stress, immune dysregulation, sarcopenia, and low bone mineral density; and 7. explain how exercise training can influence inflammatory response, oxidative stress, immune function, and musculoskeletal health in energy imbalance. Offered as NTRN 361 and NTRN 461. Prereq: NTRN 201 or requisites not met permission.

NTRN 362. Exercise Physiology and Macronutrient Metabolism. 3 Units.

The purpose of this course is to provide students with the knowledge of theoretical and applied concepts of exercise physiology. Students will gain an understanding of the acute and chronic physiological responses and adaptations of the cardiovascular, metabolic, hormonal, and neuromuscular systems in response to exercise. Additional topics include factors effecting performance, assessing cardiorespiratory and muscular fitness, designing exercise programs for health and wellness, special populations, and athletes, environmental considerations and nutrition's role in sport and exercise performance. Offered as NTRN 362 and NTRN 462. Prereq: NTRN 201 and BIOL 216.

NTRN 363. Human Nutrition I: Energy, Protein, Minerals. 3 Units.

Chemical and physiological properties of specific nutrients, including interrelationships and multiple factors, in meeting nutritional needs throughout the life cycle. Prereq: BIOL 216 and (Junior or Senior status).

NTRN 364. Human Nutrition II: Vitamins. 3 Units.

Chemical and physiological properties of vitamins, including interrelationships and multiple factors, in meeting nutritional needs throughout the life cycle. Prereq: NTRN 363.

NTRN 365. Nutrition for the Prevention and Management of Disease: Pathophysiology. 4 Units.

Interplay among etiology, metabolic perturbations, pathophysiology, clinical signs and symptoms, and nutrition principles for the prevention and management of disease. Prereq: NTRN 363 and BIOC 307 or equivalent or consent of instructor.

NTRN 366. Nutrition for the Prevention and Management of Disease: Clinical Applications. 3 Units.

Application of nutrition principles and knowledge for the prevention and management of disease. Case studies and other educational approaches and techniques will be used. Course includes evidence-based assessments and interpretation of key data (biochemical, dietary, physical) to develop nutritional interventions. Coreq: NTRN 365.

NTRN 370. Metabolic, Health, and Nutrition Assessments. 3 Units.

Genetics, nutrient availability, environmental and behavioral factors influence an individual's internal metabolic environment or their 'metabolic health'. Although there is no one universally accepted definition of 'metabolic health', a large body of data demonstrate that longevity, successful aging, well-being and disease risk throughout life is significantly impacted by one's metabolic health. This class combines traditional classroom lectures, case studies, discussions and 'hands-on' skill building labs to learn the validated assessment and screening procedures to assess metabolic health, nutrient status and fitness. Some included topics are body composition, determining energy requirements, hydration and fitness assessments, vitamin/mineral status, using validated screening and malnutrition assessment tools, omega-3 testing, interpreting clinical laboratory data, and a comprehensive review of bogus health tests. This is an excellent class for students interested in a career as a future health care professional. Prereq: Junior standing and (NTRN 201 or NTRN 362 or NTRN 363 or NTRN 388 or NTRN 401 or NTRN 401 or BIOL 216 or PHED 341).

NTRN 371. Special Problems. 1 - 3 Units.

Independent reading, research, or special projects supervised by a member of the nutrition faculty. Prereq: Junior or senior standing.

NTRN 388. Sports & Performance Nutrition. 3 Units.

Through contextualizing the history of sports from ancient times to modern day, students will analyze how athletic training, performance, and recovery is supported through a foundational understanding of nutritional concepts including (but not limited to): macronutrient modifications to meet energy needs (Carbohydrate Loading, Protein's Anabolic Window, the rise of Keto Diets, etc.), micronutrients and hydration considerations (multivitamins, sports beverages/electrolytes, weight cutting, etc.), gender-based nutritional concerns (RED-S/female athlete triad, body composition variations, etc.), and ergogenic aids (supplements, doping/banned substances, etc.). Throughout the course, students will critique and discuss the differences in information provided by lay source materials, controlled clinical research publications, and on-field / in game strategies. Ultimately, this course is designed to give students a broad overview of the complexities of nutrition for enhancing sports performance and provide evidence-based guidelines for where/when/how new athletic milestones can be achieved through nutritional intervention. Recommended Preparation: NTRN 200S. Prereq: NTRN 201.

NTRN 390. Undergraduate Research. 3 - 9 Units.

Guided laboratory research in nutritional biochemistry or molecular nutrition under the sponsorship of a nutrition faculty member.

NTRN 391. Nutrition Honors Research. 1 - 3 Units.

Independent research with an assigned mentor, for students accepted to and enrolled in the Nutrition Honors Program. During their independent research, students work towards completing a research project, preparing a manuscript and public presentation. Students also attend at least two Nutrition Department seminars per semester.

NTRN 397. Research Methods and Disciplinary Communications in Nutrition. 3 Units.

This course focuses on research methodology, how to critically interpret the research literature, and communicating nutrition information to both peer and lay audiences. The course format incorporates lectures, lab sessions where students apply what they have learned, long and short form written assignments, and an oral presentation. Counts as a Disciplinary Communication course. Counts as a SAGES Departmental Seminar course. Prereq: Declared Nutrition or Nutritional Biochemistry and Metabolism major and sophomore standing.

NTRN 397R. SAGES Capstone Proposal Seminar: Research. 3 Units.

This course fulfills the SAGES Department Seminar requirement. As such, it focuses on developing writing and discussion skills in your major area. This course will guide you through the process of selecting and planning your SAGES Capstone Experience to be completed in NTRN 398. Students will be matched to existing faculty nutrition research projects for their capstone experience. Concurrent enrollment with any other SAGES requirement is not permitted. Counts as a SAGES Departmental Seminar course. Prereq: Nutrition major with Junior standing. Completed SAGES First Seminar and both SAGES University Seminars.

NTRN 398. SAGES Senior Capstone Experience. 3 Units.

This course fulfills the SAGES Capstone requirement of a culminating experience in the major with a final public presentation and written report. The project varies year to year but will provide elements of nutrition research and/or nutrition education for the public and assignments to provide scaffolding towards the final presentation and report. Counts as a SAGES Senior Capstone course. Prereq: (Nutrition or Nutritional Biochem and Metabolism Major) and Senior standing.

NTRN 399. Senior Project. 3 Units.

Formal investigation of a topic in nutrition culminating in a paper and oral presentation. Requires definition of a problem, evaluation of the scientific literature and delineation of problem-solving approaches. Recommended preparation: Twenty-one hours of Nutrition.

NTRN 401. Nutrition for Community and Health Care Professionals. 2 - 3 Units.

This course will focus on understanding how diet and nutrition impact health and wellness throughout the life cycle. There are core concepts in human nutrition that all health care providers should understand to optimize their care of individuals, themselves, and the community. These core concepts are the focus of this course. Students who complete all course modules and assignments with a passing grade will earn 2 credits. In order to earn 3 credits, students must complete all course modules and assignments with a passing grade and complete an additional 20 page paper on a nutrition topic approved by the instructor.

NTRN 402. Culinary and Lifestyle Medicine Coaching I. 3 Units.

This course will focus on learning the key components of healthy lifestyle principles* and develop the counseling and behavior change skills necessary to promote these competencies to advocate a healthy lifestyle. Participation in culinary medicine food labs, (which is the blending of the science of nutrition with skills in fundamental cooking and food education) is also a key component of this class. Culinary medicine is designed to foster a greater understanding of the core principles in medical nutrition therapy and foundational food and nutrition education, which is critical to overall well-being. Students will also have the elective opportunity to participate in a Health and Wellness Coaching training certificate from the Academy of Nutrition and Dietetics. Listening to the 4 modules comprising this certificate, (each 60-90 minutes), and completion of a post exam with at least an 80% score will result in a certificate of participation in Health and Wellness Coaching. Module 1 establishes the framework and basic skills; Module 2 is focused on facilitating behavior change; Module 3 explains the technique of using a positive approach to health and wellness coaching and the 4th final module involves application and practice. *Core components of a healthy lifestyle include: A dietary pattern that is calorically sufficient, focused on minimally processed foods in balanced proportions; routine physical activity at recommended levels of intensity, frequency and duration; avoidance of toxins such as alcohol, tobacco and non-medically prescribed drugs; adequate quantity and quality of sleep; mitigating excess stress via a variety of evidence-based stress reduction techniques and strong social bonds.

NTRN 403. Evidence-Based Practice for Healthcare Professionals. 1 Unit.

In this course, students will learn how to use the evidence-based practice process to make decisions and answer questions in a clinical setting. This course may be appropriate for any student pursuing a career in healthcare, however the examples and cases used in class focus on nutrition-related issues. Prereq: Graduate student standing.

NTRN 410. Basic Oxygen & Physiological Function. 3 Units.

On-line lecture only course which explores the significance and consequences of oxygen and oxygen metabolism in living organisms. Topics to be covered include transport by blood tissues, oxygen toxicity, and mitochondrial metabolism. Emphasis will be placed on mammalian physiology with special reference to brain oxidative metabolism and blood flow as well as whole body energy expenditure and oxidative stress related to disease. The course will cover additional spans of physiology, nutrition and anatomy. Offered as NTRN 410 and PHOL 410.

NTRN 433. Advanced Human Nutrition I. 4 Units.

Emphasis on reading original research literature in energy, protein and minerals with development of critical evaluation and thinking skills. Recommended preparation: NTRN 201 and CHEM 223 and BIOL 348 or equivalent.

NTRN 434. Advanced Human Nutrition II. 3 Units.

Emphasis on reading original research literature on vitamins with development of critical evaluation and thinking skills. Recommended preparation: NTRN 433 or consent.

NTRN 435. Nutrition During Pregnancy. 3 Units.

Study of current research literature on nutrition for pregnancy and lactation including nutrient requirements, nutrition assessment, and nutrition intervention. Prereq: Graduate Student in Nutrition or Public Health Nutrition.

NTRN 436. Pediatric Nutrition. 3 Units.

This course will focus on understanding the nutritional needs of infants, children and adolescents. Evidence based guidelines will be used as we discuss best clinical practice for the management of pediatric nutrition issues. Anthropometric measurements used in growth assessment will be reviewed. Nutrient requirements for each stage of development will be explored with a specific focus on micronutrients relevant to pediatrics such as fluoride, iron, calcium and vitamin D. Abnormal growth resulting in malnutrition and obesity will be examined with a focus on prevention, diagnosis and treatment. Skills necessary to complete a pediatric nutrition assessment will be reviewed with opportunities to practice and demonstrate competency. Prereq: NTRN 435.

NTRN 437. Nutrition Communication, Counseling and Behavior Change Strategies. 3 Units.

How do we help someone make a dietary behavior change, such as choosing a side salad instead of fries when eating a hamburger? Yes, it is a very challenging task and most often, providing just nutrition education is not sufficient. Therefore, the focus of this course is to prepare students for their future career by providing fundamental knowledge about human decision making and developing communication skills that can help improve others nutritional well-being. In addition, the course will critically evaluate and interpret nutrition information for the consumer. Changes in food marketing and sources of nutrition information for consumers over the past five decades will be analyzed and discussed. Furthermore, the impact of nutrition labeling, the food industry and food marketing on the dietary intake of Americans and various demographic groups in the U.S. will be studied. Offered as NTRN 337 and NTRN 437 Counts as a Human Diversity & Commonality course. Prereq: NTRN 201 or Requisites Not Met permission.

NTRN 438. Dietary Supplements. 3 Units.

An examination of dietary supplements specific to health promotion and disease prevention/treatment throughout the life cycle. Topics and concepts include regulation, controversies, safety, efficacy, and the surrounding scientific evidence for dietary supplement use. For NTRN 338, preference will be given to senior level Nutrition majors. Offered as NTRN 338 and NTRN 438. Prereq: NTRN 364 or requisites not met permission.

NTRN 440. Nutrition for the Aging and Aged. 3 Units.

Consideration of the processes of aging and needs which continue throughout life. The influences of food availability, intake, economics, culture, physical and social conditions and chronic disease as they affect the ability of the aged to cope with living situations. Prereq: Graduate student standing.

NTRN 441. Human Lactation. 3 Units.

This course explores the complexities and importance of human milk and breastfeeding. Using lectures, group discussion, and experiential learning we will explore the following topics: nutrition and development in the breastfeeding infant/mother dyad; the physiology of breastfeeding; maternal and infant disease states and their effects on breastfeeding; common pathologies in breastfeeding; pharmacology and breastfeeding; psychological, social, and cultural issues and breastfeeding; clinical skills and techniques in advising the breastfeeding mother; public health, ethical, and legal issues in breastfeeding and breastfeeding advocacy; current research topics in breast milk and breastfeeding; and options for certification in lactation education. Prereq: NTRN 363 or NTRN 433 or NTRN 401 or Requisites Not Met permission.

NTRN 448. Integrative and Functional Nutrition. 3 Units.

An examination of the core concepts and principles surrounding integrative and functional medical nutrition therapy (IFMNT). The course will emphasize a whole systems approach to addressing clinical imbalances and creating personalized therapeutic interventions based upon an individual's genetics, environment and lifestyle. Topics include precision medicine, IFMNT nutrition care plan processes, IFMNT laboratory tests and interpretation, dietary supplementation, and discussion of the evidence for integrative therapeutic nutrition/diet plans related to the gut microbiome/gastrointestinal disorders, food sensitivity/intolerance, methylation, immune function, detoxification, cardiometabolic intervention, energy, hormones, and wellness.

NTRN 451. Food Service Systems Management. 3 Units.

The application of organizational and management theory and skills in the preparation and service of quantity food, including principles of foodservice math. Graduate students will analyze one aspect of food service management policy in depth. This course will count for Social Sciences & Management breadth for students under the Unified General Education Requirements; it will NOT count as STEM & Nursing breadth. Offered as NTRN 351 and NTRN 451. Prereq: Nutrition major.

NTRN 452. Nutritional Biochemistry and Metabolism. 3 Units.

Mechanisms of regulation of pathways of intermediary metabolism; amplification of biochemical signals; substrate cycling and use of radioactive and stable isotopes to measure metabolic rates. Recommended preparation: BIOC 307 or equivalent. Offered as BIOC 452 and NTRN 452.

NTRN 454. Advanced Nutrition and Metabolism: Investigative Methods. 3 Units.

Lecture/discussion course on the use of analytical techniques in metabolic research on whole body metabolism, energy balance, and disease (diabetes, obesity, and neuropathologies); discussions include the design of in-vitro and in-vivo investigative protocols in humans and animals using stable isotope tracer and mass spectrometric analysis; critical interpretation of data from the literature with emphasis on metabolic pathway identification, regulation and kinetics. Recommended preparation: BIOC 407.

NTRN 455. Molecular Nutrition. 3 Units.

Students will analyze, present, and discuss peer-reviewed research articles that focus on the molecular mechanisms underlying nutrient actions. Students will gain in-depth understanding of the basic science and translational aspects of 'hot topics' that relate nutrition and health. Class will be conducted through interactive discussion of assigned primary research articles. Offered as NTRN 355 and NTRN 455. Prereq: BIOC 307 or BIOC 407 or NTRN 452 or Requisites Not Met permission.

NTRN 456. Pediatric Obesity. 3 Units.

This is an upper-level, discussion- and case-based course. This course will examine the epidemiology, potential causes, assessment, and treatment of pediatric obesity. Special topics from the current pediatric obesity literature will also be covered. This course has a large discussion component and incorporates weekly readings from the scientific literature. Class sessions take place via synchronous, web-based video conferencing with additional asynchronous video lectures and course work each week. Prereq: MS student in Nutrition or Requisites Not Met permission.

NTRN 459. Diabetes Prevention and Management. 3 Units.

In this course, we will explore the diabetes epidemic, its effects on the healthcare system, and strategies for prevention. The pathophysiology of the disease will be examined as well as environmental factors leading to the increase in diagnoses. Comorbid conditions and acute and chronic complications of diabetes and hyperglycemia will be addressed. Rationale for current therapeutic strategies will be explored, including the use of blood glucose monitoring, physical activity, nutrition counseling, oral medications, and insulin therapy. Patient education and health literacy will be studied in the context of patient centered goal setting. Requirements for developing a Diabetes Self-Management Education Program will be discussed. Community program development will be examined in the context of population-based prevention strategies. Prereq: Graduate Standing.

NTRN 460. Sports Nutrition. 3 Units.

Study of the relationships of nutrition and food intake to body composition and human performance. Laboratory sessions include demonstrations of body composition and fitness measurements and participation in a research project. Recommended preparation: NTRN 363 or NTRN 433 or consent.

NTRN 461. Metabolic Dysregulation of Energy from Obesity to Anorexia. 3 Units.

Energy imbalance and the implications on health will be explored in this course. Key concepts covered in this class include: 1. Energy imbalance refers to positive and negative states of energy balance and occurs when energy intake does not match energy expended in metabolic processes, daily living activities, and physical activity; 2. Obesity is a result of chronic positive energy balance whereas anorexia nervosa is a condition of chronic negative energy balance; 3. Energy metabolism is controlled by a complex array of neural and hormonal signaling; 4. Energy imbalance disrupts the neural and hormonal signaling pathways of energy metabolism resulting in unfavorable health consequences such as pro-inflammatory state, oxidative stress, immune dysregulation, menstrual dysfunction, sarcopenia, and low bone mineral density; and 5. Exercise training can impact energy imbalance health-related outcomes. Learning Outcomes: Students will be able to 1. define energy balance and explain the components of energy expenditure; 2. define disordered eating, female athlete triad, and disordered eating; 3. explain the relationship among energy intake, energy expenditure, and body composition in energy imbalance; 4. describe alterations in skeletal muscle and adipose physiology in energy imbalance; 5. diagram neural control of feeding and energy homeostasis and hormonal control of energy metabolism; 6. explain the neural and hormonal changes that occur in chronic energy imbalance and describe current theories in how it results in menstrual dysfunction, inflammatory response, oxidative stress, immune dysregulation, sarcopenia, and low bone mineral density; and 7. explain how exercise training can influence inflammatory response, oxidative stress, immune function, and musculoskeletal health in energy imbalance. Offered as NTRN 361 and NTRN 461. Prereq: NTRN 201 or requisites not met permission.

NTRN 462. Exercise Physiology and Macronutrient Metabolism. 3 Units.

The purpose of this course is to provide students with the knowledge of theoretical and applied concepts of exercise physiology. Students will gain an understanding of the acute and chronic physiological responses and adaptations of the cardiovascular, metabolic, hormonal, and neuromuscular systems in response to exercise. Additional topics include factors effecting performance, assessing cardiorespiratory and muscular fitness, designing exercise programs for health and wellness, special populations, and athletes, environmental considerations and nutrition's role in sport and exercise performance. Offered as NTRN 362 and NTRN 462. Prereq: Nutrition Major.

NTRN 470A. Nutrient Drug Interactions: Introduction. 1 Unit.

We rely on the gastrointestinal system for processing not only food and beverages but also drugs. The mass of ingested food (100's of grams) exceeds that of most drugs (a few mg) by 10,000-fold or more. Nutrients and drugs follow similar processes through absorption, distribution, metabolism and excretion. Nutritional state is also a powerful determinant of drug action. Drugs have potent effects on nutritional status. Conversely, nutrition modifies the action of drugs. Herbal supplements and functional foods have properties of both foods and drugs, but are regulated by the FDA as foods. Flavonoids from foods have mild medicinal properties and interact with multiple drug metabolizing pathways. Current teaching around nutrient-drug interactions consists almost entirely of listings of potential interactions, or interactions that have been reported in humans as seldom as a single instance. Fortunately, most nutrient drug interactions are not dangerous and have a low potential for seriousness. Clinical impact is great only for those drugs with a low therapeutic index, meaning that the threshold concentration for toxicity is close to the concentration needed for therapeutic efficacy. To identify these potentially life-threatening interactions, health care professionals should learn more about the principles of pharmacology. Electrolyte imbalances such as high or low plasma levels of potassium, magnesium and calcium are a common side effect of frequently prescribed medications. The role of nutrition habits and preferences in the incidence and severity of these side effects is not known. NTRN 452 is recommended but not required. Prereq: Graduate standing.

NTRN 470B. Nutrient Drug Interactions: Pharmacology. 1 Unit.

Foods affect every stage of drug kinetics from dissolution of tablets and capsules, through absorption, distribution, metabolism and excretion. Nutritional state is also a powerful determinant of drug action. Herbal supplements and functional foods have properties of both foods and drugs, but are regulated by the FDA as foods. Flavonoids from foods have mild medicinal properties and interact with multiple drug metabolizing pathways. Current teaching around nutrient-drug interactions consists almost entirely of listings of potential interactions, or interactions that have been reported in humans as seldom as a single instance. Fortunately, most nutrient drug interactions are not dangerous and have a low potential for seriousness. Clinical impact is great only for those drugs with a low therapeutic index, meaning that the threshold concentration for toxicity is close to the concentration needed for therapeutic efficacy. To identify these potentially life-threatening interactions, dieticians and other health care professionals should learn more about the principles of pharmacology. Prereq: Graduate standing and NTRN 470A.

NTRN 470C. Nutrient Drug Interactions: Clinical Applications. 1 Unit.

The clinical management of patients and clients must integrate pharmacotherapeutics with nutrition based care plans. Drugs can affect nutritional needs and conversely nutrition can modify the efficacy of drugs. Disease states modify the actions of both nutrients and drugs as well as their interactions. Distinct nutrient-drug interactions are prominent in different patient populations. NTRN 452 is recommended but not required. Prereq: Graduate standing and NTRN 470A.

NTRN 501. Cultural Influences on Nutrition Practice: Seminar. 1 Unit.

Through book discussions and guest speakers, explore cultures, cultural foods, norms, and meanings of food and/or healthcare and be prepared to practice in a manner aligned with the principles of cultural humility.

NTRN 502. Advanced Nutrition Practice: Seminar. 1 Unit.

This course is a close examination of the focus area standards of practice in nutrition and dietetics, with an emphasis on the activities completed by an expert or advanced practice practitioner in each area. Weekly seminar speakers who are advanced practitioners in each area will explain their roles/responsibilities and how they developed their skills to achieve the advanced practice level.

NTRN 516. Seminar in Dietetics I. 3 Units.

Study of evidence-based guidelines for dietetic practice in medical nutrition therapy. Emphasis on life cycle stages and common disease states that require specialized nutrition care. Enrollment restricted to those accepted into Case Coordinated Dietetic Internship/Master Degree Program.

NTRN 517. Seminar in Dietetics II. 3 Units.

Study of scientific basis for clinical and community nutrition practice and developments in food service systems management. Recommended preparation: Dietetic internship.

NTRN 528. Introduction to Public Health Nutrition. 3 Units.

An introduction to the field of public health/community nutrition with a focus on three key themes: (1) The role of nutrition in population based health, (2) the multilevel nature of key influences on dietary behavior, and (3) skills needed to be a successful public health practitioner. Prereq: Graduate Student in Nutrition or Public Health Nutrition or Requisites Not Met permission.

NTRN 529. Nutritional Epidemiology. 3 Units.

Poor diet is the leading risk factor for death worldwide, with approximately 1 in 5 deaths being linked to poor diet quality, underscoring the importance of research methods to examine the linkage between diet and disease. This course is designed to introduce students to key concepts and methods in Nutritional Epidemiology in the design, analysis, and critical evaluation of population-based nutrition research. There will be a focus on dietary assessment methodology and nutritional epidemiological research methods. Students will gain an understanding of the skills needed to design, analyze, interpret and critically evaluate population-based nutrition research focusing on the relationship between diet and chronic diseases.

NTRN 530. Public Health Nutrition. 3 Units.

Exploration of the professional role of the Public Health Dietitian/Nutritionist with a focus on three key themes: (1) The conduct of research and interpretation of research findings related to public health nutrition; (2) development of skills in the domains of public health management, program design and implementation, and communications and marketing; and (3) approaches to thinking about public health more broadly through the use of entrepreneurship and community building. Prereq: Graduate Student in Nutrition or Public Health Nutrition or Requisites Not Met permission.

NTRN 531. Supervised Practice in Nutrition and Dietetics. 1 - 3 Units.

Individually planned supervised practice in clinical, food service, or community/public health setting. Designed to meet competencies for ACEND accredited dietetic internship programs. Prereq: Graduate student in the Nutrition Dietetic Internship program.

NTRN 532. Specialized Supervised Practice in Nutrition and Dietetics. 1 - 3 Units.

Individually planned supervised practice in clinical, food service, or community/public health setting. Designed to meet competencies for ACEND accredited dietetic internship programs. Prereq: Graduate student in the Nutrition Dietetic Internship program.

NTRN 533. Nutritional Care of Neonate. 3 Units.

Nutritional assessment and management of high-risk newborns with emphasis on prematurity and low birth weight. Review of current literature coordinated with remote, synchronous lectures and class discussions. Issues on follow-up included. Recommended preparation: NTRN 435 or consent.

NTRN 534. Advanced Supervised Practice in Nutrition and Dietetics. 1 - 6 Units.

Individually planned supervised practice in clinical, food service, or community/public health setting. Designed to meet competencies for ACEND accredited dietetic internship programs. Prereq: Graduate student in the Nutrition Dietetic Internship program.

NTRN 550A. Advanced Community Nutrition. 3 Units.

An introduction to the field of public health/community nutrition with a focus on three key themes: (1) The role of nutrition in population based health, (2) the multilevel nature of key influences on dietary behavior, and (3) skills needed to be a successful public health practitioner. Prereq: Senior Nutrition major or Requisites Not Met permission.

NTRN 551. Seminar in Advanced Nutrition. 1 Unit.

Ph.D. students meet weekly to discuss topical journal articles. Students gain experience in critical evaluation of research and develop presentation/communication skills. Discussion of research integrity and ethics. Students participate in departmental seminars with invited speakers.

NTRN 559. Seminar in Diabetes: Advanced Concepts and Current Trends. 3 Units.

This course is designed for students wishing to gain additional knowledge in diabetes management, beyond the basic concepts covered in NTRN 459. In the first half of this course, students will explore advanced concepts in diabetes prevention and management including population-based prevention strategies, diagnosis and treatment of atypical forms of diabetes, emerging theories related to the root and contributing cause(s) of type 1 and type 2 diabetes, the use of technology to manage blood glucose (CGMs, closed loop systems, apps, etc), management of complications, and therapies in development and/or under investigation. The second half of the course will cover current concepts of interest to the students, in seminar form. Students will identify topics of interest as a group and then students will individually (with instructor assistance) identify and lead the discussion of a paper related to one of the concepts. Examples of topics include but are not limited to diabetes during pregnancy, role of the gut microbiome in DM development and management, pancreas and islet cell transplantation, and COVID-19 and the development of T2D. Prereq: NTRN 459 and Graduate Student standing.

NTRN 561. Investigative Methods in Nutrition. 1 - 4 Units.

Research methods appropriate for nutrition. Methods for conducting research in nutrition and food sciences, food service management and dietetics. Designing research proposals. Prereq: Nutrition major.

NTRN 562. Research Practicum. 1 - 4 Units.

Students will participate in nutrition-related research activities that employ a variety of research methodologies (clinical research, bench science, surveys, systematic reviews, etc.). Students will be engaged in the acquisition of scientific data, and data entry, analysis and interpretation.

NTRN 601. Special Problems. 1 - 18 Units.**NTRN 602. Special Project in Nutrition. 1 - 3 Units.**

Under the supervision of the instructor, the student will develop and/or implement an individual or group special project in global nutrition, community nutrition, wellness, or other area of food and nutrition practice. Prereq: Graduate Standing.

NTRN 610. Oxygen and Physiological Function. 1 Unit.

Lecture/discussion course which explores the significance and consequences of oxygen and oxygen metabolism in living organisms. Topics to be covered include oxygen transport by blood tissues, oxygen toxicity, and mitochondrial metabolism. Emphasis will be placed on mammalian physiology with special reference to brain oxidative metabolism and blood flow as well as whole body energy expenditure and oxidative stress related to disease. The course will cover additional spans of physiology, nutrition and anatomy. Offered as ANAT 610, NTRN 610, and PHOL 610.

NTRN 651. Thesis M.S.. 1 - 18 Units.

(Credit as arranged.)

NTRN 701. Dissertation Ph.D.. 1 - 9 Units.

(Credit as arranged.) Prereq: Predoctoral research consent or advanced to Ph.D. candidacy milestone.