MASTER OF SCIENCE
NUTRITION SCIENCE AND FOOD SCIENCE

INTRODUCTION

The Department of Food Sciences and Nutrition (College of Life Sciences) offers a Master of Science program in **Nutrition Science and Food Science**. Both full-time and part-time students are admitted to the program. The program is designed to prepare post-graduate students for a career with educational and research institutes, nutrition clinics, health delivery system, food industry, social service agencies, and government regulatory bodies. Research areas in nutrition include diet and the nutritional aspects of chronic diseases, obesity, community nutrition, geriatric nutrition, nutrient metabolism and regulation, malnutrition, nutrition assessment and lifecycle nutrition. Areas of research in food science include food biochemistry, food chemistry, food microbiology, packaging, food engineering, food safety and quality control, functional foods, and new product and process development. The proposed program aims to blend food science and nutrition principles to provide food technological skills and nutritional knowledge with a possibility to choose any one track of concentration, i.e., Nutrition Science or Food Science.

According to the University Council decision dated 4/2/2007, Thesis students admitted with effect from September 2007 are exempted from the comprehensive examination.

PROGRAM REQUIREMENTS

The program requirements are:

33 TOTAL COURSE CREDITS

12 COMPULSORY COURSES (credits in parenthesis)

1820-510	Biostatistics for Food Science & Nutrition	(3)
1820-512	Application of Advanced Technologies in Food Science & Nutrition	(3)
1820-513	Nutritional Biochemistry: Macronutrients	(3)
1820-514	Nutritional Biochemistry: Micronutrients	(3)
1820-591	Research Methodologies in Food Science & Nutrition	(Non-credit)

12 ELECTIVE COURSES

Track 1: Nutrition Science (3 credits each)

1820-511 Analytical Techniques in Food Science & Nutrition
1820-516 Applied Clinical Nutrition
1820-517 Public Health Nutrition
1820-518 Nutritional Epidemiology
1820-519 Maternal and Child Nutrition

1820-520 Nutritional Assessment
1820-521 Community Nutrition in Action
1820-522 Theories of Behavior Change
1820-523 Nutrition in Food Service Systems
1820-592 Special Topics in Nutrition Science

Track 1: Food Science (3 credits each)
1820-511 Analytical Techniques in Food Science & Nutrition
1820-515 Sensory Evaluation of Foods
1820-524 Risk Assessment & Management
1820-525 Food Quality Assurance
1820-526 Nutraceuticals and Functional Foods
1820-527 Principles of Food Packaging
1820-528 Advanced Food Chemistry
1820-529 Advanced Food Microbiology
1820-593 Special Topics in Food Science

9 COMPULSORY (Thesis)

1820-597 (0)
1820-598 (0)
2000-599 (9)

COURSE DESCRIPTION

1820-510: BIOSTATISTICS FOR FOOD SCIENCE AND NUTRITION CR: 3

Sampling methods and experimental design, multivariate analysis, regression, analysis of matched data and nonparametric statistics, rank correlation, and use of SAS or SPSS software in analysis of research data in food science and nutrition.

1820-511: ANALYTICAL TECHNIQUES IN FOOD SCIENCE AND NUTRITION CR: 3

Analytical techniques used in food science and nutrition such as preparative chromatographic methods, gel filtration, gas chromatography, thin layer chromatography, HPLC, LCMS, ion exchange chromatography, and electrophoresis. Practical demonstrations will be conducted for the isolation, identification and quantification of various food constituents.

1820-512: APPLICATION OF ADVANCED TECHNOLOGIES IN FOOD SCIENCE AND NUTRITION CR: 3

Application of technology to improve nutritional contents (e.g. increased levels of vitamins, amino acids and phytochemicals), reduce anti-nutritional components (e.g. tannins, trypsin inhibitor) and improve food quality (e.g. total soluble solids in potatoes, modification of pigments, delayed ripening, modification of starch properties, enhancement of texture and flavor), food fortification and enrichment. Recent advances in food science and technology, such as, ultra-high temperature sterilization, high pressure processing, Ohmic processing of foods; use of microwave energy, ultrasonic waves and immobilized enzymes in food processing; newer food additives used in food preservation, will also be discussed.

1820-513: NUTRITIONAL BIOCHEMISTRY: MACRONUTRIENTS
CR: 3

Course provides a comprehensive overview of macronutrient metabolism with an emphasis on issues relevant to human nutrition. Topics include regulation of macronutrient utilization in response to food intake, energy stores, and energy expenditure; biological regulation of food intake and energy expenditure; the regulation and utilization of macronutrients for growth; dietary reference intakes for macronutrients; specialized functions of essential amino acids and essential fatty acids; lipoprotein and cholesterol metabolism; and the regulation, or dysregulation of macronutrient utilization in various disease/physiological states.

1820-514: NUTRITIONAL BIOCHEMISTRY: MICRONUTRIENTS
CR: 3

This course in nutrition will focus on the function, homeostasis, and metabolism of the principal dietary micronutrients (vitamin and minerals). Factors affecting requirements of vitamins and minerals. Adaptation to low intake of vitamins and minerals. Inter-relations between vitamins, minerals and hormones. Anti-nutritional factors affecting the absorption and bioavailability of vitamins and minerals. Stability of vitamins and minerals in foods.

1820-515: SENSORY EVALUATION OF FOODS
CR: 3 PR: 1820-512

Principles and procedures for sensory evaluation of foods, including experimental methods, applications, and statistical analyses. Physiological, psychological, and environmental factors affecting sensory verdicts.

1820-516: APPLIED CLINICAL NUTRITION
CR: 3

Course will develop skills necessary to implement nutrition care. Application of the nutrition care process as it applies to clinical settings is emphasized. Students develop skills to perform nutrition assessment, nutrition diagnosis, nutrition intervention, monitoring, and evaluation. Content includes principles of medical nutrition therapy (MNT) for acute and chronic diseases, menu planning for disease states, the role of other allied health practitioners in assuring nutritional health. Students have the opportunity to perform basic nutrition skills at different departments of primary health care centers or in a local clinic and/or long-term care setting.

1820-517: PUBLIC HEALTH NUTRITION
CR: 3

Public health nutrition deals with efforts to improve the diet and nutritional status of populations. This course helps prepare students to work in public health nutrition units by demonstrating and evaluating methods used in the assessment of nutrition problems, the development of nutrition-related policies, and the delivery and evaluation of health, nutrition, and food assistance programs. Factors affecting nutritional status, with emphasis on socio-economic factors, mass media exposure, beliefs, attitudes, and practices. Changes in life style and food consumption patterns in Kuwait and other Gulf and Middle Eastern countries will be examined and how these changes influence the nutritional status.

1820-518: NUTRITIONAL EPIDEMIOLOGY
CR: 3

This course will covers principles of nutritional epidemiology, impact assessment of nutrition intervention programs, and nutritional surveillance. Basic principles of epidemiology will be illustrated via case studies. Application of epidemiologic principles to the role of nutrition in health study design. Diet-related risk factors in the etiology of disease. Determinants and consequences of nutritional trends. Intervention at the population level to change diet. Identification and evaluation of nutrition assessment methodologies appropriate for risk assessment in large populations, role of physical activity, and anthropometric measurements.

1820-519: MATERNAL AND CHILD NUTRITION
CR: 3

Advanced course on the role of nutrition during pregnancy and lactation. The feeding and growth of infants and children in health and disease is considered. Critical evaluation of current literature is emphasized via lecture, discussions, and a term paper.

1820-520: NUTRITIONAL ASSESSMENT
CR: 3 PR: 1820-513 & 1820-514

Introduction to biochemical assessment of nutrition status. Nutrition assessment methodologies for individuals. Disturbances in metabolism, endocrine functions, blood coagulation, immune response with altered

nutrition status, and the chemical tests for diagnosis will be performed.

1820-521: COMMUNITY NUTRITION IN ACTION
CR: 3 PR: 1820-517

Provides students with in-depth experiences in a community nutrition program and fosters the integration of research, theory, and practice. Through placements in community programs, students gain experience in program administration and in assessing, designing, implementing, and evaluating food and nutrition programs for targeted populations through public and private organizations; getting the nutritional messages out to the public.

1820-522: THEORIES OF BEHAVIOR CHANGES
CR: 3

This course will cover major models that explain people's behavior; and how to use this information to get them to make needed lifestyle changes for achieving optimal health status.

1820-523: NUTRITION IN FOOD SERVICE SYSTEMS
CR: 3

Students will gain experience in facility design; equipment selection, use, and care; job analysis and evaluation; human resources planning; management of financial resources; recipe development and volume food production; computer-assisted management; employee training; applied safety and sanitation standards. Through planning and executing a themed event, students develop other skills required to operate/ manage a food service program. Application of quality management in food service operations and facility management is stressed.

1820-524: RISK ASSESSMENT AND MANAGEMENT
CR: 3

This course will deal with characterizing, evaluating and comparing food safety risks; exposure assessment, risk analysis and management in the context of food safety; risk management models; nutritional risk/benefit analysis; microbiological risk assessment; antimicrobial resistance and animal drug risk assessment; evaluation, selection and implementation of the best management option to manage the food safety risk.

1820-525: FOOD QUALITY ASSURANCE
CR: 3 PR: 1820-512

This course integrates the latest principles, practices and terminology of food safety systems; components of food quality and food safety; systems and programs for food quality and food safety; hazards in foods; GMPs and HACCP prerequisite programs; quality control programs; quality assurance systems; quality management systems; total quality management; quality system standards; recognition programs and excellence models; HACCP system for food safety.

1820-526: NUTRACEUTICALS AND FUNCTIONAL FOODS
CR: 3

The role, chemistry, mechanism, and processing of nutraceuticals and functional foods. Their application to healthy lifestyle. Regulation, safety, marketing, and international aspects of nutraceuticals.

1820-527: PRINCIPLES OF FOOD PACKAGING
CR: 3 PR: 1820-512

Introduction and overview of food packaging. Types of packaging materials and their physico-chemical properties. Packaging of fresh and processed foods. Hazards in handling, transportation, and storage of packed foods. Standards for packaging materials. Recent advances in food packaging.

1820-528: ADVANCED FOOD CHEMISTRY
CR: 3

Advances in the chemistry of food carbohydrates, including molecular structure and physical properties, production and food applications. Food hydrocolloids. Chemistry and technology of commercial fats and oils in food systems. Advanced food protein chemistry, including molecular structures, characterization, physiochemical basis of food protein functionality, structure-function relationship, processing technologies to improve functionality.

1820-529: ADVANCED FOOD MICROBIOLOGY
CR: 3

This course deals with the current issues in food microbiology; microbial ecology of foods; manipulation of factors affecting the growth and survival of microorganisms in food; modern methods for the microbiological analysis of

foods, such as, bioluminescence, impediometry, immunological techniques, DNA probes, and other emerging technologies. Labs will deal with some of these modern methods of microbiological analysis.

1820-591: RESEARCH METHODOLOGIES IN FOOD SCIENCE AND NUTRITION
CR: (Non-credit)

Students will be exposed to the procedure of developing a research proposal including study design, data collection, data analysis and interpretation of results. At the end, students will present a seminar on their research proposal.

1820-592: SPECIAL TOPICS IN NUTRITION SCIENCE
CR: 3 PR: 1820-512

Selected topics in nutrition to cover current issues of interest will be covered. The emphasis will change as the need emerges with time.

1820-593: SPECIAL TOPICS IN FOOD SCIENCE
CR: 3 PR: 1820-512

Selected topics in food science to cover current issues of interest will be covered. The emphasis will change as the need emerges with time.

1820-597: THESIS

CR: 0

1820-598: THESIS

CR: 0

2000-599: THESIS

CR: 9