COURSE CAPSULES

First Semester

FT 5101. Principles of Food Science (2)
Definition and scope; Constituents of foods: Carbohydrates - functional properties of mono-oligo- and polysaccharides; Lipids- functional properties, lipid oxidation and antioxidants; Proteins- functional properties; Water; Organic acids, Emulsifiers: Food enzymes, Food colours- natural and approved synthetic colours, Meat pigments, Food flavors; Food systems Browning reactions; Food deterioration and their control; Principles of food preservation; heat preservation, cold preservation, dehydration, concentration, chemical preservatives, food fermentation, food irradiation.

FT 5102. Food Physics (2)
Units & dimensions, Laws of motion force & energy, Properties of gases and vapors, Physical properties of food materials, measurements and applications in the food supply chain, Rheological properties, rheological models, viscoelastic ;properties of foods, Newtonian & non-Newtonian behavior, fluid flow (laminar & turbulent), pressure drops in fluid flow, force & deformation, Viscosity measurements, Food emulsions, properties of emulsifiers & stabilizers, Surface tension, interfacial phenomena. Stabilization of emulsions, Destabilization processes, Role of surfactants in the above processes & methods of determining the changes in system stability, Food microscopy & applications.

Practical: Determination of physical properties, viscosity.

FT 5103. Biochemistry (3)
Carbohydrates, Lipids & Proteins: structures, properties & reactions, Nucleoproteins: structure, properties, protein synthesis, Enzymes: properties, classification, activity & inhibition, Vitamins: structures, properties, deficiency symptoms & co-enzyme relationship, Digestion & energy relationships, Metabolism of Carbohydrate, Lipid, Protein & Mineral, Metabolic interrelationships, Hormone ;action.

Practical: Quantitative and qualitative detection of carbohydrate, protein and fat; enzymatic digestion; chemical hydrolysis

FT 5104. Food Chemistry (2)
Role of water activity in food stability, freezing and food stability, functions and reactions of carbohydrates, reactions of lipids, environmental effect on protein, food pigments, food flavors, food additives, enzymes and food industry, enzymatic browning.

FT 5105. Food Microbiology (2)
Major groups of microorganisms and their action on foods; Intrinsic and extrinsic parameters in foods controlling microbial activity, Ecology and distribution of spoilage & other microorganisms in food, Food-borne illnesses and detection of causative microorganisms, Rapid methods for detection & enumeration of microorganisms, Indices of food sanitary quality and microbiological standards & criteria, Molecular biology of microorganisms in foods, Metabolic pathways for fermentation and fermentation products, Microbial food spoilage.

Practical: Laboratory techniques for isolation, cultivation, cultural characterization and staining of microorganisms of food origin; determination of biochemical activities of microorganisms, enumeration of microorganisms in food samples, microbiological analysis of food products, microbiology of milk and water.

FT 5106. Food Preservation (2)
Principles and application of hurdle technology, Chemical preservation (sugar, salt, chemicals, acid, smoke), Alcoholic and acidic fermentation, Preservation by radiation, Preservation through temperature reduction (chilling, refrigeration, freezing), Preservation through water removal (drying, dehydration, evaporation, freeze concentration, concentration by membrane processes, freeze drying), Preservation by heat (cooking, blanching, pasteurization, sterilization), Controlled and modified atmosphere storage, Preservation by microwaves and

electric resistance, Preservation using hydrostatic pressure and high voltage electric pulses, Preservation by microbial decontamination and use of natural anti-microbials

FT 5107. Science and Technology of Commodity Processing (2)
Sources of raw materials & their processing potential, Food colloids and stabilizers, Processes as a series of unit operations, Processing equipment & processing conditions, Principles of thermal processing, Heat penetration curves, Lethality calculations, Time-temperature profiles for aseptic systems, Applications of dehydration and drying, Applications of IQF, freezing and refrigeration, Confectionaries & product development, Construction of flow charts, cost estimation & work force, Strategies for product development R & D process

FT 5111. Food Safety (2)
Concepts of food toxicology, Epidemiology of food borne diseases, Adulterants and contaminants and chemical residues in foods, Chemical contaminants (Natural toxicants of plant origin, Mycotoxins, Sea food toxins, Environmental contaminants, Toxic substances generated during processing, Chemical residues, Microbiological contaminants (intoxicants and infective agents), Preservatives and additives, Genetically modified materials, Hazard analysis and critical control points, Scientific basis of safe use of additives, Field visit

FT 5112. Food Protection Systems (2)
Transport, cleaning and storage of raw materials, Fumigation and disinfection of storage systems, Protection of foods from pests, Effects of humidity and ambient temperature on stored foods, Reduction of postharvest crop losses, Study report on problems in food protection measures in industry.

FT 5113. Human Nutrition (3)
Integrated metabolism; Nutrient interrelationships; Composition of the body, compartments of the body, growth; Energy content of foods, measurement of energy expenditure, energy requirement, energy balance and body weight; Protein: sources, protein turnover, nitrogen balance, protein requirements, protein quality; Fats: adipose tissue, deposition of fats, dietary needs of fats; Vitamin and mineral requirement and deficiencies; Nutrition for different stages of the life cycle; basis of determining nutrient requirements.

Practical: Measurement of blood pressure, blood sugar, total protein and lipid profile.

FT 5114. Nutritional and Health Aspects of Food (2)
Definition of terms; Global and Sri Lankan nutrition situation, role of nutrition in human development and its impact on the society; food pyramid; the balanced diet, Nutritional aspects of: cereals and tubers, pulses and animal proteins, protein quality, breast feeding and formula feeding, fruits and vegetables, fats and oils, coconut and hear diseases. Role of fibre in nutrition, alcoholic and non-alcoholic beverages, vegetarianism, organic foods, junk foods and functional foods; food allergy, toxicants in foods, losses of food and nutrients during processing and cooking.

FT 5151. Sociology of Food and Nutrition (2)
Broad overview of sociological issues in food and nutrition: Understanding the culture, food and man, population food and nutrition, structural aspects of food production, sustainability of food systems, food habits and consumption patterns.

FT 5152. Sports Nutrition (2)
Exercise, energy requirements and weight maintenance; Review of muscle anatomy and physiology; Review of cardiovascular physiology; Energy metabolism, Exercise and dietary habits of Sri Lankan population; role of exercise in health maintenance and weight loss; Review of legal nutritional supplements: Theoretical and practical aspects of dietary manipulation Nutritional concerns of exercise: Exercise and the female athlete: The young athlete: nutrition and sport; international consensus view on the optimal diet.

FT 5153. Nutrition Advocacy and Counselling (2)
Social mobilization and advocacy, community participation and participatory development approaches, principles of nutrition advocacy, nutrition advocacy strategies, ABCD model, message preparation. The concept

and importance of counselling, principles, process and methods of counselling, skills needed for counselling, difficult moments of counselling and potential counselling functions.

FT 5154. Functional Foods and Nutraceuticals (2)
Introduction to functional foods and nutraceuticals – history, present status and outlook, Classification of functional foods and nutraceuticals, Nutraceuticals in health promotion and disease prevention, Techniques utilized in the production of functional foods and nutraceuticals and their practical aspects, Stability, quality and safety aspects of functional foods and nutraceuticals, Economic and marketing issues of functional foods and nutraceuticals, Current regulatory systems for functional foods, nutraceuticals and dietary supplements in the world.

FT 5155. Food Biotechnology (2)
Introduction to food biotechnology, Techniques in food biotechnology and practical aspects, Improving plant and animal - derived food products through biotechnology; applications, Biotechnology in food additive industries, Fermentation biotechnology of traditional foods in Asia, safety and diagnosis of biotechnologically - derived foods, regulations controlling the application of food biotechnology, Major concerns about biotechnologically-derived foods.

FT 5156. Food Regulations and Quality Management Systems (2)
Codex Alimentarius Commission, WTO, and other international and national food standards, National food laws, regulations, guidelines & specifications and the national food regulatory system, Food testing and regulatory mechanisms, Food inspections, Quality control in food industry, Role of quality controllers, Quality assurance, GMP, HACCP, ISO and laboratory accreditation, Total quality management in food industries, Science based quality management principles.

FT 5157. Beverage Technology (2)
Global trends in beverage products. Introduction, Statistic & trends in tea products, Black tea & green tea processing, Tea grades & blends, Value added tea products, Sensory attributes & tea tasting, Quality standards for tea, Health & Nutrition of tea, Herbal tea, local traditional beverages, Introduction, Statistic on cocoa, Cocoa bean processing, quality attributes, Cocoa products, Introduction & Statistics on coffee production, Processing of Coffee beans, Quality attributes & coffee products, Carbonated & non- Carbonated beverages, Fruits based beverages, Sports drinks, Energy drinks, Potable and Mineral water.

FT 5199. Seminar

Second Semester

FT 5201. Food Plant Layout and Operations (1)
Planning a layout for a food processing plant, Identification of locations and facilities and equipment, Regulatory and environmental requirements, Provision of services and safe operations in food plants, Plant sanitation, Sanitary and personnel health requirements, Waste disposal systems and waste management, Raw material handling and storage requirements, Testing facilities, Product storage requirements, Other support services, facilities and their maintenance, Auditing, accreditation and management, Trouble shooting in food processing.

FT 5203. Production and Marketing Operations in Food Manufacturing Organizations (2)
Environment of a business organization, Financial aspects of a business organization, Work study and productivity, Concepts of quality: Quality control, Quality assurance, ISO series, Total quality management, Production planning and control, Marketing & custom orientation, Information for marketing decisions, Marketing mix considerations, Integration of total marketing efforts.

FT 5204. Industrial Exposure (1)

The students are expected to visit at least 3 food processing industries, observe and make notes on aspects of processing, hygiene and storage. A report submitted by the students will be assessed for grading.

FT 5205. Cereal Chemistry and Bakery Products Technology (3)
Cereal grains structures and chemical composition, Starch chemistry, Characteristics of cereal starches, Gelatinization and retrogradation, Processing of cereal grains, Rice Processing. Flour milling. Flour Characteristics, Role of water, salt, yeast, shortening, chemical leavening agents, spices and flavourings in baking, Baking process, Dough process; Rheological characteristics of dough, Staling of bread; composite flour; fortification, Extrusion products, Processed cereal foods.

Practical: Theological properties of starch and flour; baking process and bakery products development; milling performances of cereals.

FT 5206. Horticultural Product Technology (2)
Handling of commodities during harvesting, transportation and storage, Commodity treatments, Packaging house operations , Control of postharvest ripening of fruits, Extension of postharvest life of vegetables, Postharvest control of insects and diseases, Application of canning, dehydration and freezing technologies, Processing of ready-to-use products from fruits and vegetables, Theories for preparation of fruit preserves, Horticultural products for exports.

FT 5207. Meat and Fish Science and Technology (3)
Introduction, Slaughtering of farm animals, Composition and structure of muscle, Color and flavor of meat, Textural properties of meat, Processing & preservation of meat & meat products, Processing & preservation of fish & fish products, Spoilage of meat and fish products, Food regulations relating to meat and fish products.

FT 5208. Poultry and Egg Products Technology (2)
Introduction to poultry Science, Slaughtering of poultry, Quality and factors determining quality of poultry meat, Slaughter house management, Composition and nutritive value of poultry and eggs, Product development in poultry, Structure, composition and functional properties of eggs, Processing of egg products, Storage of egg products, Contamination problems associated with poultry products.

FT 5209. Processing of Milk and Milk Products (2)
Dairy chemistry, Introduction to milk processing, Testing and quality control in milk products, Legal definitions and physical parameters and sanitation in milk processing, Methods of milk preservation, Milk spoilage and milk borne diseases, Hygienic quality of milk and low temperature storage, Hazardous materials in milk, Processing of fluid milk, Manufacture of powdered, condensed, flavoured, toned and low fat milk products, Formulation of milk products, Manufacture of curd and yoghurt, Manufacture of butter and ;ghee, Milk coagulation and cheese manufacture, Frozen desserts and ice cream manufacture.

FT 5210. Processing of Kernel and Nut Products (1)
World trends in kernel & nut products, Composition and nutritional significance, Processing of copra, fresh coconut kernel (wet process), value added commercial coconut products, coconut cream, coconut milk powder, liquid coconut milk, Desiccated coconut, Processing of palm fruit & palm kernel, Products from palm oil & palm kernel oil, value added industrial palm oil products, Processing of cashew nut, peanut, almond, walnut, hazel nut and value addition. Other local nuts used in food industry.

FT 5211. Spice Processing Technology (1)
Spices & condiments and their constituents, Pre-harvest and post-harvest factors affect on quality characteristics of spices, Processing of spices, cinnamon, pepper, nutmeg, ginger, cardamom, cloves, chili, vanilla, turmeric, onion *etc.* Drying, storage and packaging of spices, Extraction of essential oil and oleoresins from spices, value added spice products & condiments. Quality parameters of spices and their products, Spice based food additives. Flavor chemistry, Sensory characteristics & changes during processing.

FT 5213. Techniques in Research and Scientific Writing (2)
Elements and practice of research, Planning a publication, Preparation of a publication Preparation of a research proposal, Practical.

FT 5214. Community Nutrition (2)
Guidelines for healthy living, Preparing meals for the family, breast feeding, breast feeding code, complementary feeding, feeding and caring of infants, children, sick children, adults and elderly; Nutrition of the girl child; Diet during pregnancy and lactation; Major nutritional deficiency diseases in the community: PEM, vitamin A deficiency, iron deficiency anemia and iodine deficiency disorders; Diet and lifestyle diseases; Maternal and child health services, Nutrition and infection; Primary health care, Growth monitoring; Impact of population growth on nutrition, Family planning; Nutrition surveillance system; Food security; Urban nutrition problem; Nutrition education in the community.

Practical: Use of food composition tables for preparation of balanced diets, analysis of nutritional information of foods available in supermarkets.

FT 5215. Assessment of Nutritional Status (2)
Assessment of nutritional status in the community: Dietary assessment; Biochemical assessment; anthropometric assessment; clinical examination for nutritional deficiencies, Methodology for nutritional surveys; Nutrition rehabilitation. The course will include practical and group assignments on dietary surveys and anthropometry.

FT 5216. Planning and Management of Food and Nutrition Programmes (2)
Approaches in food and nutrition planning; The planning process, Implementation and management process, Monitoring and evaluation process; Management information systems; Planning of Food and nutrition programmes: problem identification, analysis of food and nutrition situation, analysis of resources and constraints, setting goals, objectives and targets, staffing, directing and coordinating; general policies and directions, alternative approaches; Nutrition criteria in project analysis and appraisal; Nutrition in area development and sectoral programmes; Implementation, management and evaluation of food and nutrition programmes; Provision for programme implementation and management: Support services and programmes: Complementary programmes, national research programme, training and extension programmes; Existing nutrition intervention programmes.

Practical: Includes case studies and individual and group exercises.

FT 5217. Dietetics (2)
Principles of nutritional support and Diet Therapy, Introduction to hospital diets, Existing hospital diets, Assessment of nutritional status of patients, Diet and diseases of the gastro- intestinal tract, Diet of mal-absorption disorders, Diet for liver and Gallbladder diseases, Dietary management of obesity, Diabetes, cardiovascular diseases, Kidney Disorders, Nutritional support for surgical, trauma & burns, Diet and the cancer patient, Diet and other diseases- neurological and psychiatric disorders, AIDs.

Practical: Will consist of hospital visits and practical on diet preparations.

FT 5218. Nutrition Epidemiology (2)
Use of epidemiology and other nutrition research methods to address specific nutrition research questions; definition, objectives, cause and risk, types of epidemiological study, experimental and observational; Descriptive studies: surveys, sampling, survey bias; Cohort studies: Principles advantages and disadvantages of retrospective and prospective, case-control and intervention studies; Interpretation of epidemiological data; basic statistics. Introduction to nutritional epidemiology and important scientific concepts in study design.

FT 5221. Food Lipids (2)
Nomenclature and classification of fats and oils, physical properties; extraction, isolation and analysis of dietary lipids; fats and oil processing; refining, bleaching, deodorizing, hydrogenation; recent advances in fats and oil processing, utilization of fats and oils in shortening technology, margarine and specialty lipids, lipids as

functional foods and nutraceuticals, potential sources, health benefits of specialty lipids, sphingolipids, conjugated linoleic acids, marine oils, structured lipids, trans fatty acids, biotechnological advances in lipid technology, deep fat frying.

FT 5222. Food Process Engineering and Unit Operations (2)
Physical characteristics of foods materials , Mass and energy balance , Rheology of foods; stress-strain behavior rheological perimeters & models in materials, Viscoelastic behavior and rheometers, Laminar & turbulent flow, friction factor, pressure drop and pumping of fluid foods, Heat transfer: forms of steam: conduction, forced & free convection, radiation, steady & unsteady state heat transfer, Overall heat transfer coefficient, performance of heat exchangers & types, Food dehydration & drying: Psychometrics, Equilibrium moisture content, estimation of drying rates & time for dryer types , Properties of frozen foods, ice-crystal formation & freezing point dispersion, cooling rate determination, Aero & hydrodynamic characteristics, Size reduction equipment / machines, Mechanical separation techniques

FT 5223. Food Analysis (3)
Sampling, Proximate analysis, Kjeldahl nitrogen estimation, Potentiometry, pH and ion selective electrodes, Colorimetry, Chromatography, Spectroscopy, Spectrophotometry, Flame photometry, Atomic Absorption Spectrophotometry, Fluorometry, Refractometry and polarimetry, Food microscopy, Analysis of milk & milk products, Laboratory quality assurance, Microanalytical methods for pesticides, vitamins, & mycotoxins, Interpretation and presentation of results, Food texture measurements, Product evaluation based on laboratory analysis.
Practical: Food sampling; instrumentation: HPLC, GLC, AAS & UV visible Spectroscopy; analysis of carbohydrate, protein and fat; detection of food colors, food additives and contaminations.

FT 5224. Sensory Evaluation of Foods (2)
Concepts of sensory evaluation, Sensory attributes, Product oriented tests, Consumer oriented tests, conducting sensory tests, Training panelists, Application of sensory testing, Descriptive sensory analysis, Flavor profile analysis, Texture profile analysis

Practical: Paired comparison test, Triangle test, Using line-scales, Ranking test (product oriented test), Paired preference test, Ranking test (consumer oriented test), Hedonic test.

FT 5225. Current Topics in Nutrition (1)
Food and nutrition related topics of current interest will be discussed at length. Students will be motivated to gather information and critically examine facts in order to have a better understanding and judgment on issues and remedial approaches.

FT 5226. Consumer-Driven Food Product Development (2)
Consumer responses to food products, Sensory perception as a basis of food acceptance and consumption, Effect of culture, Ethics and beliefs on the choice of food, Psychobiological mechanisms in food choice, Consumer attitudes towards food innovation and technology, Methods to understand consumer attitudes and motivations in food product development, Sensory research and consumer-based food product development, Consumer driven-concept development and innovation in food product development, Case study of consumer-oriented food product development.

FT 5298. Directed Study (5)
Self-learning exercise guided by a supervisor to carry out a limited study or produce a review manuscript publishable in a refereed journal.