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

· 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.

· **AI for Food and Health (3)**

This course explores how artificial intelligence (AI) technology can be utilized in functional food development and personalized healthcare services. It examines the fundamental theories and statistical models of AI, focusing particularly on machine learning. Through hands-on practice developing AI models using provided data, students will gain an understanding of the types of AI assistants that can be implemented based on data generated in the food, nutrition, and healthcare industries.

❑ **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.

· **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.

· **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 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.

· **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.

· **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.

· **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.

· **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**

· **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.

· **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.

· **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.

· **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.

· **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.

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

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

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