

Division of Nutritional Sciences

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The Division

The field of nutrition is complex, with a breadth that ranges from the subcellular chemistry of nutrients to the economic policies that determine world food supplies. At Cornell, the intricate relationships of food, diet, and health are studied in the Division of Nutritional Sciences. The division, which bridges the College of Human Ecology and College of Agriculture and Life Sciences, brings together specialists from the physical, biological, and social sciences to form one of the most complete nutrition programs in the country. Dedicated to both the discovery and application of knowledge, the faculty in the division conduct undergraduate and graduate teaching; public service, primarily through Cooperative Extension; and research programs in many aspects of human nutrition.

Most undergraduates who major in nutrition are admitted through the College of Human Ecology and must meet the admission and graduation requirements of that college. Undergraduates in the College of Agriculture and Life Sciences may also develop a nutritional sciences concentration through the general studies program. Courses in the division may be used to meet graduation requirements in both colleges.

The undergraduate major, combining basic and professional courses, offers students several career options after graduation. Students are trained for a variety of entry-level positions in nutrition and health, including laboratory research, consumer affairs, nutrition education, and community service. A dietetic internship is another route open to nutrition majors. All students graduate with a solid foundation for advanced study, and many continue in such fields as nutrition, food science, medicine, other health sciences, biological sciences, education, and social services. A nutritional sciences concentration can also be combined with other majors in human ecology or agriculture and life sciences.

The Major

All nutritional science majors essentially spend their first two years meeting common core requirements in the sciences and humanities. There is some choice among the required basic sciences, depending on the student's background and career goals, but choices usually include general and organic

chemistry, general biology, biochemistry, and microbiology. Introductory courses in food and nutrition and in economics, sociology, or psychology are required as well.

The mathematics requirement is based on the results of the Cornell mathematical test, which all entering students take during orientation week. Students who have high scores on this test are not required to take additional courses in mathematics.

By their junior year, students take the more specialized courses recommended for the five major emphases described below. The common core ensures that they can move into any emphasis, or change emphases, while it provides the foundation for advanced work in foods or nutritional science.

Foods. Students who elect this emphasis concentrate on basic and applied science courses, including physiochemical aspects of food and laboratories in experimental methods. They study the composition and treatment of food and how these affect food quality, safety, acceptability, and nutritive value.

Consumer food and nutrition. This emphasis prepares students to apply the nutritional and food sciences to consumers' questions about food quality, safety, cost, and nutritive value. Course work in communications, economics, government, public policy, and marketing is added to the nutritional sciences core.

Community nutrition. This emphasis gives students the skills to help people translate nutritional knowledge into action. It provides a strong background in basic and nutritional sciences, but also includes supporting courses in the social sciences and communications. Practical experience through supervised field study is strongly recommended.

Clinical nutrition. This emphasis builds on the basic science core to form a solid foundation in the biological aspects of human nutrition. Designed for students interested in pursuing advanced study in human nutrition or medicine, the program stresses courses and laboratory work in the natural and biological sciences.

Nutritional biochemistry. This basic science-oriented curriculum prepares students for advanced study in the nutritional and biomedical sciences. Students who want to explore more broadly the scientific basis of food and nutrition may decide to concentrate in this area. Courses and laboratory work in chemistry, biochemistry, and physiology help develop a deeper understanding of nutrient action at the subcellular level.

Students with interests in the field of applied nutrition should consider fulfilling the requirements for membership or registration (or both) in the American Dietetic Association (ADA). To do this, students must complete courses in the basic requirements and one area of specialization. The areas of specialization include general dietetics, management, clinical nutrition, and community nutrition.

Evaluation of academic qualifications for membership in the ADA should be completed prior to graduation. Seniors should initiate this academic evaluation process in March if they will be graduating the following January, and in September if they will be graduating the following May. All students who will complete the academic requirements by graduation should participate in the evaluation process while at Cornell. Students who meet most but not all of the academic requirements are encouraged to have their academic work evaluated so that deficiencies can be identified and documented. Additional information about the dietetic programs at Cornell may be obtained from Rose Marie Holmes, 314 Martha Van Rensselaer Hall, and Joan M. L. Koch, 373 Martha Van Rensselaer Hall.

The core and professional courses required in each emphasis represent the minimum course work. In general, more course work will be necessary in the sciences and in food and nutrition for specific career goals. Many graduate schools require a year of college mathematics, biology, physics, and organic chemistry for entrance. Students interested in preparing for medical careers should consult the University's Health Careers Office.

Academic Advising

Every nutritional sciences major is assigned a faculty adviser from the Division of Nutritional Sciences, and an effort is made to match the professional interests of students and adviser. If the student's interests change, he or she may change advisers.

Advising clinics are held during course registration each semester to help students plan their programs of study. Regular conferences with the faculty adviser are *required* at least twice a year. The adviser not only helps to plan course work, but also can help students identify special experiences and career choices. Although advisers must sign the green schedule card during course enrollment each term, it is the student's responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for the major and the college.

Questions about the advising system and about the undergraduate major in nutritional sciences should be addressed to Marjorie Devine, associate director for academic affairs, 334 Martha Van Rensselaer Hall.

Special Opportunities

The division's Learning Resources Center, featuring a reading room and audio-visual materials on a great variety of nutrition topics, is open weekdays for use by individuals or groups. These materials are useful to supplement class work, for special projects, or for independent study. In cooperation with a faculty member, students may earn credit for developing audiovisual presentations on selected topics.

Undergraduate students are often able to work closely with faculty members on laboratory projects or in field research. Independent study courses (Directed Readings, Empirical Research, or Supervised Fieldwork) provide more diverse or intensive experience than can be gained in the classroom.

Field experience can be arranged through independent study, as a class project (Nutritional Sciences 302, 445), or as a summer field study, for two or more credits. Students specifically interested in fieldwork in community nutrition should contact the Division of Nutritional Sciences field study coordinator, or Shiriki Kumanyika, assistant professor of community nutrition.

Honors Program

The honors program, leading to a bachelor of science degree with honors in nutritional sciences, is designed to challenge the academically talented undergraduate. Students are expected to evaluate research findings and design an independent project. They are given the opportunity to do an independent piece of research, which may be empirical or may deal with policy and program development.

The honors committee considers applications from sophomores majoring in nutrition during the spring semester of each year. Criteria for selection include scholastic achievement in the sciences and professional courses, cumulative grade point average, and motivation for independent study. Other students, including those transferring to a nutrition major as juniors, are considered upon written request. The deadline for entry into the program is the beginning of the second semester of the junior year.

Courses Recommended for Nonmajors

Courses in the division are open to all students of the University. For nonmajors, courses in nutritional science can strengthen preparation for careers in biological science, medicine, agriculture, food science, human services, and other fields.

Introductory courses in nutrition (Nutritional Sciences 115) and food (Nutritional Sciences 146), as well as some special-interest courses (NS 222, Maternal and Child Nutrition; NS 325, Sociocultural Aspects of Food and Nutrition; NS 346, Consumer Food Issues; and NS 457, National and International Food Economics) are open to all students. Nonmajors who have taken college courses in chemistry, biological sciences, and nutritional sciences may elect advanced food and nutrition courses.

Graduate Programs

Graduate study is administered by the graduate Field of Nutrition, a group of more than forty faculty members from throughout the University who have a common interest in nutritional problems. In the M.S. and Ph.D. degree programs, students may major in human nutrition, animal nutrition, international nutrition, foods, nutritional biochemistry, or general nutrition. A professional Master of Nutritional Sciences (M.N.S.) degree in clinical nutrition combines academic study on campus with clinical training at affiliated institutions.

The specialties and interests represented in the Field of Nutrition provide almost unlimited opportunity for graduate study. Cornell's extensive laboratory and agricultural facilities ensure that students in experimental nutrition have exceptional choice and thorough training. There are opportunities to work with community and federal agencies, which broaden the human nutrition major; and students in international nutrition are expected to conduct their dissertation projects abroad.

More-detailed information about the graduate degrees is found in the brochure *Graduate Study in Nutrition*, available from the Graduate Faculty Representative, Field of Nutrition, Savage Hall, Cornell University, Ithaca, New York 14853.

Nutritional Sciences Courses

115 Ecology of Human Nutrition and Food Fall and spring. 3 credits. Prerequisites: fall: high school biology (juniors and seniors with advanced biological science background must have permission of the instructor); spring: a one-semester college biology course or permission of the instructor. S-U grades optional. Cost of handouts and pamphlets, \$3.

Fall: M W F 9:05; spring: M W F 11:15. Discs scheduled in place of some lec's. Students should have one of the following times free: W 4:25, W 7 p.m., R 3:35, R 4:25, or F 12:20. Evening prelims to be arranged. M. Devine.

An introduction to the field of human nutrition and food. Includes study of human nutritional needs; problems encountered in providing food to meet nutritional needs; relationships among physiological needs, sociocultural systems, food, and the significance of these relationships to the attainment of health. Discussion of current issues, such as vegetarianism, weight control, and dietary goals, is included.

146 Introductory Foods Fall and spring. 3 credits. Each section limited to 16 students. Prerequisite: NS 115 or concurrent registration and permission of instructor during course registration (permission-

of-instructor forms must be obtained from and returned to 335 Martha Van Rensselaer Hall). Cost of handouts, \$2.

Fall: lec, M 12:20; labs, T R 10:10–12:05 or 2:30–4:25. Spring: lec, M 10:10; labs, W F 10:10–12:05 or T R 10:10–12:05 or T R 2:30–4:25. M. Pimentel.

Criteria for evaluating the practice of the science of food and nutrition. Lab includes an introduction to the physicochemical properties of food and the relationship of these properties to preparation, techniques, and food quality. Meal preparation, focusing on human nutritional needs and the management of money and time, is included.

222 Maternal and Child Nutrition Spring. 3 credits. Prerequisites: NS 115 and a college biology course. S-U grades optional.

M W F 11:15. V. Utermohlen. Involves a study of the nutritional requirements in pregnancy, lactation, and growth through adolescence. Topics include the relationship between maternal diet and pregnancy outcome; analysis of different methods of infant feeding; and nutritional status of pregnant women, children, and adolescents in the United States and in developing countries.

246 Introduction to Physicochemical Aspects of Food Fall or spring. 4 credits. Each section limited to 18 students. Prerequisites: a college course in organic chemistry or biochemistry, NS 146, and permission of instructor during course registration (permission-of-instructor forms must be obtained from and returned to 335 Martha Van Rensselaer Hall). S-U grades optional.

Lecs, T R 9:05; labs, T R 10:10–12:35 or M W 2–4:25. Fall: B. Lewis; spring: R. Parker.

A study of (a) the colligative properties of solutions; (b) colloidal systems—sols, gels, foams, and emulsions; (c) physical and chemical properties of the major groups of foods, the effect of basic methods of food preparation and preservation on these properties and their relation to food quality—especially color, flavor, and texture. Labs introduce the experimental study of food and illustrate the function of ingredients and effect of treatment on food quality.

300 Special Studies for Undergraduates Fall or spring. Special arrangements to establish equivalency for courses not transferred from a previous major or institution. Students prepare a description of the study they want to undertake on forms available from the Counseling Office, N105 Martha Van Rensselaer Hall. The form, signed by both the instructor directing the study and the associate director for academic affairs, is filed at course registration or during the change-of-registration period.

301 (also Food Science 301) Nutritional Aspects of Raw and Processed Foods Spring. 3 credits. Prerequisite: NS 115 or permission of the instructor.

M W F 9:05. D. Miller. An evaluation of the nutritional qualities of human foods with an emphasis on changes that occur during processing and storage. Topics, including food processing methods, dietary trends, vegetarian diets, fabricated foods, fast foods, and food additives, will be discussed in the context of their potential impact on nutrition and health.

302 Orientation to Field Study in Extension Fall. 2 credits. Limited to 10 juniors and seniors. Prerequisites: NS 115, 146, and permission of instructor. S-U grades only.

F 12:20–2:20; field trips to nearby counties are arranged as student schedules permit. R. Klippstein.

The selection and preparation of appropriate food and nutrition information for specific lay audiences. Participants complete an individual project using two different mass-medium teaching tools. When appropriate, the project is taught to established

county audiences. The major project is a group project presenting programs to a scheduled extension audience. Additional experiences include a field visit to a county extension office and review of extension organization and resources. Understanding the needs of audiences, informal teaching techniques, and self-critiquing and group critiquing are stressed.

325 Sociocultural Aspects of Food and Nutrition Fall. 3 credits. Limited to juniors and seniors.

Prerequisites: NS 115 and a college course in anthropology or sociology.

M W F 2:30. D. Sanjur. The course offers a cross-cultural perspective for understanding the environmental and sociocultural parameters affecting the development of food consumption patterns. Emphasis is on theories on formation of food habits, dietary methodologies, ethnicity and food habits and educational programs in nutrition, in national and international contexts.

331 Physiological and Biochemical Bases of Human Nutrition Spring. 3 credits. Prerequisites: Biological Sciences 330 or 331 and NS 115 or equivalent. S-U grades optional.

M W F 10:10. M. C. Nesheim and T. C. Campbell. The biochemical and physiological bases for human nutrition requirements, including digestion and absorption, energy metabolism, food intake regulation, protein amino acids, minerals, vitamins, and determination of nutritional status.

332 Laboratory Methods in Nutritional Sciences Fall and spring. 3 credits. Each section limited to 18 students. Prerequisites: NS 331 or concurrent registration and permission of instructor during course registration (permission-of-instructor forms must be obtained from and returned to 335 Martha Van Rensselaer Hall).

Lec, R 9:05; labs, M W 1:25–4 or T R 1:25–4. M. Stipanuk.

Introduction to principles and procedures of experimental design, analytical techniques, and data analysis in human nutrition. Emphasis on methods of analysis of nutrients and metabolites in food, tissues, and body fluids. Application of these methods in assessing physiological and biochemical responses to alterations of nutrient intake in animal and human studies.

346 Consumer Food Issues Fall. 2 credits. Limited to 30 juniors and seniors. Prerequisites: NS 115 and 146 or permission of instructor. S-U grades optional.

T R 12:20. C. Bisogni. An examination of selected consumer issues related to the availability, safety, and quality of food. Current legislative and regulatory proposals will be investigated in terms of relevant research and potential impact on consumers and the food supply.

347 (also HDFS 347) Human Growth and Development: Biological and Social Psychological Considerations Spring. 3 credits. Prerequisites: Biological Sciences 101 or 109 or equivalent; HDFS 115 or Psychology 101 and NS 115 or equivalent.

M W F 1:25. J. Haas and H. Ricciuti. A review of major patterns of physical growth from the fetal period through adolescence, with consideration of biological and socioenvironmental determinants of growth, as well as physical and psychological consequences of variations in growth patterns. An examination of normal patterns of growth is followed by an analysis of major sources of variations in growth (normal and atypical).

361 (also Psychology 361) Biochemistry and Human Behavior Fall. 3 credits. Prerequisites: Biological Sciences 101–102, Chemistry 103–104, Psychology 123, or permission of instructor. A fundamental knowledge of human biology and chemistry is essential. S-U grades optional.

M W F 11:15. D. Levitsky.

A survey of the scientific literature on the role of brain and body biochemical changes as determinants of human behavior. The topics covered include action and effects of psychopharmacologic agents, biochemical determinants of mental retardation, biochemical theories of psychosis, and effects of nutrition on behavior.

378 Management Principles in Food-Service

Operation Spring. 4 credits. Prerequisites: NS 246, Agricultural Economics 220, Hotel Administration 211 or I&LR 121 or I&LR 151 or I&LR 260 or I&LR 363 or equivalent, or permission of instructor. S-U grades optional. Estimated cost, \$5.

T R 10:10–12:05. R. Holmes.

Application of management principles to food-service operations involved in production, distribution, and service of quality food in quantity. Includes menu planning, food-service layout and design, production and service controls, purchasing, food cost control, personnel management, sanitation, and safety.

398 Honors in Nutritional Sciences

Fall. 1 credit. Limited to students admitted to the division honors program. S-U grades only.

T 2:30. M. Morrison, coordinator.

Research design. Delineation of honors research problem in consultation with a faculty adviser.

400–401–402 Special Studies for

Undergraduates Fall or spring. Credit to be arranged. S-U grades optional.

Division faculty.

For advanced, independent study by an individual student or for study on an experimental basis with a group of students in a field of nutritional sciences not otherwise provided through course work in the division or elsewhere at the University. Students prepare a description of the study they want to undertake on forms to be signed by the instructor directing the study and the associate director of academic affairs. The forms, available from the Counseling Office, are filed at course registration or within the change-of-registration period. To ensure review before the close of the course registration or change-of-registration period, students should submit the special studies form to the associate director for academic affairs as early as possible.

400 Directed Readings For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading and writing. Academic credit is awarded for this integration of theory and practice.

441 Nutrition and Disease Fall. 4 credits. Prerequisites: NS 331 and a human physiology course. S-U grades optional. Cost of handouts and pamphlets, \$5.

M W F 10:10 and F 8. J. Rivers.

Study of the physiologic and metabolic anomalies in chronic and acute illnesses and the principles of nutritional therapy and prevention. The topics covered are diabetes mellitus, starvation, obesity, nutritional assessment, nutritional pharmacology, severe injury, infection, cancer, gastrointestinal diseases, liver disorders, renal diseases, cardiovascular diseases, and pediatrics. Original research papers, books, review papers, and publications of professional organizations are used throughout the course.

442 Diet Formulation and Analysis Fall. 2 credits. Each lab limited to 10–20 students. Prerequisites: NS 146, concurrent registration in NS 441 (or equivalent

background in either course). Limited enrollment. S-U grades optional. Cost of handouts, pamphlets, and brochures, \$5.

Lec, M 11:15; lab, M 2:30–4:25 or T 11:15–1:10 or T 2:30–4:25. Evening prelims to be arranged.

C. Lanciault.

Development of skills in formulation and analysis of therapeutic dietary regimes. Various sources of information of food composition, diet planning, and enteral and parenteral nutrition supplements are used.

445 Community Nutrition and Health

Spring. 3 credits. Prerequisites: NS 331 or concurrent enrollment in 331. Recommended: NS 325. S-U grades optional. The field project component of this course may involve off-campus activity; students are responsible for their own transportation or bus fare.

Lec-discs, M W 11:15; fieldwork lab, W 2:30–4:30.

S. Kumanyika.

Study of human nutrition and health problems from a community perspective; programs and policies related to nutrition at local, state, and federal levels; approaches and techniques of effective application and dissemination of nutrition knowledge in communities.

446 Physicochemical Aspects of Food

Fall. 3 credits. Prerequisites: NS 246 and a college course in biochemistry, which may be taken concurrently. S-U grades optional.

M W F 9:05. G. Armbruster.

The relation of food quality to (a) rheological properties of food systems, (b) oxidation and reduction reactions, and (c) enzymatic and nonenzymatic browning. Covers physical and chemical factors accounting for the color, flavor, and texture of natural and processed foods.

447 Physicochemical Aspects of Food—

Laboratory Fall. 1 credit. Limited to 16 students. Prerequisite: NS 446 or concurrent registration. S-U grades optional.

T 1:25–4:25. G. Armbruster.

Laboratory experiments designed to illustrate the effect of varying ingredients and treatment on the quality of food products. Objective testing methods are used to determine food quality characteristics.

448 Physicochemical Aspects of Food—

Laboratory Fall. 1 credit. Limited to 16 students. Prerequisite: NS 446 or concurrent registration. S-U grades optional.

R 1:25–4:25. G. Armbruster.

Laboratory experiments designed to illustrate (a) the physicochemical behavior of colloidal systems, (b) chemical reactions of some food components, and (c) effects of temperature, pH, moisture, inorganic salts, and enzymes on physicochemical changes in natural foods, food components, and food mixtures.

456 Experimental Foods Methods

Spring. 3 credits. Limited to 16 students. Prerequisites: NS 446, 448, and a course in statistics recommended.

Labs, T R 1:25–4:25. G. Armbruster.

Application of the scientific method in the design and performance of experimental food problems and the interpretation and evaluation of results. Evaluation of the use of instruments and chemical and sensory methods in the measurement of food properties. Independent problems.

457 National and International Food Economics

Spring. 3 credits. Prerequisites: college course in economics and junior standing or permission of instructor. S-U grades optional.

M W F 9:05. E. Thorbecke.

Examination of individual components essential for an understanding of the United States and world food economies. Analysis of the world food economy. Review and analysis of (a) the major economic factors determining the demand for food, the composition of food consumption, and nutritional intake and (b) the major economic factors affecting

food production and supply. Examination and evaluation of the effectiveness of various food policies and programs in altering food consumption patterns. Principles of nutritional planning in developing countries within the context of the process of economic and social development.

488 Applied Dietetics in Food-Service Systems

Fall and spring. 3 credits. Limited to 30 students a semester. Prerequisite or corequisite: NS 378 and permission of instructor before course registration. S-U grades optional. Estimated cost, \$5.

Lec, T 9:05; one sec, M–F 2:30–7; plus four 7–9 p.m. sessions to be arranged in place of lab when necessary. Possible field trip. J. M. L. Koch.

Lab is arranged through Cornell Dining. Other experiences may be possible in community food-service operations. Students will gain experience in care and use of institutional equipment, job analysis, volume food production, applied sanitation, and recipe development and evaluation as well as other management skills required to operate a food-service program.

498 Honors in Nutritional Sciences

Spring. 1 credit. Limited to students admitted to the division honors program. Students may register in NS 499 concurrently.

T 9:05. M. Morrison, coordinator.

Informal presentation and discussion of current topics in food and nutrition in which all members participate. Written reports on topics discussed may be requested.

499 Honors Problem

Fall and spring. Credit to be arranged. Open only to students in the division honors program.

Hours to be arranged. Division faculty; M. Morrison, coordinator.

An independent literature, lab, or field investigation. Students should plan to spread the work over two semesters.

600 Special Problems for Graduate Students

Fall or spring. Credit to be arranged. Limited to graduate students recommended by their chairperson and approved by the instructor in charge. S-U grades optional.

Hours to be arranged. Division faculty.

Emphasis on independent, advanced work. Experience in research laboratories in the division may be arranged.

601–604 Advanced Nutrition Series A series of nutrition courses offered jointly by the Division of Nutritional Sciences and the Departments of Animal Science and Poultry Science. Prerequisites: courses in nutrition, physiology, and biochemistry, including intermediary metabolism, or permission of instructor.

601 (also Animal Science 601) Proteins and

Amino Acids in Nutrition Fall. 3 credits. Prerequisites: courses in physiology, biochemistry, and nutrition or permission of instructors.

M W F 11:15. R. E. Austic, M. A. Morrison.

Advanced course in amino acid and protein nutrition with emphasis on the dynamic aspects of protein digestion, amino acid absorption, protein synthesis, amino acid metabolism, and nitrogen excretion. Discussion includes current topics in protein and amino acid nutrition, nutritional interrelationships, amino acid and protein requirements, evaluation of protein quality, and bioavailability of amino acids. Emphasis is on basic principles and their applications to animal and human nutrition.

602 Lipids

Fall. 2 credits. T R 11:15. A. Bensadoun. Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is on critical analysis of current topics of lipid methodology, lipid absorption, lipoprotein secretion, structure, and catabolism; mechanisms of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

604 The Vitamins Fall. 2 credits.

T R 10:10. G. F. Combs, Jr.
Lectures on nutritional aspects of the vitamins, including recent developments in nutritional and biochemical interrelationships with other nutrients and metabolites.

606 Carbohydrate Chemistry Spring. 2 credits.

Prerequisite: organic chemistry. Recommended: biochemistry. S-U grades optional.
T R 11:15. B. A. Lewis.
The chemistry and physicochemical properties of simple carbohydrates, polysaccharides, and their complexes with lipids, proteins, and inorganic ions. The functional role of the carbohydrates in food systems and their nutritional implications will be discussed as well as applications of carbohydrates in food processing.

611 Molecular Toxicology Spring. 2 credits.

Prerequisite: full-year 400-level course in biochemistry or equivalent. S-U grades optional. Offered alternate years.
T R 11:15. C. Wilkinson, C. Campbell, A. Aronson, and others.

A study of fundamental biochemical mechanisms of absorption, transport, metabolism, and excretion of drugs, carcinogens, and toxicants. Emphasis on oxidative and conjugative pathways of metabolism and of environmental and nutritional factors that influence toxicant metabolism and disposition. Methods of evaluating *in vivo* and *in vitro* metabolism.

612 Methods of Assessing Physical Growth in Children Spring. 2 credits. Limited to graduate students and students who have permission of the instructor. S-U grades optional.

Lec, T 1:25; labs, T R 1:25–4:25. J. Haas.
A lab course to train students in methods and techniques used to assess the physical growth and development of growing children. The methods explored are those applicable for field or community studies and cover anthropometry, body composition, skeletal age, maturity indicators, physical fitness, and physiological responses to environmental stress.

613 Obesity and the Regulation of Body Weight Spring. 3 credits. Limited to 30 students.

Prerequisites: one course in psychology, one course in nutrition. Undergraduate students may register with permission of the instructor. Offered alternate years.
M W F 11:15. D. Levitsky.

This course is a multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, genetics of obesity, role of activity and energy metabolism, psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, social discrimination.

616 Readings in Food Fall. 2 credits. Prerequisite: organic chemistry. Recommended: biochemistry. S-U grades optional. May be repeated for credit with permission of instructor.

W 7:30–9:25 p.m. N. Mondy.
Critical review of selected topics in the current literature. Emphasis on experimental data and basic scientific principles underlying modern theory and practice relative to food quality.

617 Teaching Seminar First half of semester during fall or spring. 1 credit. Limited to division graduate students and students who have permission of the instructor. S-U grades only.

W 7:30–9:30 p.m. M. Devine and N. Yaghlian.
A series of workshops focusing on development of teaching skills for guiding classroom learning in lec, disc, and lab settings. Preparation of content, presentation, and interaction techniques and evaluative methods are emphasized in relation to the student's specific teaching assignment. Videotape simulations provide opportunity for practice and analysis of teaching behaviors.

618 Teaching Experience Fall or spring.

Noncredit. Limited to division graduate students and students who have permission of the instructor.
Hours to be arranged. Division faculty; M. Devine, coordinator.
Designed to provide experience in teaching nutritional sciences by direct involvement in college courses under supervision of a faculty member. The aspects of teaching and the degree of involvement vary depending on the needs of the course and the experience of the student.

619 (also Animal Science 619) Field of Nutrition Seminar Fall or spring. Noncredit. S-U grades only.

M 4:30. Faculty and guest lecturers.
Lectures on current research in nutrition.

625 Seminar in Food Habits Research Fall.

3 credits. Limited to 12 graduate students.
Prerequisite: statistics or research design course. Offered alternate years.
W F 3:35. D. Sanjur.

Emphasizes a critical review of the literature and development of a research proposal using sociological theories and techniques as applied to nutritional data.

626 Special Topics in Food Spring. 2 credits.

Hours to be arranged. G. Armbruster and B. A. Lewis.
Current research related to food is reviewed in the context of basic principles and their application to the quality of food.

627 Special Topics in Food Spring. 2 credits.

Prerequisite: organic chemistry. Recommended: biochemistry. S-U grades optional. May be repeated for credit with permission of instructor.
W 7:20–9:25 p.m. N. Mondy.

Current research related to food production and processing will be reviewed. May be repeated for credit with permission of instructor.

630–633 Advanced Nutrition Laboratory Spring.

1–5 credits. Limited to 12 students.
T R 2:15–5:15. Division faculty.
Study of the anthropometric, dietary, clinical, and biochemical assessment of human nutritional status. The individual courses are taught in sequence over the entire semester. Any or all of the modules may be taken for credit.

630 Anthropometric Assessment 1 credit.

Prerequisites: NS 331 or equivalent and permission of instructor.
J. Haas.
Study of methods and procedures for anthropometric, radiographic, and energetic assessment of children and adults in clinical, research, and survey settings.

631 Dietary Assessment 1 credit. Prerequisites: statistics and NS 331 or equivalent, and permission of instructor.

D. Sanjur.
Study of methods and techniques for assessing dietary intakes at the individual and household levels.

632 Clinical Assessment 1 credit. Prerequisites: NS 630, 631, 441, Biological Sciences 330 or 331, and either NS 332 or Biological Sciences 430, and permission of instructor.

V. Utermohlen and division faculty.
Study of methods and techniques for clinical assessment of nutritional status and diagnosis of nutritional disorders.

633 Biochemical Assessment Weeks 9–14; interested students must enroll with the instructor during the first 2 weeks of the term. 2 credits.

Prerequisites: NS 331, Biological Sciences 330 or 331, either NS 332 or Biological Sciences 430, a course in human physiology, and permission of instructor.

M. N. Kazarinoff and division faculty.
Biochemical assessment of nutritional status. Experiments are selected to exemplify measurements of intake, use, and output of primary nutrients and their metabolites.

634 (also Biological Sciences 634) Vitamins and Coenzymes Spring. 2 credits. Prerequisites: organic chemistry 253 or 357–358 and Biological Sciences 331 or 330, or their equivalents in biochemistry. Offered alternate years.

T R 10:10. M. N. Kazarinoff.
The chemical, biochemical, and nutritional aspects of the vitamins and coenzymes.

635 (also Biological Sciences 635) Enzymology and Metabolic Regulation Spring. 2 credits.

Prerequisites: Chemistry 357–358 and either Biological Sciences 330 or 331 or permission of the instructor. Recommended: physical chemistry.
T R 9:05. W. L. Dills and division faculty.
Lectures only. The study of enzymes and the molecular mechanisms of metabolic regulation.

636 (also Biological Sciences 637) Integration and Coordination of Energy Metabolism Fall.

3 credits. Prerequisites: Biological Sciences 330 and 331, or equivalent.
M W F 9:05. W. J. Arion and staff. Evening prelims, hours to be arranged.
The elements of energy homeostasis are developed through correlations of the structural, functional, and metabolic characteristics of the major animal tissues and organs. Mechanisms which control energy metabolism within individual tissues and coordinate these processes in the intact animal are analyzed in the contexts of selected physiologic and pathologic stresses.

637 Epidemiology of Nutrition Fall. 2 credits.

Limited to graduate students. Prerequisites: Statistics and Biometry 602 or 604 or equivalent; NS 331, 441, 601, 603, 630, and 631, or equivalent, and permission of instructor. S-U grades optional.
Hours to be arranged. J-P. Habicht.
In the context of designing and evaluating population interventions to improve protein-calorie nutrition, students (a) review past evidence of effectiveness and efficiency of intervention, (b) attempt to quantify sensitivity and specificity of outcome measures, and (c) design methods to improve interventions and evaluations.

638 Epidemiology of Nutrition Spring. 2 credits.

Limited to graduate students. Prerequisites: Statistics and Biometry 602 or 604 or equivalent; NS 331, 441, 601, 603, 630, and 631, or equivalent, and permission of instructor. S-U grades optional.
Hours to be arranged. J-P. Habicht.
In the context of designing national nutrition surveillance, students review (a) principles underlying surveillance, (b) prerequisites of indicators, and (c) current surveillance proposals to identify strengths and weaknesses. The role of evaluation of programs in nutrition surveillance also is reviewed.

645 Seminar on United States Nutritional Services and Programs Spring. 2 credits. Limited to graduate students with a major or minor in human nutrition. S-U grades optional.

M W F 11:15. S. Kumanyika.
Participants attend two NS 445 lectures and a seminar hour where they are guided in the study and discussion of United States food and nutrition programs, and community settings for delivery of nutrition and health services. Participants will be responsible for preparing and presenting relevant material in class.

646 Seminar in Physicochemical Aspects of Food Spring. 3 credits. Prerequisite: a college course in organic chemistry or biochemistry. S-U grades optional.

T R 9:05; disc to be arranged.

An introduction to physiochemical aspects of food for graduate students who have had limited or no work in this area. The seminar uses the lectures of NS 246 as a basis for supplementary readings and critical review of research on selected topics.

649 Geriatric Nutrition Spring, 3 credits.

Prerequisite: NS 331. Letter grade only.

M W F 10:10, plus 20 hours during the semester working with elderly individuals in the Ithaca area. D. Roe.

Emphasis is given to effects of aging, particularly as these change food habits, alter digestive processes, or decrease nutrient utilization. Causes of nutrient overload and nutritional deficiency are described. Nutritional assessment of elderly people is explained, together with precautions that must be taken in interpreting findings. Consideration is given to geriatric nutrition as a major responsibility of nutritionists working in hospitals, extended care facilities, and community programs. Therapeutic aims considered are the provision of nutritional rehabilitation in acute-care hospitals and specific diet therapy for chronic-disease patients. Community program objectives are discussed, including establishment and maintenance of feeding programs for the elderly.

650 Clinical and Public Health Nutrition Spring, 3 credits.

For graduate students with a major or minor in nutrition and undergraduate nutrition majors in their senior year. Prerequisite: NS 331 or equivalent.

M W F 9:05. D. Roe.

Lectures cover social, environmental, and disease variables that influence the nutrition of infants, children, and adults. Endemic nutritional problems (such as obesity, dental caries, and anemias) of public health importance in the United States are discussed. Student presentations are made in class. Limited field experience is offered.

651 Nutrition and the Chemical Environment

Fall, 3 credits. Prerequisite: NS 331 or equivalent.

M W F 11:15. D. Roe.

The relationship between nutrition and the effects of foreign chemicals. Students are offered an overall view of compounds to which we are exposed, including natural food toxicants, food additives, water pollutants, pesticide residues, and radioactive wastes, as well as medications and illegal drugs. A factual and scientific background is developed so students can interpret information and misinformation circulated in the news media.

652 Nutrition Counseling Spring, weeks 1-7.

2 credits. Limited to students in the Clinical Nutrition Program. Prerequisites: NS 441, 442, and permission of instructor. S-U grades only.

Hours to be arranged. C. Lanciault.

Principles and procedures of nutritional counseling in clinical practice. Emphasis on subject matter and process skills necessary to develop, implement, and evaluate nutritional care plans for individuals and groups. Includes workshops, simulation techniques, and work with clients in selected settings.

659 (also Veterinary Medicine 759) The Nutrition and Physiology of Mineral Elements Fall, 2 credits.

Prerequisites: basic physiology, intermediate biochemistry, and general nutrition.

T R 8. R. Schwartz, D. VanCampen, R. Wasserman. Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macro- and micro-elements, with emphasis on recent developments. Included is information on methodologies of mineral research and the chemistry of ions and complexes as well as essentiality, requirements, transport, functions, homeostasis, interrelationship, and toxicity of various mineral elements.

660 Special Topics in Nutrition Fall or spring.

3 credits maximum each term. Registration by permission of the instructor.

Hours to be arranged. Division faculty.

Designed for the student who wants to become informed in any specific topic related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a group of students, and/or selected lectures of another course already offered. Topics may be changed so that the course may be repeated for credit.

669 Field Seminar Spring; offered during

January intersession or immediately following final examinations spring semester. 1 credit. Limited to 12 students. Required for graduate students in clinical nutrition. Open to other graduate students in nutrition with permission of instructor.

J. Rivers and M. Devine.

Overview of policy decision making and implementation of nutrition programs at the state and national levels. Seminars alternate between Washington, D.C. (even years) and Albany, N.Y. (odd years). Provides opportunities to meet and confer with staff members of selected governmental and private agencies. Upon return to campus an integrated summary report is required prior to group discussion.

670 Clinical Field Studies Fall, spring, summer.

15 credits maximum. Limited to graduate students in clinical nutrition. Prerequisites: NS 441, 442, 652, 630, 631, 632, and 633. S-U grades only.

Full-time study at off-campus clinical sites.

C. Lanciault, R. Holmes, V. Utermohlen, and

J. Rivers.

The delivery of nutritional care in hospitals, outpatient clinics, and community settings.

680 International Nutrition Problems, Policy and Programs Fall, 3 credits. Prerequisite: permission of instructor.

T R 11:15-12:30. M. Latham.

Designed for graduate students who want to learn about the important nutritional problems of developing countries. The major forms of malnutrition related to poverty and their underlying causes are discussed. Emphasis is placed on programs and policies that can assist poor countries and communities to improve their nutritional and health status.

690 (also Psychology 690) Seminar on Nutrition and Behavior Spring, 2-4 credits.

Limited to 25 students. Prerequisite: Psychology and NS 361 and permission of the instructor. S-U grades optional.

T R 10:10-11:25. D. Levitsky.

The seminar this year covers several current topics in nutrition and behavior. These topics include: early nutritional insult and mental development, malnutrition and behavior, nutrition and learning, food additives and hyperkinesis, megavitamin therapy, inborn metabolic defects and mental illness, nutrition and depression, and hypoglycemia.

695 Seminar in International Nutrition and Development Policy Spring, 2 credits.

Prerequisite: NS 680 or equivalent. S-U grades optional.

T R 10:10-12. M. Latham and division faculty.

The role of nutrition in national development. Emphasis is on the interdisciplinary nature of the programs and policies needed to solve the food and nutrition problems of low-income countries and communities. Planning of programs and evaluation of alternate strategies designed to improve nutrition are discussed, using examples from particular countries.

699 Special Topics in International Nutrition

Fall and spring, 3 credits maximum each term.

Registration by permission of the instructor.

International nutrition faculty.

This option is designed for the graduate student who wants to become familiar with some specific topic related to international nutrition. The instruction usually consists of individual tutorial study involving extensive use of existing literature. In certain semesters it may consist of a lecture or seminar

course on a subject such as nutrition and parasitology or the nutritional problems of some geographic region. On occasions it may involve laboratory or field studies. Because the topics may change, this course may be repeated for credit.

702 Seminar in Nutritional Toxicology Fall or

spring. No credit. S-U grades only.

M 12:20. T. C. Campbell and C. F. Wilkinson.

One-half of meetings on general topics in toxicology with the other half on nutrition and cancer. The toxicology seminar program covers varied topics in biochemical, genetic, nutritional, and veterinary toxicology and includes basic research studies as well as concepts and research activities on environmental problems of a toxicological nature. The nutrition and cancer seminar program includes presentations by off-campus speakers addressing either fundamental concepts of chemical carcinogenesis and the role of dietary and nutritional modification of the carcinogenesis process.

703 Seminar in Nutritional Science Fall or spring.

1 credit. S-U grades only.

T 12:20 or W 12:20. Division faculty.

899 Master's Thesis and Research Fall or spring.

Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional.

Hours to be arranged. Division graduate faculty.

999 Doctoral Thesis and Research Fall or spring.

Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional.

Hours to be arranged. Division graduate faculty.

Faculty Roster

Arion, William J., Ph.D., U. of N. Dakota. Prof.
 Armbruster, Gertrude, Ph.D., Washington State U.
 Assoc. Prof.
 Bensadoun, Andre, Ph.D., Cornell U. Prof., Nutritional Sciences/Physiology
 Bisogni, Carole, Ph.D., Cornell U. Assoc. Prof.
 Brink, Muriel S., M.S., Michigan State U. Assoc. Prof.
 Campbell, T. Colin, Ph.D., Cornell U. Prof.
 Cowell, Catherine, M.S., U. of Connecticut. Adjunct Prof.
 Crompton, D. W. T., Ph.D., Sc.D., U. of Cambridge (England). Adjunct Assoc. Prof.
 Devine, Marjorie M., Ph.D., Cornell U. Prof.
 Dills, William L., Jr., Ph.D., U. of Vermont. Asst. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology
 Gillespie, Ardyth, Ph.D., Iowa State U. Asst. Prof.
 Haas, Jere D., Ph.D., Pennsylvania State U. Assoc. Prof.
 Habicht, Jean-Pierre, Ph.D., Massachusetts Inst. of Technology. James Jamison, Professor of Nutritional Epidemiology
 Immink, Maarten D. C., Ph.D., U. of Hawaii. Asst. Prof.
 Kazarinoff, Michael N., Ph.D., Cornell U. Asst. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology
 Klippstein, Ruth N., M.S., Michigan State U. Prof.
 Kumanyika, Shiriki K., Ph.D., Cornell U. Asst. Prof.
 Latham, Michael C., D.T.M. & H., U. of London. Prof.
 Levitsky, David A., Ph.D., Rutgers U. Assoc. Prof.
 Lewis, Bertha A., Ph.D., U. of Minnesota. Assoc. Prof.
 Mondy, Nell I., Ph.D., Cornell U. Assoc. Prof.
 Morrison, Mary A., Ph.D., U. of Wisconsin. Prof.
 Nesheim, Malden C., Ph.D., Cornell U. Prof.
 Olson, Christine M., Ph.D., U. of Wisconsin. Assoc. Prof.
 Parker, Robert S., Ph.D., Oregon State University. Asst. Prof.
 Rivers, Jerry M., Ph.D., Pennsylvania State U. Prof.
 Roe, Daphne A., M.D., U. of London. Prof.
 Sanjur, Diva M., Ph.D., Cornell U. Prof.
 Schwartz, Ruth A., Ph.D., U. of London. Prof.

Stephenson, Lani, Ph.D., Cornell University. Visiting
Asst. Prof.
Stipanuk, Martha H., Ph.D., U. of Wisconsin. Asst.
Prof.
Thorbecke, Erik, Ph.D., U. of California. H.E. Babcock
Professor of Economics and Food Economics
Utermohlen, Virginia, M.D., Columbia U. Asst. Prof.,
Nutritional Sciences/Biochemistry, Molecular and
Cell Biology
Wright, Lemuel D., Ph.D., Oregon State Coll. Prof.
Emeritus
Zilversmit, Donald B., Ph.D., U. of California. Prof.,
Nutritional Sciences/Biochemistry, Molecular and
Cell Biology

Joint Appointees

Apgar, B. Jean, Visiting Asst. Prof., U.S. Plant, Soil
and Nutrition Laboratory/Nutritional Sciences
Austic, Richard E., Assoc. Prof., Poultry
Science/Nutritional Sciences
Bauman, Dale, Assoc. Prof., Animal Science/
Nutritional Sciences
Combs, Gerald F., Jr., Asst. Prof., Poultry
Science/Nutritional Sciences
Krook, Lennart P., Prof., New York State College of
Veterinary Medicine/Nutritional Sciences
Miller, Dennis, Asst. Prof., Food Science/Nutritional
Sciences
VanCampen, Darrell R., Res. Chemist, U.S. Plant, Soil
and Nutrition Laboratory/Nutritional Sciences
VanSoest, Peter J., Prof., Animal Science/Nutritional
Sciences
Wamer, Richard G., Prof., Animal Science/Nutritional
Sciences
Wasserman, Robert H., Prof., New York State College
of Veterinary Medicine/Nutritional Sciences
Young, Robert J., Prof., Animal Science/Nutritional
Sciences