M.Sc. (Food Science and Technology)

DSC- FT- 1 A: FUNDAMENTALS OF FOOD SCIENCE AND TECHNOLOGY

PART I Unit 1 Introduction to Food Science and Technology • Definition, scope and current trends in food science and technology Unit II Food Groups, Nutrients and Balanced Diet • Definition and meaning of food, nutrition, nutrient, health, concept and characteristics of a balanced diet. • Introduction to basic food groups and nutrients, food pyramid, macro and micronutrients. • Effect of processing on nutrients. Unit III Browning reactions in foods • Classification (enzymatic, non-enzymatic and metallic browning), causes and prevention of browning Unit IV Cereals and Pulses • Composition and nutritive value, types of cereals, processing of cereals and pulses (gelatinization of starch and the factors affecting it, germination and fermentation), toxic constituents in pulses, milling of pulses. Unit V Fruits and vegetables Classification of fruits and vegetables, composition and nutritive value; effect of processing on pigments. Unit VI Chocolate and cocoa products 10 Cocoa bean processing, preparation of chocolate liquor, cocoa butter and chocolate

DSC – FT- 1B : FUNDAMENTALS OF FOOD SCIENCE AND TECHNOLOGY

PART II THEORY Unit I Milk and milk products • Composition and nutritive value • Introduction to liquid milk technology (clarification, pasteurization, homogenization, fortification, sterilization) • Types of milk • Effect of processing on milk, • Introduction to milk products. Unit II Eggs • Composition and nutritive value • Structure of an egg • Egg quality and deterioration • Green ring formation in boiled egg, preservation of eggs • Egg foams – stages of preparation and factors affecting them • Effect of heat on egg proteins; functions of eggs in cookery. Unit III Meat, Fish and Poultry • Composition and nutritive value • Selection/purchasing criteria for meat, fish and poultry • Tenderization of meat. Unit IV Sugar • Composition and nutritive value • Properties of sugars • Manufacturing/refining of sucrose • Sugar cookery – crystalline and noncrystalline candies, sugar based products. Unit V Fats and oils • Composition and nutritive value • Types of fats/oils and their functions • Rancidity in fat and its prevention • Changes in fat during heating • Care of fat used for frying, emulsions. VI Introduction to food hygiene and food adulteration • Food hygiene, factors affecting food safety, personal hygiene. • Adulteration, adulterants and their effects on health.

DSC – FT- 1C: BASIC BAKING TECHNOLOGY

Unit 1 Baking Industry • Baking industry and its scope in the Indian economy. • History of Bakery - present trends, prospects • Nutrition facts of bakery products. Unit II Wheat Grain Technology • Wheat grain– its structure • Milling of wheat; types of refined wheat flour; composition of refined wheat flour (gluten, amylose/ amylopectin, enzyme activity, moisture) and its storage Unit III Cake Technology • Preparation of cakes - types of cakes; ingredients used; methods of batter preparation; steps in cake making; balancing of cake formula; evaluation of the baked cake; operational faults in cake processing and the remedial measures. Labeling and Packaging. Costing • Cake decoration- different methods of cake decoration Unit IV Pastry Technology • Preparation of pastry - types of pastries (short crust, puff/flaky and choux pastry); ingredients; processing and evaluation. faults and remedies

DSC- FT- 1D: INTRODUCTION TO FOOD SAFETY AND PRESERVATION

Unit I: Purpose and Scope of Preservation • Objectives of preservation and processing • Scope of preservation industry in India. Unit II: Post-harvest Changes and Spoilage • Physical, chemical and microbiological changes in fruits and vegetables • Factors affecting growth of microorganisms and the control measures Unit III: Food Safety • Key terms, factors affecting food safety, recent 20 concerns • Food laws, standards and regulations • Food additives and contaminants • Hygiene and sanitation • HACCP Unit IV: Principles and Methods of Preservation • Asepsis • Use of low temperature, • Use of high temperature • Removal of moisture • Removal of air, • Use of chemical preservatives • Fermentation • Irradiation • Gas preservation • Newer methods Unit V: Fruit and Vegetable Processing – Sauces and Beverages • Chutney and sauces- definition, method of preservation, steps in preparation of chutney and sauces. • Fruit beverages- definition and classification, method of preservation (with special emphasis on pasteurization, use of chemical preservatives, sugar), role of various ingredients.

DISCIPLINE SPECIFIC ELECTIVE (DSE) DSE- FT 1: ADVANCED BAKING TECHNOLOGY

Unit I: Bread Technology • Preparation of bread - ingredients used; methods of dough preparation; steps in bread processing; evaluation of the baked bread; staling of bread; diseases of bread. Unit II: Biscuit and Cookies Technology • Preparation of biscuits and cookies – types; • ingredients; processing and evaluation. Crackers Unit III: Food Packaging • Packaging – it's importance, essential features of an ideal package; various food packaging materials and their characteristics • recent trends in the field of packaging (active packaging, intelligent packaging, RFID) • label regulations and designing for packaged foods , nutritional labelling Unit IV: Marketing and Cost Control • Marketing - definition, scope, understanding the 4Ps – (Product, Price, Place, Promotion), marketing techniques, marketing and distribution of processed products. • Cost control – food cost, labour cost and other costs; costing of processed products.

DSE-FT 2: ADVANCED FRUIT AND VEGETABLE PRESERVATION TECHNOLOGY

Unit I: Dehydration and Concentration • Dehydration- definition and objectives, method of preservation, normal drying curve, water activity, factors affecting rate of drying, sun drying, types of dehydrators (air convection, drum, freeze and vacuum driers) steps in dehydration of fruits and vegetable • Concentration- definition and objectives, techniques Unit II: Refrigeration and Freezing • Definition and objectives, difference between freezing and refrigeration, systems of refrigeration, method of preservation, steps in freezing fruits and vegetables, cryogenic freezing of fruits and vegetable, evaluation. Unit III: Canning • Definition and objectives, selection of fruits and vegetables, method of preservation, steps of canning fruits and vegetables (with special emphasis on blanching, exhausting and heat processing), spoilage of canned foods Unit IV: Introduction to New Food Product Development • Need and importance for developing a new product, types of new products, challenges, failure of new product Unit V: Fruit and Vegetable Processing –Pectin Products Preserves and Pickles • Jam, Jelly and Marmalade- definition, role of pectin and theory of gel formation, method of preservation, steps of preparation, evaluation. • Preserves- definition, method of preservation, steps of preparation, evaluation, candied, crystallized and glazed fruits. • Pickles- definition, classification, method of preservation, steps of preparation of vinegar pickles, evaluation.

DSE-FT 3: FOOD SAFETY, HYGIENE AND QUALITY TESTING

Unit I Food Laws and Regulations • Introduction to food acts laws and standards • National food safety and standard act • International standards, regulatory agencies • Consumer protection act Unit II Food Quality Management • Characteristics of quality • Quality Control, • Quality Assurance • Total Quality Management • Quality Management System • Good Manufacturing Practices • Hazard Analysis Critical Control Point System (HACCP) Unit III Introduction to Food Safety and Hygiene • Food hygiene • Factors affecting food safety • Food spoilage • Food handling • Special requirements for high-risk foods, • Safe food cooking temperature and storage techniques. Unit IV Hygiene and Sanitation in Food Service Institutions Cleaning and disinfection Personal hygiene Pest control Waste disposal Unit VI Sensory Methods of Food Quality Testing • Sensation of taste, smell, appearance and flavor, sensory evaluation techniques Unit VII Objective Methods of Food Quality Testing • Physical test methods (moisture, acidity, water activity, texture, viscosity, colour) • Simple methods of chemical analysis (protein, fat, water, ash) • Microbiological sampling and testing.