DETAILED SYLLABUS

FOR

DISTANCE EDUCATION

POST GRADUATE PROGRAM

M.SC. IN FOOD AND NUTRITION

SEMESTER SYSTEM
COURSE TITLE : M.Sc. IN FOOD AND NUTRITION
DURATION : 2 YEAR
MODE : SEMESTER
TOTAL MARKS : 700

FIRST SEMESTER

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Paper-1

Paper Code- MSCFN/S/110

ADVANCED PHYSIOLOGY

UNIT-I

UNIT-II
Endocrinology and Reproduction Anatomy of endocrine glands and Reproductive organs. Hormones - Mode of action, functions of hormones of the endocrine glands - Pituitary,
UNIT-III  

UNIT-IV  

UNIT-V  
Immunity - Properties, natural and acquired Immunity, features of immune responses, antigen - antibodies - types, properties, antigen - antibody interaction, Auto immune disorder and allergy.

ADVANCED FOOD SCIENCE

UNIT-I  

UNIT-II  
Pulses - Composition, types, Cooking methods, factors affecting cooking quality, nutritive value, toxic constituents and its removal, Germination and factors affecting Germination. Vegetables - Structure, Classification, Composition, Methods of Cooking, Changes on Cooking - pigments, Nutritive value. Fruits - Structure, Classification, Composition, Ripening of fruits, changes on ripening, Pectic substances, Cooking changes.
UNIT-III
Egg - Structure, Composition, Nutritive value, Grading, Methods of Cooking and Role of egg in cookery. Meat - Structure, Composition, Nutritive value, Classes and Grades of meat cuts, Changes on cooking and Rigor mortis. Poultry - Composition, Nutritive value, Grades, Methods of cooking, Effects of cooking. Fish - Composition, Nutritive value, Types, Cuts, Selection, Spoilage, Cooking and Factors effecting cooking quality.

UNIT-IV

UNIT-V

Paper-3

ESSENTIALS OF MACRO NUTRIENTS

UNIT-I : CARBOHYDRATES
History, classification, sources, functions, digestion, absorption, utilization and storage, hormonal regulation of blood glucose, role of carbohydrate in dental caries. Dietary fiber - Development and concept, role of fiber in lipid metabolism, colon function, blood glucose level and GI tract functions - Disadvantages of Dietary fibre.

UNIT-II : LIPIDS
History, classification, sources, functions, digestion, absorption, utilization and storage, effects of deficiency and excess of fat, lipotropic factors, role of saturated fat, cholesterol, lipoprotein and triglycerides and EFA in the diet.

UNIT-III : PROTEINS AND AMINOACIDS
History, classification, sources, functions, digestion, absorption, utilization and storage, protein quality evaluation, nutritional classification of aminoacids, aminoacid balance, imbalance and toxicity, aminoacid pool.

UNIT-IV : ENERGY
History, energy value of foods, SDA, energy production, factors affecting thermogenesis, energy utilization by cells, energy output - BMR, physical activity, factors affecting energy input - hunger, appetite, energy balance, measurement of energy content of food.

UNIT-V
Inter relationship between carbohydrate, fat and protein, nutritional adaptation and hypotheses.

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Paper-4
MSCFN/S/140

HEALTH AND FITNESS

UNIT-I
Definition of Health and wellness - Factors affecting health and wellness. Physiological, psychological and social health.

UNIT-II
Fitness - Definition, basic components of physically active life style in preventing obesity, osteoporosis, heart disease, and diabetes, Physical fitness tests - for flexibility, muscle endurance (any 3 tests for each) and cardio vascular endurance.

UNIT-III
Nutrition and exercise - energy requirement for, aerobic and anaerobic exercises, carbohydrate loading, water and dehydration, special foods. Importance of exercise in preventing life style diseases - Diabetes, CVD, hypertension, obesity and osteoporosis.

UNIT-IV
Sports nutrition - special foods - Nutrition and performance of athletes and players, dietary modifications and diet plan, sports supplementation.

UNIT-V
Special nutritional needs for monitoring, space, military and sea voyage.
DETAILED SYLLABUS

FOR

DISTANCE EDUCATION

POST GRADUATE PROGRAM

M.SC. IN FOOD AND NUTRITION

SEMESTER SYSTEM
SECOND SEMESTER

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Paper-1
Paper Code- MSCFN/S/210

ESSENTIALS OF MICRO NUTRIENTS

UNIT-I : HOMOESTASIS MAINTENANCE
Water - Distribution of water in the body, role of water, Water balance, Fluid balance
Electrolytes - Electrolyte content of fluid compartments, Functions of electrolyte, Sodium, Potassium and Chloride, Absorption, Transport and balance, Factors affective electrolyte balance and hydrogen ion balance.

UNIT-II : FAT SOLUBLE VITAMINS
UNIT-III: WATER SOLUBLE VITAMINS
Thiamine, Riboflavin, B12, Folic acid, Pyridoxine, Pantothenic acid, Niacin, Biotin, Ascorbic acid - Chemistry, Functions, Physiological action, Digestion, Absorption, Utilization, Transport, Storage, Excretion, Source, RDA, Deficiency, Diagnosis of deficiency, Toxicity, Interaction of fat soluble vitamins with other nutrients.

UNIT-IV: MACROMINERALS
Calcium - Distribution in the body digestion, Absorption, Utilization, Transport, Excretion, Balance, Deficiency, Toxicity, Sources, RDA, Regulation of calcium concentration, Calcium interaction with other nutrients. Phosphorus - Distribution, Concentration in the body, Digestion, Absorption, Utilization, Transport, Storage, Excretion, Sources, Calcium: Phosphorus ratio. Iron - Distribution, Concentration in the body, Digestion, Absorption, Utilization, Transport, Storage, Excretion, Sources, RDA, interaction with other nutrients, Role of iron in prevention of anaemia.

UNIT-V: MICRO MINERALS
Iodine, Fluoride, Mg, Cu, Zn, Se, Manganese, Chromium, Distribution in the human body, Physiology, Function, deficiency, Toxicity and Sources.

NUTRITION THROUGH LIFE CYCLE

UNIT-I
Recommended allowances - RDA for Indians, basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. General concepts about growth and development through different stages of life.

UNIT-II
Nutrition in Pregnancy Stages of gestation, maternal weight gain, complications of pregnancy, maternal physiological adjustments, nutritional problems and dietary management, importance of nutrition during and prior to pregnancy, teenage pregnancy - nutritional problems and dietary management, planning a menu.

UNIT-III
Nutrition during Lactation Physiology of lactation, hormonal control and reflex action, efficiency of milk production, problems of breast feeding, nutritional composition of breast milk, nutritional concerns during lactation, special foods during lactation, dietary
modification, planning a menu. Nutrition in Infancy - Infant feeding, nutritional needs, premature infant and their feeding, weaning foods. Feeding problems, infant formulae, lactose intolerance, planning menu. Nutrition in Pre-school - Physiological development related to nutrition, feeding problems, behavioural characteristics, nutritional requirement and planning diet.

UNIT-IV
Nutrition in school children - feeding school children and factors to be considered. Planning a menu, feeding problems, packed lunch. Nutrition during Adolescence - changes in growth and development, hormonal influences, Age at menarche - factors affecting age at menarche, psychological problems, body image, disordered eating behaviour, nutritional problems, planning a menu.

UNIT-V
Nutrition in Adult and Elderly - Nutrition and work efficiency, Menopausal and post menopausal women, hormonal changes, nutritional requirement, planning a menu. Physiological changes in aging - Psycho-social and economical factors affecting eating behaviour, social situation, knowledge and belief, institutionalization, common health problems, nutritional requirement, modification in diet, feeding old people.

Paper-3

MSCFN/S/230

FOOD MICROBIOLOGY

UNIT-I
Classification of microorganism, morphology of yeast, mould, bacteria, virus, algae and protozoa.

UNIT-II
General principles underlying spoilage of food, fitness and unfitness of food for consumption, contamination and spoilage of non perishable and perishable foods.

UNIT-III
Food in relation to disease - food born diseases, food infection, intoxication, microbial toxins - types, bacterial poisoning and infection - causative agents and sources, symptoms and prevention of Staphylococcal food poisoning, botulism, salmonella, bacillus infection, E.coli, food poisoning of fungal origin - ergotism, aflatoxin.

UNIT-IV
Control of microorganism - Principles of preservation, Preservation by high and low temperature, chemical preservatives, salt, sugar as preservative, new trends in preservation.

UNIT-V
Sterilization by Physical agents - Heat, moist heat, fractional sterilization, pasteurization, other types of sterilization, chemical sterilization. Microbiology of water, typical organisms in water, types of bacterial examination for water, water treatment.

**HUMAN RIGHTS**

**UNIT-I**

**UNIT-II**

**UNIT-III**

**UNIT-IV**

**UNIT-V**
DETAILED SYLLABUS

FOR

DISTANCE EDUCATION

POST GRADUATE PROGRAM

M.SC. IN FOOD AND NUTRITION

SEMESTER SYSTEM
COURSE TITLE: M.Sc. IN FOOD AND NUTRITION
DURATION: 2 YEAR
MODE: SEMESTER
TOTAL MARKS: 700

THIRD SEMESTER

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Paper-1

Paper Code- MSCFN/S/310

NUTRITIONAL BIOCHEMISTRY

UNIT-I : BIOLOGICAL OXIDATION
Enzymes and co-enzymes involved in oxidation and reduction, respiratory chain, phosphates in biologic oxidation and energy capture, role of respiratory chain and mechanism of phosphorylation.

UNIT-II : METABOLISM OF CARBOHYDRATE
Glycolysis, Gluconeogenesis, TCA cycle, HMP shunt, bioenergetics, disorders of carbohydrate metabolism - galactosemia, glycogen storage disease, pentosuria, abnormal level in blood glucose.

UNIT-III : METABOLISM OF LIPIDS
Biosynthesis and oxidation of saturated and unsaturated fatty acids, glycerides, phospholipids and cholesterol, bioenergetics, disorders of lipid metabolism, lipoproteins and their significance.

UNIT-IV : PROTEIN AND AMINOACID METABOLISM
Biosynthesis of protein, general catabolism of aminoacids, deamination, transamination, urea cycle, disorders of aminoacid metabolism - phenyl ketonuria, cystinuria, albinism, alkaptonuria, maple syrup disease.

UNIT-V : METABOLISM OF NUCLEIC ACIDS
Biosynthesis of purine and pyrimidine nucleotides, DNA replication and repair, biochemical importance of cyclic AMP. Disorders of purine and pyrimidine metabolism - gout, aciduria, xanthinuria. Structure and properties of DNA, RNA - mRNA, tRNA, rRNA.

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Paper-2

MSCFN/S/320

DIET THERAPY

UNIT-I

UNIT-II

UNIT-III
Diseases of cardio vascular system - Risk factors of CVD, Etiology, Symptoms, and dietary management of atherosclerosis, Ischemic heart disease, dislipidemia, prevention through lifestyle modifications. Hypertension - Classification, prevalence, Diet related factors influencing hypertension, Management of hypertension.

UNIT-IV

UNIT-V
Diseases of the Kidney - Etiology, Symptoms and Dietary modification, Nephritis, Nephrosis, Acute and chronic renal failure, Nephrolithiasis, Transplantation and dialysis, Dietary Modification. Dietary modification and Nutritional Support for cancer and HIV.

COMMUNITY NUTRITION

UNIT-I

UNIT-II
Assessing the food and nutrition problems in the community - socio economic diet survey, anthropometry, clinical examination, laboratory examination for common nutrition problems.

UNIT-III
Nutrition and National Development, National nutritional policy - Aim, objectives, guidelines and thrust areas. PDS - Public distribution system, Agricultural planning - New strategies.

UNIT-IV
UNIT-V
Demographic changes due to malnutrition. IMR, MMR, Mortality, morbidity rate, birth rate, sex ratio, poverty level. Nutrition education - Merits, planning, evaluation and conduct. Health care delivery - PHC, School Health services and their role in preventing communicable diseases.

UNIT-I
Natural / manmade disasters resulting in emergency situations. Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies. Factors giving rise to emergency situation in these disasters. Illustration using case studies from Indian Subcontinent.

UNIT-II

UNIT-III
Communicable diseases: Surveillance and treatment. Control of communicable diseases in emergencies. Role of immunisation and sanitation.

UNIT-IV

UNIT-V
Public nutrition approach to tackle nutritional problems in emergencies.
DETAILED SYLLABUS

FOR

DISTANCE EDUCATION

POST GRADUATE PROGRAM

M.SC. IN FOOD AND NUTRITION

SEMESTER SYSTEM
# Fourth Semester

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**Paper-1**

**Course Title:** Research Methodology and Applied Statistics

**Unit-I**
Meaning of research, Types of research, Objectives of research. Collection of Data - Methods of collecting data. Primary and Secondary data - Sources of Primary and Secondary data, Editing the data and precautions used in the use of data. Different types of research tools for collecting research data, defining and determining a problem.

**Unit-II**
Sampling Design - Census and sampling survey, Methods of sampling - Probability and non-probability sampling methods size of the sample, Merits & Demerits of each sampling method, Sampling errors and methods of Reducing the error.
UNIT-III
Classification and Tabulation of Data - Meaning, Objective, Types of Classification, Formation of frequency distribution, Tabulation of data - Schemes general rules, Types of tables and preparation of tabular forms. Representation of data - Diagramatic and Graphic significance, Types of diagrams, Types of graphs.

UNIT-IV
Measures of central tendency - Mean, Median, Mode, their relative advantages and disadvantages. Measures of dispersion - mean deviation, standard deviation, Quartile deviation, Co-efficient of variation, percentile, Association of attributes, Contingency table, correlation - coefficient of correlation and its interpretation, Rank correlation, Regression equation and predictions.

UNIT-V

FOOD BIOTECHNOLOGY

UNIT-I
Biotechnology - Definition, Scope, Application. Gene cloning - Definition, Basic concepts, Characteristics of ideal cloning vector, Plasmid, Bacteriophages, Cosmid and Phasmid Eg. PBR 322.

UNIT-II
Fermentation Technology - Definition, Steps in fermentation, Design of bio reactors, Medium & Micro organism. Microbial products - Primary, secondary metabolites, Vit B12, Citric Acid, Penicillin & alcohol.

UNIT-III
Enzyme Technology - Production of enzymes - Amylase, Protease, Lipase, Lactase and pectinase, Use of enzymes in food & beverage industry (eg Cheese, fruit, juice, Wine, Meat tenderizing & dairy)

UNIT-IV
Plant tissue culture - Basic requirement for tissue culture Lab, Media & Techniques
Animal cell culture - Primary culture cell line, media requirement & application
(only outline)

UNIT-V
Biotechnology & Health care Vaccines - Types, Biogas & Bio ethanol production, Concept of Bio - remediation, Hazards of genetic engineering.

NUTRACEUTICALS

UNIT-I
Introduction - Definition, history, classification - Type of classification (Probiotics, Probiotics and Synbiotics; Nutrient Vs Non-Nutrient: according to target organ, according to source of origin)

UNIT-II
Probiotics Taxonomy and important features of probiotic micro-organisms. Health effects of probiotics including mechanism of action. Probiotics in various foods: fermented milk products, non-milk products etc. Quality assurance of probics and safety.

UNIT-III
Prebiotics Definition, Chemistry, Sources, metabolism and bioavailability, effect of processing, Physiological effects, effects on human health and potential applications in risk reduction of diseases, Perspective for food applications for the following. Non-digestible CHO / Oligosaccharides. Dietary fibre, resistant starch, gums.

UNIT-IV
Other Food components with potential health benefits: Polyphenols: Flavonoids, Catechins is flavones tanning Phytoesterogens Phytosterrls Glucosinolates Pigments: Lycopene, Curcumin etc. Organo Sulphur Compounds Other Components - Phytates, Procase inhibitions, saponins, anylase inhibitions, harmagglutinins. Active biodynamic principles, in spices, condiments and other plant materials.

UNIT-V
Non-nutrient effect of specific nutrients: Proteins, peptides and nucleotides, conjugated linoleic acid and n-3 fatty acids, vitamins and minerals.

PROJECT WORK

Paper-3
MSCFN/S/430

Paper-4
MSCFN/S/440