

**FOOD, NUTRITION AND DIETETICS**

<b>UNIT-01</b>	<b>FOOD SCIENCE AND NUTRITION</b>	<b>Credit-2</b>
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**Understanding food:**

groups for balanced diet, structure, composition, nutritive value and processing techniques of cereals, pulses and legumes, fruits and vegetables, nuts and oil seeds, milk and milk products, egg meat and fish, Food additives, food color, emulsifiers, stabilizers and flavors, Food fortification, enrichment and supplements.

**Food Preservation:**

Food spoilage and food poisoning. Food consumption practices and nutrient intakes of Indian population- Region and community wise. Common nutritional problems in Indian population. food processing for food and nutrition security-Nutrient conservation,

**Application of food engineering:** Food engineering process for development of novel nutritious food products and its suitability to various communities. Advances in food preservation techniques. Functional, designer and organic foods (nutritional and non-nutritional) Pre, pro and synbiotics nutraceuticals. Application of Nanotechnology in food production and processing.

Genetically modified foods, Role of hygiene and sanitation in food quality, food additives and food adulterants, macro and micronutrients, phytonutrients and functional foods ,dietary supplements and nutraceuticals probiotics and prebiotics, caring for people through life cycle

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<b>UNIT-02</b>	<b>NUTRITION AND DIETETICS</b>	<b>Credit-2</b>
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**Nutrition:** in food, their function, requirements, sources, digestion absorption and utilization.

Effect of low and excess intake of nutrients on human body,

RDA for different age sex and activities, methods of assessment of nutritional status.

**Nutrition During Life Span-** growth and development, nutritional requirement, nutritional problems, feeding patterns and special needs of-

Infancy, Preschool age, School age and adolescents, Adults and elderly, Pregnancy and lactation, Therapeutic modification of normal diet, special feeding methods.

**Causes, symptoms and principles of dietetic management of-**

Fevers, Peptic ulcer, Gastritis, diarrhea and constipation, Jaundice and hepatitis,

Cardiovascular diseases, Nephritis and renal disorders, Gout, Arthritis, Diabetes mellitus,

Obesity and under weight, Cancer, Nutritional problems in India.

**Contagious diseases-** causes, symptoms, prevention and management of-

COVID-19, Influenzas, Meningitis, Sexually transmitted diseases, Tuberculosis,

Ebola, AIDS

**Mental Health and Psychological disorders-**

nature, etiology, symptoms and management of-Anxiety disorders- panic phobias

generalized anxiety disorder, obsessive compulsive disorder, Conversion and dissociate

disorder, Schizophrenia and paranoid, Mood disorders, Personality disorders,

Health and hygiene

**UNIT-  
03**

**FOOD PRODUCT DEVELOPMENT**

**Credit-2**

**Basic principle of food product development:**

Sensory properties of food and their role in product development. Formulation and evaluation of recipes at laboratory level. Bulk food preparation for food industry Institutions and Enterprises: servings, nutritive value and costing.

**Evaluation of Food:** objective and subjective methods, selection and training of judges, development of score cards and Analysis of data.

Consumer evaluation development of schedule and data analysis. Packaging material, types of different products. Food labelling. Food safety issues in product development, food quality regulations and Standards quality control and HACCP product formulation and development for general and therapeutic use.

UNIT-04	PUBLIC HEALTH AND NUTRITION	Credit-2
<p><b>Concept of public nutrition:</b> Concept of community socio cultural aspect of food preference relationship between health and nutrition, role of public nutritionist in the Healthcare delivery system.</p> <p><b>Health and development indices:</b> Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators- sex ratio indicators for social and mental health, human development index, disability adjusted life years (DALY), reproductive health index .</p> <p><b>Nutritional Problem of the Community:</b> Global perspectives in malnutrition, protein - energy malnutrition, Vitamin A deficiency, anaemia, iodine deficiency disorder, fluorosis and their control and Management.</p> <p><b>Nutritional Epidemiology:</b> Concept and scope, classification of growth standards (Gomez and waterlow ) growth charts, population health index, methods for assessing nutritional status, case control and cohort studies.</p> <p><b>Nutrition and Policy Planning:</b> Aims, government guidelines and policy, Government and Non governmental organisation, Health Care delivery system in rural and urban India.</p> <p><b>National Nutritional Programme:</b> Planning, execution and evaluation of various health programs (special nutrition program, mid-day meal, ICDS IDD) and immunization.</p>		

## 2. M.Sc. (Food, Nutrition and Dietetics)

Food, Nutrition and Dietetics

COURSE CODE AND DETAILS

Session 20-21

<b>SEMESTER</b>	<b>COURSE CODE</b>	<b>Title of Course</b>	<b>Credits T+P= 72</b>	
<b>First Semester</b>	MFN.101	Applied Physiology	4	
	MFN.102	Advanced Nutritional Biochemistry	4	
	MFN.103	Advances in Food Microbiology	4	
	MFN.104	Lab work based on paper 101,102,103	6	
	<b>Credits of First Semester</b>			<b>18</b>
<b>Second Semester</b>	MFN.105	Food Science and Experimental Cookery	4	
	MFN.106	Advance Clinical and Therapeutic Nutrition	4	
	MFN.107	Research Methodology and Statistics	4	
	MFN.108	Lab work based on paper 105,106,107	6	
<b>Credits of First Semester</b>			<b>18</b>	
<b>Third semester</b>	MFN.109	Advance Community Nutrition	6	
	MFN.110	Advanced Nutrition	6	
	MFN.111	Internship (Based on overall syllabus)	6	
	<b>Credits of Third Semester</b>			<b>18</b>
<b>Forth Semester</b>	CHOICE BASED GROUP PAPERS			
	<b>GROUP -1</b>	MFN.112	Food Processing and Preservation Technology	6
		MFN.113	Nutritional Management in Health and Diseases	6
		MFN.114	Nutrition Policies and Intervention of Programs	6
		<b>Credits of First Semester</b>		
<b>GROUP-2</b>	OR			
	MFN.115 Or MFN.116 Or MFN.117	Food Processing and Preservation Technology	6	
		Nutritional Management in Health and Diseases	6	
		Nutrition Policies and Intervention of Programs	6	
	M.Sc.FN.118	Dissertation	12	

<b>Credits of First Semester</b>	18
<b>Total Credits</b>	72

## **FIRST SEMESTER**

## **CORE PAPER**

### **MFN.101 Applied Physiology**

### **Credit-4**

#### **UNIT 1- Cell structure and function**

Levels of cellular organisation and function- organelles, tissues, organs and systems – Brief review Cell membrane, transport across cell membrane and intercellular communication. Regulation of cell multiplication

#### **UNIT 2- Nervous system**

- Review of structure and function of neuron, Conduction of nerve impulse, synapses, role of neurotransmitters.
- Organisation of central nervous system, structure and function of Brain and spinal cord, Afferent and efferent nerves, Blood Brain Barrier, CSF, Hypothalamus and its role in various body functions-obesity, memory.

#### **UNIT 3- Endocrine system**

- Endocrine glands – structure, function, role of hormones, regulation of hormonal secretion. The neuroendocrine axis. Disorders of endocrine glands. Emphasis on *physiology* of diabetes and stress hormones.

#### **UNIT 4- Sense organs**

- Review of structure and function. Role of skin, eye, ear, nose and tongue in perception of stimuli.

#### **UNIT 5- Digestive system**

- Review of structure and function. Secretory, Digestive and Absorptive functions, Role of liver, pancreas and gall bladder and their dysfunction. Motility and hormones of GIT.

#### **UNIT 6- Respiratory system**

- Review of structure and function. Role of lungs in the exchange of gases. Transport of oxygen and CO<sub>2</sub>. Role of haemoglobin and buffer systems. Cardio-respiratory response to exercise and physiological effects of training.

#### **UNIT 7- The circulatory system**

- Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure, hypertension. Blood formation, composition, blood clotting and haemostasis: Formation and function of plasma proteins.

#### **UNIT 8- The excretory system**

- Structure and function of nephron. Urine formation. Role of kidney in maintaining pH of blood.
- Water, electrolyte and acid bases balance, diuretics

#### **UNIT 8- The Muscular – skeletal system**

- Structure and function of bone, cartilage and connective tissue. Disorders of the skeletal system.
- Types of muscles, structure and function.

**UNIT 9-** Immune system

- Cell mediated and humoral immunity. Activation of WBC and production of antibodies. Role in inflammation and defence.

**UNIT 10-** Reproduction

- Menstrual cycle, spermatogenesis, physiological changes in pregnancy.

**MFN.102    Advanced Nutritional Biochemistry    Credit-4**

**UNIT 1-** Heteropolysaccharides: Definition, classification, structure and properties of glycoproteins and proteoglycans.

**UNIT 2-** Plasma Proteins – Nature, properties and function

Overview of regulation of intermediary metabolism: Equilibrium and non-equilibrium reactions, committed steps, allosteric modifications, covalent modulation, hormonal induction and repression, cross-over theorem, starve-feed cycle, caloric homeostasis and futile cycles.

**UNIT 3-** Intermediary metabolism: Reactions standard free energy changes and regulation.

- Carbohydrates- glycolysis, gluconeogenesis, citric acid cycle, hexose monophosphate pathway.
- Lipids, beta-oxidation, de novo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids and triacylglycerol.

**UNIT 4-** Purines and pyrimidines- Synthesis and breakdown.

**UNIT 5-** Nucleic acids – DNA replication and transcription, DNA repair systems, DNA recombinant Genetic mutation, regulation of gene expression and protein biosynthesis.

**UNIT 6-** Hormones – Mechanism of action of hormones.

**UNIT 7-** Minerals – Biological role of trace elements.

**UNIT 8-** Detoxification in the body – Metabolism of foreign compounds

**UNIT 9-** Major alterations in carbohydrates, protein and fat metabolism in chronic nutrition-related degenerative diseases.

**MFN.103 Advancement in Food Microbiology Credit-3**

- Unit 1 Microbiology of Foods
- Unit 2 Food Safety- Basic Concept
- Unit 3 Occurrence and Growth of Microorganisms in Foods
- Unit 4 Food Spoilage
- Unit 5 Food Hazards of Microbial Origin
- Unit 6 Food Contaminants
- Unit 7 Food Additives
- Unit 8 Food Adulteration
- Unit 9 Food Safety in Food Service Establishment and Other Food Areas
- Unit 10 Hygiene and Sanitation in Food Service Establishments
- Unit 11 Food Packaging
- Unit 12 Risk Analysis
- Unit 13 HACCP – A Food Safety Assurance System
- Unit 14 Food Regulations – Standards and Quality Control.

**MFN.104 Lab Work Based on Paper 1.1,1.2,1.3 Credit-3**

**SECOND SEMESTER**

**MFN.105 FOOD SCIENCE AND EXPERIMENTAL COOKERY Credit 4**

UNIT 1- .Introduction to Food Science: evolution of the food industry and allied industries development of Food Science as a discipline as a discipline.

UNIT 2. Constituents of foods: properties and significance.

UNIT 3. Water and food dispersions: physical properties of water and ice, chemical nature, structure of water molecule.

- Sorption phenomena type of water, solutions and colligative properties.
- free and bound water
- water activity and food spoilage
- freezing and ice structure
- colloidal salts, stabilization of colloidal systems, rheology of food dispersions
- Gels : structure formation strength types and permanence.
- emulsions: formation stability surfactants and emulsifiers.
- Foams: structure,formation, stabilization.

UNIT 4- Polysaccharides, sugars and sweeteners:

- Starch: structure, gelatinization characteristics of some food starches.
- non starch polysaccharides: cellulose hemicellulose , pectins , gums, animal polysaccharides.
- sugars and sweeteners: sugars,syrups, sugar products.
- sweetener chemistry related to uses in food products: fermentation non- enzymatic browning.

UNIT 5- Cereals and cereal products:

- Cereal grains: structure and composition
- cereal products
- flour quality and flour quality
- extruded foods,breakfast cereals, wheat germ, Puffed and flaked cereals.
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UNIT 6- Fats, oils and related products:Sources composition,effects of composition on fat properties of fat and uses in food preparation.Fat substitutes: fat deterioration and antioxidants, Radiolysis.

UNIT 7- Proteins: classification, composition, denaturation, non enzymatic Browning.

UNIT 8- Enzymes: Nature of enzymes stability and action. proteolytic enzyme oxidases, lipases, immobilized enzymes.

UNIT 9-Milk and Milk products: composition,

physical and functional properties, denaturation, effects of processing and storage.

dairy products: cultured milk, yoghurt, butter, cheese, concentrated and dried products frozen desserts.

UNIT 10- Meat and poultry: muscle composition, characteristics and structure. postmortem changes . Processing, preservation and their effects. heat induced changes in meat. tenderizers. meat products.

UNIT 11- Eggs- structure and composition changes during storage functional properties of eggs, used in cookery korma egg processing



UNIT 12- Fish and sea foods: types and composition, Aaj storage and changes during storage

UNIT 13- Pulses and legumes: structure, composition, processing .

UNIT 14- Nuts and oilseeds: composition extraction and by products.

UNIT 15- Fruits and vegetables: structural features and activities of living system. enzymes in fruits and vegetable full stop flavour constituents Police Stop plant phenolics. pigments post harvest changes. effects of storage processing and preservation.

UNIT 16-Spices and condiments: composition flavouring extracts- natural and synthetic

### **MFN.106** **Clinical and Therapeutic Nutrition**

Unit 1: Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients. identification of high risk patient. assessment of patient needs based on interpretation of patient data- Clinical coma biochemical, biophysical, personal, etc

Unit 2: New trains in delivery of nutritional care and dietary counseling.

Unit 3: Diet, nutrient, and drug interaction: effect of drugs on ingestion, station, absorption and metabolism of nutrients. effect of food, nutrients and nutritional status on Drug dose is and efficacy.

Unit 4: Nutritional support: recent advances in techniques and feeding substrates.

Unit 5: Patho physiology, e metabolic and clinical aberrations, Complication, preventions and recent advances in medical nutritional management of: wait imbalances cardiovascular disorders Diabetes mellitus and other metabolic disorders, g i tract disorders liver and gallbladder, pancreatic disorders, renal disorders, stress and trauma cancer, neurological disorders, musculoskeletal disorders, immunodeficiency disorder, genetic disorders, infections and AIDS respiratory problems.

Unit 6: Childhood problems/ disorders including inborn errors of metabolism and their nutritional management.

### **MFN.107** **Research methods and statistics**

Unit 1: Science, scientific methods, scientific approach.

Unit 2: Role of statistics and research in home science discipline.

objectives of research: explanation of control and protection.

Unit 3: Types of research: historical, descriptive experimental, case study, social research, participatory research.

Unit 4: Definition and identification of a research problem:

selection of research problem Justification, theory, hypothesis, basic assumptions, limitations and Delhi stations of the problem.

Unit 5 : Types of variables:

Unit 6 Theory of probability, population and sample probability sampling: simple random,

systematic random sampling, two stages and multistage sampling, cluster sampling. non probability sampling: purposive, Kota and volunteer sampling/ snowball sampling.

Unit 7 : Principle of Research Design: GNE theory and design in quantitative research definition and types of quantitative research, methods and techniques of Data

Unit 8: Collection group discussion interview observations, social mapping, participatory Rapid assessment, group discussion participatory learning assessment.

Unit 9: Data gathering instruments: observation questionnaire and interview, scaling methods case study reliability and validity of measuring instruments.

Unit 10: Scales of measurement and the appropriate Statistical Techniques.

Unit 11 : Critical analysis of research

Unit 12 : Writing a research proposal

Unit 13 : Analysis of data and Research report

**MFN.108**

**LAB BASED ON PAPER -105,106,107**

### **THIRD SEMESTER**

**MFN.109**

**Advanced Community Nutrition**

Unit 1: Concept and scope of community nutrition.

Unit 2: Food availability and factors affecting food availability and its consumption- agriculture production, post harvest handling, marketing and distribution, population economic, regional, socio-cultural industrialisation.

Unit 3 Nutritional problems of the community and implications for public health: common problems in India, causes ( nutritional and non- nutritional) incidence of nutritional problems, sign and symptoms treatment, PEM, Micronutrient deficiencies( vitamin A iron Iodine),

Unit 4: Schemes and programmes to combat nutritional problems in India: prophylaxis programs, mid day meal programme, ICDS.

Unit 5: Hazards to Community Health and nutritional status

: adulteration in food pollution of water, industrial effluent sewage pesticide Residue in food

Unit 6: Nutrition policy in India and plan of action

UNIT 7- Nutritional assessment as a tool for improving the quality of life of various segments of the population including hospitalized patients.

UNIT 8- Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following.

- Food consumption
- Anthropometry
- Clinical and laboratory
- Rapid Assessment & PRA
- Functional indicators such as grip strength, respiratory fitness, Harvard Step test, Squatting test.

UNIT 9- Nutritional Surveillance – Basic concepts, uses and setting up of surveillance systems.

UNIT 10- Monitoring and Evaluation

## **MFN.110**

## **Advanced nutrition**

Unit 1 : Energy : energy content of foods, physiological fuel value- review. measurement of energy expenditure: BMR,, thermic effect of feeding and physical activity methods of measurement. estimating energy requirements of individuals and groups. regulation of energy metabolism : of food intake, intake, digestion, absorption and body weight.

Unit 2: Carbohydrates : types classification, digestion and transport- review, dietary fibre, oligosaccharides, resistant starch- chemical composition and physiological effects glycemic index of foods. sweetness- nutritive and non nutritive.

Unit 3: Proteins: classification of digestion and absorption and transportation- review, metabolism of proteins: role of muscle, liver and gastrointestinal tract, protein quality, methods of evaluating protein quality. protein and amino acid requirements. therapeutic applications of specific amino: branched Chain and glutamine, Arginine, homocysteine, cysteine, taurine.

Unit 4: Lipid : classification, digestion absorption, transport- review full stop functions of e f a. rule of n-3 ,n-6, fatty acids in health and diseases. requirements of total fat and fatty acid. trans fatty acids. Prostaglandins.

Unit 5: Water : regulation of intra and extracellular volume. Osmolality, water balance and its regulation.

Unit 6: Minerals: each nutrient sources, bioavailability, metabolism, function requirements, RDI/ ES iADDI, and talk toxicity,

micro minerals: calcium, Phosphorus, magnesium, Sodium and potassium and chloride

micro minerals: iron, copper, zinc, magnesium iodine chloride.

trace minerals: Selenium, Cobalt chromium, vanadium, Silicon, Boron

Unit 7: Vitamins: historical background structure, food sources, absorption and transport, metabolism, biochemical function assessment of status for list of interaction with other nutrients, physiological and therapeutic effects, toxicity and deficiency with respect to the followings: fat soluble vitamins-A,D,E,K., water soluble vitamins: I mean, riboflavin,, pyridoxine, Folic acid, pantothenic acid, ascorbic acid cyanocobalamin , inositol.

Unit 8: Non nutritive food components with potential health effects: polyphenols containing, 5, phytoestrogens, SY no Jenner compounds, lectins and saponins.

Unit 9: Nutritional regulation of gene expression.

Unit 10: Nutrition management in special condition: space travel, high altitude low temperatures, submarines.

Practicals:

1. Estimation of protein quality using different methods: PER,B.V,N.P.U.

2. Estimation of energy value of food stuff using Bomb calorimeter.

3. Estimation of energy requirements.:

- BMR, energy expenditure on physical activities, factorial approach, balance studies nitrogen balances.
- assessment of micronutrients status: iron Vitamin C vitamin A vitamin from B complex group.
- bioavailability of selected nutrients.

**MFN.111**

**Internship (Based on overall syllabus)**

**FOURTH SEMESTER**

**CHOICE BASED GROUP PAPERS**

**Unit 1-Introduction:** Main crops grown in the country – importance and storage

**Unit 2-Physical principles in food processing operations**

- Thermal processing – Degree of processing of preservation. Selecting heat treatments, heat resistance of micro organisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments.
- Refrigeration – Refrigeration, cool storage and shelf life extension; cool storages with air circulation, humidity control and gas modification (i.e.CA, MA, & SA)
- Freezing – Changes during freezing – rate of freezing, choice for final temperature for frozen foods, freezing methods, freezing effects.
- Dehydration – Dehydration, water activity and food safety/quality; methods of dehydration.
- Ionising radiations – Forms of radiant energy; ionising radiations, sources and properties; radiation units; radiation effects. Limiting indirect effects; dose fixing factors; objectives in food irradiation safety and quality of irradiated food; irradiation of various foods and comparison with other methods of preservation.

**Unit 3- Chemical principles in food processing**

Preservation/processing by sugar, salt, curing, smoke, acid and chemicals; chemical changes in foods that affect texture, flavour, colour, nutritive value and safety during handling, storage and processing; Chemical and biochemical reactions affecting food quality and safety.

**Unit 4- Processing technology of foods and nutritional implications for the following:**

**Cereals and Pulses**

Wheat grain characteristics and products; wheat milling process; milling of durum or semolina; macaroni or pasta products, noodles, wheat starch and gluten fractionation, baking technology, production of bread, biscuits and cakes.

- Corn wet milling; zein separation; corn starch products;
- Barley malting; dry milling and air classification; wet fractionation of barley, pearling.
- Storage and quality of cereal grains
- Rice processing, fractionation, quick-cooking rice, parboiled rice, rice based instant foods.
- Pulses – processing, elimination of toxic factors, quick-cooking dals, fermentation and germination.

**1. Oilseeds**

- Oilseed pressing, solvent extraction, purification (degumming. Refining. Bleaching. deodorization), hydrogenation, plasticising and tempering, products – butter, margarine, shortening, mayonnaise and salad dressing, inter-esterification and production of MCT.

**Unit 5-Fruits and Vegetables**

- Structure, composition, physiological and biochemical changes during ripening. Handling and storage.

- Varietal, harvesting and pre-processing considerations for vegetables; post harvest processing practices. Processing of vegetables, canning, freezing. Dehydration, pickles and chutneys.
- Potato processing – Raw material handling and storage. Raw material quality and suitability for chips, French fries, dehydrated granules and boiled/canned potatoes; processing for chips. French fries and dehydrated granules.
- Fruit processing – Citrus juices, apple juices, slices and dehydrated products, grape juice and raisins. Canning. Fruit-based beverages and concentrates, squashes, jams, jellies, ketchup's sauces, high sugar, high acid products.

#### **Unit 6-Milk and Milk Products.**

- Milk processing – Classification, separation and standardization, pasteurisation, off-flavour removal, homogenisation, packaging; UH sterile milk.
- Milk products – Fortified milk, skim milk, concentrate milks, cream, butter, cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products: khoa, channa, paneer, curd, yoghurt, ghee, kulfi.

#### **Unit 7-Meat, Fish and Eggs**

- Chemistry of processed meats, Ageing and tenderising, curing, smoking and freezing of meat fresh storage of meat.
- Fish preservation and processing.
- Meat and fish products: preservation by curing, smoking, salting and pickling and dehydration, corned beef, sausages, salami, bacon, luncheon meat.
- Dehydrated egg powder and frozen egg, egg storage.
- Sources of bone meal, gelatine, casing, plasma and blood, curing.

#### **Unit 8-Additives and preservatives**

- Definition of food additives; acids, buffer systems and salts, chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming texturizers, appearance control and clarifying agents.
- Flavour enhancers, aroma substances, sugar substitutes, sweeteners, antioxidants,
- Anticaking agents, bleaching agents, protective gases.

**Unit 9-Spices:** Processing and extraction of essential oils and colours, stability, storage preservation.

#### **Unit 10-Fermentation Technology**

- Fermentation technology, yeast, milk products, fermented vegetables, beer, vinegar. Fermented soy products.
- Enrichment and fortification technology, high protein food technology.

**Unit 11-Functional foods and Technologies to meet special needs. New advances.**

#### **Unit 12-Waste disposal and sanitation**

- Waste characteristics, treatments and technologies, food plant sanitation.

**MFN.113****Nutritional management in health and diseases**

Unit 1: Definition of Health and nutrition- dimensions of health( physical and psychological, emotional and spiritual).

Unit 2: Energy requirements- factors affecting energy requirements: BMR activity, age, climate,diet- induced thermo Genesis( SDA), physiological conditions..

Unit 3 : Concept of nutritionally adequate diet and meal planning: a- importance of meal planning b- factors affecting meal planning- social cultural and religious Geography economi availability of time and material resources.

- religious, Geography, economic, availability of time and material resources.

Unit 4: Nutrition through life cycle: adulthood pregnancy, lactation, infancy, preschool adolescence, old age.

Unit 5: Principles of diet therapy: modification of normal diet for therapeutic purposes, full diet soft diet,fluid diet,bland diet.

Unit 6: Nutritional management in common ailments: requirement and diet planning- constipation, fevers- weight management.

Unit 7: Dieticians as part of the medical team and outreach services.

Unit 8: Medical history assessment-techniques of obtaining relevant information for patient profiles.

Unit 9: Dietary diagnosis and tests for nutritional status – Correlating clinical and dietary information.

Unit 10: Patient education and counselling- assessment of patient needs, Establishing rapport, counselling relationship, resources and aids to counselling.

Unit 11: Aesthetic attributes of diets.

Unit 12: Follow up visits and patients' education.

**MFN.114****NUTRITION POLICIES AND INTERVENTIONS OF PROGRAMMES**

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**Unit 1-Global, National and regional Concerns** – Situation of vulnerable groups vis-a-vis food, nutrition and health security.

**Unit 2- Programme Development** – Overview of programme development models. Formative evaluation approach. Precede – proceed planning model. Sussman’s four-step model of empirical curriculum development, chain model.

**Unit 3- Programme planning** - pre-requisites for planning vis-a-vis short term and long term objectives. Planning at various levels – Government local health department, state. Voluntary sector and community- based. Approaches used in planning – Top-down approach, need-based approach. Community participation and partnership, rights-based approach.

**Unit 3- Appraisal of existing programmes and interventions** – Merits, demerits. Lacunae-gaps vis-a-vis objectives and goals.

**Unit 4- Implementation of programmes** – Developing prototypes, training and HRD aspects of the programmes. Pilot and prototype studies, innovations.

**Unit 5- Scaling – up of programme.** Centralisation and decenfralisation, vertical and horizontal linkages, intersectoral linkages, involvement of corporate sectors. Legal issues, Financial management, Cost benefits, Cost effectiveness and Cost efficiency.

Unit 6: Current situation in India with regard to National and regional level rural urban: food availability, mortality, morbidity and illness, nutritional problems economic status, population and infrastructure available environmental sanitation women and children: situation. poverty line its significance.

Unit 7: Need for policies- factors leading to current problems/ situation( cultural economic, commercial/ market forces, laws and regulations).

Unit 8: Policies existing in the country- agriculture, food, health, nutrition, development policies which have in their perspectives and goals- improvement of Health and nutritional status. factor take when policies..

Unit: 9: Nodal Ministries and departments at Central and state level responsible for formulation and implementation of policy.

Unit 10: Programs and schemes available in various sectors with the aim of improving health and nutritional status of the population- agriculture, food, nutrition, health, economic water environment and its relation to health.

Unit 11: Objectives of each programs/ schemes, focus and target groups- coverage principles,/philosophy/ intervention strategies. mode of implementation, operationalization. for selection of target group and benefit through the scheme/ program. current status, success and games in focus, coverage operational hurdles and deficiencies there of.

unit 12: Legislations- role of improve improving health and nutritional status.

Unit 13: Nutritional plan of action - state plan of action, goal to improve health and nutritional status.

Unit 14: case studies of intervention used in other countries or within country to improve health and nutritional status.

**OR**



## GROUP -2

### 1.Select Any One Paper From Group One

MFN.115

## FOOD PROCESSING AND PRESERVATION TECHNOLOGY

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**Unit 1-Introduction:** Main crops grown in the country – importance and storage

**Unit 2-Physical principles in food processing operations**

- Thermal processing – Degree of processing of preservation. Selecting heat treatments, heat resistance of micro organisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments.
- Refrigeration – Refrigeration, cool storage and shelf life extension; cool storages with air circulation, humidity control and gas modification (i.e.CA, MA, & SA)
- Freezing – Changes during freezing – rate of freezing, choice for final temperature for frozen foods, freezing methods, freezing effects.
- Dehydration – Dehydration, water activity and food safety/quality; methods of dehydration.
- Ionising radiations – Forms of radiant energy; ionising radiations, sources and properties; radiation units; radiation effects. Limiting indirect effects; dose fixing factors; objectives in food irradiation safety and quality of irradiated food; irradiation of various foods and comparison with other methods of preservation.

**Unit 3- Chemical principles in food processing**

Preservation/processing by sugar, salt, curing, smoke, acid and chemicals; chemical changes in foods that affect texture, flavour, colour, nutritive value and safety during handling, storage and processing; Chemical and biochemical reactions affecting food quality and safety.

**Unit 4- Processing technology of foods and nutritional implications for the following:**

**Cereals and Pulses**

Wheat grain characteristics and products; wheat milling process; milling of durum or semolina; macaroni or pasta products, noodles, wheat starch and gluten fractionation, baking technology, production of bread, biscuits and cakes.

- Com wet milling; zein separation; com starch products;
- Barley malting; dry milling and air classification; wet fractionation of barley, pearling.
- Storage and quality of cereal grains
- Rice processing, fractionation, quick-cooking rice, parboiled rice, rice based instant foods.
- Pulses – processing, elimination of toxic factors, quick-cooking dals, fermentation and germination.

## **2. Oilseeds**

- Oilseed pressing, solvent extraction, purification (degumming. Refining. Bleaching. deodorization), hydrogenation, plasticising and tempering, products – butter, margarine, shortening, mayonnaise and salad dressing, inter-esterification and production of MCT.

### **Unit 5-Fruits and Vegetables**

- Structure, composition, physiological and biochemical changes during ripening. Handling and storage.
- Varietal, harvesting and pre-processing considerations for vegetables; post harvest processing practices. Processing of vegetables, canning, freezing. Dehydration, pickles and chutneys.
- Potato processing – Raw material handling and storage. Raw material quality and suitability for chips, French fries, dehydrated granules and boiled/canned potatoes; processing for chips. French fries and dehydrated granules.
- Fruit processing – Citrus juices, apple juices, slices and dehydrated products, grape juice and raisins. Canning. Fruit-based beverages and concentrates, squashes, jams, jellies, ketchup's sauces, high sugar, high acid products.

### **Unit 6-Milk and Milk Products.**

- Milk processing – Classification, separation and standardization, pasteurisation, off-flavour removal, homogenisation, packaging; UH sterile milk.
- Milk products – Fortified milk, skim milk, concentrate milks, cream, butter, cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products: khoa, channa, paneer, curd, yoghurt, ghee, kulfi.

### **Unit 7-Meat, Fish and Eggs**

- Chemistry of processed meats, Ageing and tenderising, curing, smoking and freezing of meat fresh storage of meat.
- Fish preservation and processing.
- Meat and fish products: preservation by curing, smoking, salting and pickling and dehydration, corned beef, sausages, salami, bacon, luncheon meat.
- Dehydrated egg powder and frozen egg, egg storage.
- Sources of bone meal, gelatine, casing, plasma and blood, curing.

### **Unit 8-Additives and preservatives**

- Definition of food additives; acids, buffer systems and salts, chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming texturizers, appearance control and clarifying agents.
- Flavour enhancers, aroma substances, sugar substitutes, sweeteners, antioxidants,
- Anticaking agents, bleaching agents, protective gases.

**Unit 9-Spices:** Processing and extraction of essential oils and colours, stability, storage preservation.

### **Unit 10-Fermentation Technology**

- Fermentation technology, yeast, milk products, fermented vegetables, beer, vinegar. Fermented soy products.

- Enrichment and fortification technology, high protein food technology.

**Unit 11-Functional foods and Technologies to meet special needs. New advances.**

**Unit 12-Waste disposal and sanitation**

- Waste characteristics, treatments and technologies, food plant sanitation.

**MFN.116**

**Nutritional management in health and diseases**

Unit 1: Definition of Health and nutrition- dimensions of health ( physical and psychological, emotional and spiritual).

Unit 2: Energy requirements- factors affecting energy requirements: BMR activity, age, climate, diet- induced thermo Genesis( SDA), physiological conditions..

Unit 3 : Concept of nutritionally adequate diet and meal planning: a- importance of meal planning b- factors affecting meal planning- social cultural and religious Geography economi availability of time and material resources.

- religious, Geography, economic, availability of time and material resources.

Unit 4: Nutrition through life cycle: adulthood pregnancy, lactation, infancy, preschool adolescence, old age.

Unit 5: Principles of diet therapy: modification of normal diet for therapeutic purposes, full diet soft diet,fluid diet,bland diet.

Unit 6: Nutritional management in common ailments: requirement and diet planning- constipation, fevers- weight management.

Unit 7: Dieticians as part of the medical team and outreach services.

Unit 8: Medical history assessment-techniques of obtaining relevant information for patient profiles.

Unit 9: Dietary diagnosis and tests for nutritional status – Correlating clinical and dietary information.

Unit 10: Patient education and counselling- assessment of patient needs, Establishing rapport, counselling relationship, resources and aids to counselling.

Unit 11: Aesthetic attributes of diets.

Unit 12: Follow up visits and patients' education.

**Unit 1-Global, National and regional Concerns** – Situation of vulnerable groups vis-a-vis food, nutrition and health security.

**Unit 2- Programme Development** – Overview of programme development models. Formative evaluation approach. Precede – proceed planning model. Sussman’s four-step model of empirical curriculum development, chain model.

**Unit 3- Programme planning** - pre-requisites for planning vis-a-vis short term and long term objectives. Planning at various levels – Government local health department, state. Voluntary sector and community- based. Approaches used in planning – Top-down approach, need-based approach. Community participation and partnership, rights-based approach.

**Unit 3- Appraisal of existing programmes and interventions** – Merits, demerits. Lacunae-gaps vis-a-vis objectives and goals.

**Unit 4- Implementation of programmes** – Developing prototypes, training and HRD aspects of the programmes. Pilot and prototype studies, innovations.

**Unit 5- Scaling – up of programme.** Centralisation and decenfralisation, vertical and horizontal linkages, intersectoral linkages, involvement of corporate sectors. Legal issues, Financial management, Cost benefits, Cost effectiveness and Cost efficiency.

Unit 6: Current situation in India with regard to National and regional level rural urban: food availability, mortality, morbidity and illness, nutritional problems economic status, population and infrastructure available environmental sanitation women and children: situation. poverty line its significance.

Unit 7: Need for policies- factors leading to current problems/ situation( cultural economic, commercial/ market forces, laws and regulations).

Unit 8: Policies existing in the country- agriculture, food, health, nutrition, development policies which have in their perspectives and goals- improvement of Health and nutritional status. factor take when policies..

Unit: 9: Nodal Ministries and departments at Central and state level responsible for formulation and implementation of policy.

Unit 10: Programs and schemes available in various sectors with the aim of improving health and nutritional status of the population- agriculture, food, nutrition, health, economic water environment and its relation to health.

Unit 11: Objectives of each programs/ schemes, focus and target groups- coverage principles,/philosophy/ intervention strategies. mode of implementation, operationalization. for selection of target group and benefit through the scheme/ program. current status, success and games in focus, coverage operational hurdles and deficiencies there of.

unit 12: Legislations- role of improve improving health and nutritional status.

Unit 13: Nutritional plan of action - state plan of action, goal to improve health and nutritional status.

Unit 14: case studies of intervention used in other countries or within country to improve health and nutritional status.

**MFN.118**

**Dissertation**

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