

# NUTRITIONAL SCIENCES (NUTRS)

*Any experimental courses offered by NUTRS can be found at:*

registrar.iastate.edu/faculty-staff/courses/explisting/ (<http://www.registrar.iastate.edu/faculty-staff/courses/explisting/>)

**Courses primarily for graduate students, open to qualified undergraduates:**

## **NUTRS 501: Biochemical and Physiological Basis of Nutrition: Macronutrients and Micronutrients**

(4-0) Cr. 4. F.

*Prereq: Credit or enrollment in BBMB 404 or BBMB 420*

Integration of the molecular, cellular, and physiologic aspects of energy, macronutrient, and micronutrient metabolism in mammalian systems. Survey course that includes interactions among nutrients (dietary carbohydrate, fiber, lipid, protein, vitamins, and minerals) and non-nutrients, metabolic consequences of nutrient deficiencies or excesses, relevant polymorphisms, epigenetics, and major research methodologies.

## **NUTRS 504: Nutrition and Epigenetic Regulation of Gene Expression**

(1-0) Cr. 1. Alt. S., offered even-numbered years.

*Prereq: graduate standing; undergraduate with consent of instructor*

Discussion of epigenetic regulation of gene expression and the role that nutrition plays in this process. Examination of current research literature to understand how different nutrients and physiological states influence epigenetics, as well as, the research methodology used to address these relations.

## **NUTRS 505: Short Course**

(1-0) Cr. 1. Repeatable. SS.

*Prereq: Permission of instructor*

## **NUTRS 518: Digestive Physiology and Metabolism of Non Ruminants**

(Cross-listed with AN S). (3-0) Cr. 3. Alt. S., offered odd-numbered years.

*Prereq: AN S 419 or NUTRS 501*

Digestion and metabolism of nutrients. Nutritional requirements and current research and feeding programs for poultry and swine.

## **NUTRS 520: Digestive Physiology and Metabolism of Ruminants**

(Cross-listed with AN S). (2-2) Cr. 3. Alt. S., offered even-numbered years.

*Prereq: AN S 419 or NUTRS 501*

Digestive physiology and nutrient metabolism in ruminant and peruminant animals.

## **NUTRS 542: Introduction to Molecular Biology Techniques**

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS.

Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

## **NUTRS 542A: Introduction to Molecular Biology Techniques: DNA Techniques**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. F.S.

Includes genetic engineering procedures, sequencing, PCR, and genotyping. Offered on a satisfactory-fail basis only.

## **NUTRS 542B: Introduction to Molecular Biology Techniques: Protein**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, VDPAM). Cr. 1. Repeatable. S.SS.

*Prereq: Graduate classification*

Techniques. Includes: fermentation, protein isolation, protein purification, SDS-PAGE, Western blotting, NMR, confocal microscopy and laser microdissection, Immunophenotyping, and monoclonal antibody production. Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

## **NUTRS 542C: Introduction to Molecular Biology Techniques: Cell Techniques**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. F.S.

Includes: immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection. Offered on a satisfactory-fail basis only.

## **NUTRS 542D: Introduction to Molecular Biology Techniques: Plant Transformation**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. S.

Includes: Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of transformants. Offered on a satisfactory-fail basis only.

## **NUTRS 542E: Introduction to Molecular Biology Techniques: Proteomics**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. F.

Includes: two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. Offered on a satisfactory-fail basis only.

**NUTRS 542F: Introduction to Molecular Biology Techniques:**

**Metabolomics**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. F.

Includes: metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects. Offered on a satisfactory-fail basis only.

**NUTRS 542G: Introduction to Molecular Biology Techniques: Genomic**

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NREM, V MPM, VDPAM). Cr. 1. Repeatable. S.

Offered on a satisfactory-fail basis only.

**NUTRS 549: Advanced Vertebrate Physiology I**

(Cross-listed with AN S, KIN). (4-0) Cr. 4. F.

*Prereq: recommended: an undergraduate physiology course and a biochemistry course*

Overview of mammalian physiology. Cell biology, endocrinology, cardiovascular, respiratory, immune, digestive, skeletal muscle and reproductive systems.

**NUTRS 561: Medical Nutrition and Disease I**

(Dual-listed with FS HN 461). (4-0) Cr. 4. F.

*Prereq: FS HN 360, FS HN 361, FS HN 367; plus BIOL 256 and 256L or BIOL 335*

Pathophysiology of selected chronic disease states and their associated medical problems. Specific attention will be directed to medical nutrition needs of patients in the treatment of each disease state to optimize nutritional status and improve health.

**NUTRS 562: Advanced Nutrition Assessment**

(4-0) Cr. 4. F.

*Prereq: Acceptance in the Master of Professional Practice in Dietetics program.*

Overview and practical applications of methods for assessing nutritional status, including: theoretical framework of nutritional health and disease, dietary intake, biochemical indices, nutrition focused physical exam, and body composition across the life cycle. Activities designed to meet accreditation standards. Offered online only.

**NUTRS 563: Community Nutrition and Health**

(3-0) Cr. 3. F.

*Prereq: FS HN 265 or FS HN 360; FS HN 361*

Dual listed with FS HN 463. Survey of current public health nutrition problems among nutritionally vulnerable individuals and groups.

Discussion of the multidimensional nature of those problems and of community programs addressing them. Grant writing as a means for funding community nutrition program development. Significant emphasis on written and oral communication at the lay and professional level. Field trip.

**NUTRS 564: Medical Nutrition and Disease II**

(3-0) Cr. 3-4. S.

*Prereq: FS HN 360, FS HN 461, or NUTRS 561.*

(Dual listed with FS HN 464.) Pathophysiology of selected acute and chronic disease states and their associated medical problems. Specific attention will be directed to medical nutrition needs of patients in the treatment of each disease state to optimize nutritional status and promote health.

**NUTRS 589: Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology**

(Cross-listed with FS HN, GERON, NEURO, PSYCH). Cr. 2. S.

*Prereq: Graduate standing, or undergraduate with consent of instructor.*

Structural, functional, and biochemical aspects of brain and non-motor behavior across the human lifespan. Types of neuroimaging used to assess the brain. Current research is leveraged to gauge how nutrition, diseases related to nutrition, and associated physiological processes influence the brain, particularly for common developmental, psychological, and neurological disorders.

**Courses for graduate students:**

**NUTRS 618: Vitamins and Minerals**

(Cross-listed with AN S). Cr. 2. Alt. S., offered even-numbered years.

*Prereq: Biochemistry, physiology, basic nutrition*

Understanding molecular aspects of vitamin and mineral metabolism and homeostasis in humans and animals. An in-depth examination of the chemistry of vitamins and minerals, including genetic mutations, proteins involved in absorption and excretion, and their necessity in biological processes.

**NUTRS 619: Advanced Nutrition and Metabolism - Protein**

(Cross-listed with AN S). (2-0) Cr. 2.

*Prereq: BBMB 405*

Digestion, absorption, and intermediary metabolism of amino acids and protein. Regulation of protein synthesis and degradation. Integration of cellular biochemistry and physiology of mammalian protein metabolism.

**NUTRS 620: Advanced Nutrition and Metabolism - Energy**

(Cross-listed with AN S). (2-0) Cr. 2. Alt. S., offered odd-numbered years.

*Prereq: BBMB 405*

Energy constituents of feedstuffs and energy needs of animals as related to cellular biochemistry and physiology. Interpretations of classical and current research.

**NUTRS 680: Modern Views of Nutrition**

Cr. R. Repeatable. F.

Current concepts in nutrition and related fields.

**NUTRS 690: Special Problems**

Cr. arr. Repeatable. F.S.SS.

**NUTRS 695: Grant Proposal Writing**

(Cross-listed with FS HN). (1-0) Cr. 1. F.

*Prereq: 3 credits of graduate course work in food science and/or nutritional sciences*

Grant proposal preparation experiences including writing and critiquing of proposals and budget planning. Understanding the grant funding process from federal, foundation, and commodity agencies. Includes preparing a grant for possible submission and participation in the review of proposals. Discussion of the role of successful grant writing in career development.

**NUTRS 699: Research in Nutritional Sciences**

Cr. arr. F.S.SS.

Offered on a satisfactory-fail basis only.