Dept. of Food & Nutrition

The Dept. of Food and Nutrition offers academic programs regarding healthier living. The program involves technological aspects of high quality and safe food production and a wide variety of subjects linked to human nutrition. The MS and Ph.D programs in the department of Food and Nutrition are specialized for nutritional science and food biotechnology. The areas of study include nutrient metabolism, nutritional requirements, nutrient-gene interactions, clinical nutrition, and a variety of bioactive compounds in food and natural resources. Students will develop a strong background and practical skills through research projects. Graduates from this program possibly construct a career as a nutritionist and a researcher in the field of product development, evaluation, and analysis.

❑ Food and Nutrition Major

The graduate program in Food and Nutrition major is a continuation of the undergraduate degree program, but with further development of research skills in specific areas of nutrition and food science as well. Food and Nutrition major provides students with training in normal and therapeutic nutrition, biological and social sciences, biochemistry, physiology, food science, nutrigenomics, food service management, communication, public policy, experimental design and statistics, and epidemiology.

❑ Food Biotechnology Major

Food Biotechnology major emphasizes the integrated application of several disciplines of chemistry, microbiology, and biotechnology to the processing and manufacturing of foods. This program also provides a strong research background for biological sciences and engineering to food systems.

□ Courses

❑ Core Courses

· Advanced Nutrition (3)

Literature of human nutrition related to macronutrients and micronutrients covers metabolism, genetics, physiology, biochemistry, endocrinology, and epidemiology.

· Advanced Food Science (3)

The course deals with chemical, physical, and biological properties of food components and their application in food system.

· Experimental Design and Statistics (3)

The course covers sampling theory, sample survey design, experimental and

epidemiological study designs, descriptive statistics, statistical distributions and estimation, and statistical inference and tests including z-test and t-test for one sample, analysis of differences in two means, simple linear regression, and a chi-square goodness of fit test.

- **Seminar in Food and Nutrition (3)**

  The course deals with issues in area of food and nutrition based on current literature.

- **Research Ethics & Thesis Research (3)**

  This course helps graduate students understand the nature of ethical concepts and decision-making in scientific research, including standards of research methods and procedures, data collection and analysis, and reporting results. In particular, they will acquire information on international codes of research ethics and Korean laws related to bioethics and safety, such as the Enforcement Decree of Bioethics and Safety Act and Animal Protection Act. They will aware of ethical issues through discussion with some examples of scandals and abuses in research as well as by actual practice of scientific writing based on the standards.

❑ **Food & Nutrition Major Courses**

- **Advanced Biochemistry (3)**

  A comprehensive treatment of biochemistry and molecular biology stressing structures of biological molecules, including proteins, nucleic acids, carbohydrates, and lipids, enzymology, and selected aspects of metabolism and bioenergetics.

- **Nutrient Metabolism (3)**

  Regulatory mechanisms of nutrition and metabolism, including current genetic theories on metabolic controls and their dysfunction in human health.

- **Nutritional Physiology (3)**

  The course deals with the effects of nutrients on human organs including nervous, muscular, respiratory, circulatory, digestive, renal, endocrine, and reproductive systems.

- **Precision Nutrition in Disease (3)**

  The course helps graduate students understand nutrigenomics, which is the science study on the relationship between nutrition, genetics, and health outcomes. In particular, students get information on the Human Genome Project and big data of human genomes from the Korean Genome and Epidemiology Study and understand results of nutrigenomic studies and related biochemical and physiological mechanisms. This course also provides students a chance to practice analysis of

genomic and nutritional data to understand precision nutrition.

· **Nutrition and Development (3)**

Relationship of nutrition to growth and development of brain and other human organs. The course covers the application of basic principles of nutrition to nutritional and physiological needs throughout the life cycle from prenatal to aging. The interaction between physical and behavioral or psychological factors is emphasized.

· **Lipid and Carbohydrate (3)**

Literature of human nutrition related to lipid and carbohydrate covers metabolism, genetics, physiology, biochemistry, endocrinology, and recent nutritional problems.

· **Protein and Amino Acids (3)**

Literature of human nutrition related to protein and amino acids includes metabolism, physiological function, biochemistry, endocrinology, and recent nutritional knowledge.

· **Vitamins and Minerals (3)**

Literature on human mineral nutrition includes molecular biology, physiology, and epidemiology with special emphasis on the role of minerals and vitamins in optimal health.

· **Advanced Clinical Nutrition (3)**

Critical examination of nutritional intervention strategies used in clinical settings. Emphasis is placed on systematic analysis of nutrition-related disease problems and interventions designed to address the problems.

· **Topics in Nutritional Assessment (3)**

Advanced study of precision and interpretation of information obtained from dietary, biochemical, anthropometric, and clinical techniques as well as physical examination for individuals and populations.

· **Nutrition and Environment (3)**

Understanding of nutritional ecology. Topics include interactions between human and environment, population growth and regulation, interaction of genetic and ecological processes, and ecosystems.

· **Topics in Nutrition Counseling (3)**

Advanced study of nutrition counseling in health and disease care with nutrition professionals and counseling tools for successful management and delivery of nutrition services, including knowledge of nutrition assessment, planning,

implementation and evaluation as related to nutritional care.

· **Topics in Food Preparation (3)**

The course deals with basic knowledge of food components and applied scientific principles in food preparation and production.

· **Food Service Industry (3)**

The course deals with factors affecting food production and service in the food service industry emphasizing adherence to food quality and service.

· **Nutrition and Immunity (3)**

Cellular and molecular mechanisms underlying interactions of nutrition and immune function, including modulation of immuno-competence by diet and effects of immune responses on nutritional needs. Lectures and discussion explore implications for resistance to infection, autoimmunity, and cancer.

· **Cultural Aspects of Food and Nutrition (3)**

Historical and contemporary overview of culture, food habits, and diet: exploration of the major themes in food habit research: origins and development of dietary practices: the anthropological approach to food and diet: field work methods: case histories that explore food patterns and their nutritional implications.

· **Society and Nutrition (3)**

Nutrition problems in contemporary communities and of selected target groups. Nutrition programs and policy, principles of nutrition education issues and problems related to community-based nutritional assessment: ethical issues in human investigation.

· **Aging and Elderly Nutrition (3)**

Interaction between nutrition and the rate of biological aging. Topics include physiological and biochemical basis of aging, age-related changes affecting nutritional requirements, assessment of nutritional status in the elderly, and a relationship between nutrition and aging-related diseases.

· **Research Methods in Clinical Nutrition and Nutritional Epidemiology (3)**

The course provides basic knowledge on epidemiological studies including clinical trials, which focus on dietary and nutritional exposures, advanced knowledge on epidemiological methodology, and practical opportunities to analyze and interpret research data related to clinical nutrition and nutritional epidemiology.

· **Interaction of Nutrients (3)**

Study of nutrient-nutrient and nutrient-drug interactions in metabolism. The course

covers physical nutrient-drug complexation, effects of drugs on nutritional status, nutrient-induced drug toxicity, and drug-induced nutrient depletion.

· **Policy of Food and Nutrition (3)**

Practical and theoretical basis for analyzing, critiquing and designing a variety of policies and programs aimed at tackling food supply, nutrition and hunger problems. Major areas of change in food consumption pattern and dietary habits is explored under different socio-economic and political conditions.

· **Food Service Organization (3)**

The course deals with application of management functions and principles to food service organizations. The course also covers evaluation of food products and commercial equipment.

· **Advanced Food Service Management (3)**

The course deals with principles of menu development, food production, service, delivery, procurement, sanitation, safety, and equipment selection in food service management.

· **History of Food & Dietary Behavior (3)**

The course deals with basic knowledge of the food consumption and food culture in geographical and historical insights. Students will study food economically, behaviorally, socially and culturally, looking at how different societies have procured sustenance and how they have attached different meanings to what they consume.

· **Weight Management and Nutrition (3)**

This course covers the biological and pathophysiological mechanisms of obesity and its related diseases. Additionally, strategies to prevent and manage obesity, including modifications of diet, exercise, behavior, and other environmental factors, will be discussed in the class.

❑ **Food Biotechnology Major Courses**

· **Fermentation Technology (3)**

The study of microorganisms associated with food fermentation and principles in the processing of fermented foods.

· **Advanced Food Chemistry (3)**

The course deals with various aspects of food components and consequences of the properties on food processing. The course also covers mechanism of physical chemical reaction affecting food qualities and their reaction products.

· **Advanced Food Microbiology (3)**

Review on the recent progress in microorganisms associated with natural and processed foods. Topics include characteristics of bacteria, fungi and yeasts associated with foods, foodborne disease, utilization of microorganisms for food processing.

· **Food Quality Management (3)**

The course deals with principles, methods and techniques involved in evaluating food quality and management.

· **Topics in Food Hygiene (3)**

Food service sanitation, providing training in the regulation and procedures necessary to prevent food poisoning and food borne diseases in a food service establishment.

· **Advanced Food Preservation (3)**

The course deals with major causes of food degradation and fundamental principles of food preservation. The course also covers methods of shelf-life testing and ways to improve shelf life.

· **Topics in Food Products (3)**

The course deals with unit operations used in food processing and physical? chemical changes of food undergoes during processing.

· **Food Toxicology (3)**

The course deals with principles of food safety and toxicology including food borne infection and poisoning. The course also covers food protection criteria and regulations surrounding food additives.

· **Biological and Chemical Analysis (3)**

The course deals with principles and application of modern instruments used for the analysis of biological substance.

· **Food Quality Evaluation (3)**

The course deals with objective and subjective methods for sensory evaluations of foods and application of statistics in food quality control.

· **Assessment of Food Safety (3)**

The course deals with chemical, microbiological, nutritional and dietary risks associated with food consumption. The course also covers issues in genetically modified food products.

· **Functional Foods (3)**

The course deals with definitions of functional foods and regulatory arena surrounding functional foods, as well as the efficacy and safety of selected functional substance. The course also covers application of functional substance in variety of functional food products.

· **Food Products Development (3)**

The course deals with interrelationships of processing principles and chemical and physical properties in the development of new and improved food products.

· **Food & Consumers (3)**

The course deals with food safety, factors affecting the food supply and management of consumer resources from the perspectives of food consumer.

· **Food Enzymology (3)**

The course deals with the nature, role, and applications of enzymes in food industry. The course also covers production, isolation and kinetic behavior of enzymes in food processing.

· **Sensory Evaluation of Foods (3)**

The course deals with detail sensory evaluation methods from panel selection to consumer testing methods. The course also covers basic experimental design and statistical analysis.

· **Advanced Molecular Biology (3)**

The study focused on gene structure and function at the molecular level, including gene structure, replication, transcription, translation and regulation of gene expression.

· **Food Biotechnology (3)**

Study on applications of various biotechnology to food processing, including genetic engineering, enzyme technology, cell culture technology and biochemical engineering.

· **Gene Manipulation (3)**

The course deals with basic concepts of DNA manipulation and their application in food industry.

· **Research Method in Food and Nutrition (3)**

The course deals with principles and methodologies of recent research related to foods and nutrition.

· **Current Topics in Food Science (3)**

This course will cover a critical evaluation of recent literature on food science.

☐ Faculty Members

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