SGT UNIVERSITY
SHREE GURU GOBIND SINGH TRICENTENARY UNIVERSITY
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Faculty of Allied Health Sciences

B.Sc(Nutrition and Dietetics)

Syllabus

2017

Semester-I		
Subject-Basic Nutrition-I	**Paper 1**	**Credit hours-4**
S.No.	**Contents**	**Lectures**
1.	Introduction to nutrition - Food as source of nutrients, functions of food, definition of nutrition, nutrients &energy, adequate, optimum & good nutrition, malnutrition. Interrelationship between nutrition & health: - Visible symptoms of good health.	**4**
2.	Food guide - Basic five food groups - How to use food guide (according to R.D.A.)	**4**
3.	Use of food in body - Digestion, Absorption, transport & utilization	**6**
4.	Carbohydrates: Functions, classification, food sources, RDA, storage in body, Consequences of inadequate and excessive intake of carbohydrate. Dietary fiber, Functions, side effect, Food sources, RDA and Role of fiber in human nutrition. Glycemic Index.	**6**
5.	Lipids, Fats & oils: composition, saturated and unsaturated fatty acids, classification, RDA, food sources, function, Consequences of inadequate and excessive intake of fats and oils.	**6**
6.	Proteins - composition, classification, functions RDA, Food sources, essential & non-essential amino acids, Protein deficiency & excess and protein quality.	**6**
7.	Water – as a nutrient, components of body fluids, function, sources, requirement, water balance & effect of deficiency.	**4**
8.	Energy- energy balance measurement of energy, energy intake and source of food and energy requirements.	**4**
9.	Minerals - macro & micro mineral. - Functions, Sources, RDA Bioavailability deficiency & Excess of nutrients.	**11**
10.	Vitamins (water & fat soluble) - definition, classification & functions, RDA, deficiency& Excess of nutrients.	**10**
11.	Effect of cooking & heat processing on the nutritive value of food s	**5**
12.	Processed and Low cost supplementary foods	**4**
13.	Food sanitation in hygiene	**4**
14.	Recent concepts in food – Functional or Designer foods, Convenience Organic, Fortification, Genetically Modified, & Bio fortification of Foods.	**6**

Semester-I	
Subject- Basic Nutrition-I (Practical) **Credit hours-2**	
Topic	**Hours**
1. Use and care of kitchen equipments. **2.** Rich Sources of nutrients price list, nutrition and labeling. **3.** Controlling techniques - Weights and measures standard, household measures for raw and cooked food. **4.** Food preparation and classifying recipes as good, moderate or poor, sources of specific nutrients. Amount of ingredients to be in standard recipe - (a) portion size - (b) Beverages - tea, coffee, cocoa, fruit juice, milk, milk shakes etc. (c) Cereals and flour mixtures - basic preparation & their nutritive value - boiled rice and rice pulao, chapati, puri, paratha, sandwiches, pastas, pancakes, cookies & cakes **5.** Vegetables & fruits - Simple salads, Dry vegetables, Curries, fruits preparation using fresh and dried stewed fruit, fruit salad etc. **6.** Milk and milk products Porridges, Curds, paneer and their commonly made preparations, Milk based simple desserts and puddings, custard, kheer, ice cream **7.** Meat - cuts of meat - Meat preparations, Poultry, Fish, hard and soft cooked, poached, scrambled, fried &omlete etc. **8.** Soups - Basic, clear and cream soups etc. **9.** Snacks- Pakoras, cheese toast, upma, pohe, peanut, chikki, til & laddo etc.	40

Semester-I		
Subject-Family Meal Management Paper 2 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1.	Introduction to meal management - balanced diet - food groups & - the planning of balance diet	**4**
2.	Food guides for selecting adequate diet	**4**
3.	International terms used for nutrients requirement and Recommended Dietary Allowances	**5**
4.	Diet & stress in current scenario.	**4**
5.	Meal planning for the family.	**6**
6.	Indian meal patterns - vegetarian & non-vegetarian.	**5**
7.	Food faddism & the faulty food habits.	**3**
8.	Nutritive value of common Indian recipes.	**3**
9.	Daily values: Nutritional information on labels	**4**
10.	Understanding nutrient composition tables	**5**
11.	Nutrient density	**4**

Semester-I		
Subject-Nutritional Biochemistry-I Paper 3 **Credit hours-4**		
S.No	**Contents**	**Lectures**
1.	**Basics of energy metabolism, nutrition & dietetics -** Unit of measuring energy, calorific value of food, BMR & factors affecting it, SDA of food, calculation of energy requirement, balanced diet, nutrition in health & diseases (protein energy malnutrition).	**6**
2.	**Chemistry of carbohydrates & their related metabolism –** Introduction, definition, classification, biomedical importance Brief outline of metabolism : Glycogenesis & glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level.	**8**
3.	**Amino acids -** Definition, classification, essential & non-essential amino acids.	**2**
4.	**Chemistry of Proteins & their related metabolism -** Introduction, definition, and classification, biomedical importance Metabolism: Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle.	**6**
5.	**Chemistry of Lipids & their related metabolism -** Introduction, definition, classification, biomedical importance, essential fatty acids, identification of fats & oils (saponification no, acid no, iodine no, acetyl no, reichert- miesel no. etc.)	**5**
6.	**Acid base balance concepts & disorders -** pH, Buffers, Acidosis, Alkalosis	**4**
7.	**Vitamins & Minerals-**sources, requirement, deficiency disorders & biochemical functions.	**12**
8.	**General concepts & functions of immune globulins**	**2**

Semester-I	
Subject- Nutritional Biochemistry-I (Practical) **Credit hours-2**	
Topic	**Hours**
1. Identification of carbohydrates (QualitativeTests) **2.** Identification of proteins (Qualitative Tests)	20

Semester-I		
Subject-Physiology-I Paper 4 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1.	**Compositionandfunctionofblood** Redbloodcells–Erythropoiesis,stagesofdifferentiationfunction, count, physiological variations Hemoglobin–structure, functions, concentration, physiological variation Methods of estimation of Hb White bloodcells– Production,function,life span,count,differential count Platelets– Origin,normal count,morphologyfunctions. Plasma Proteins– Production,concentration, types, Albumin,Globulin,Fibrinogen, Prothrombinfunctions. Hemostasis– Definition,normalhaemostasis,clottingfactors,mechanism ofclotting, disorders of clotting factors. Blood groups– ABOsystem, Rh system Bloodgrouping&typing, Blood Transfusion reaction Crossmatching Anticoagulants–Classification, examples and uses Anemia:Classification, effects of anemia on body Blood Volume-Normal value, determinationof bloodvolume andregulationofbloodvolume Bodyfluid–pH,normal value,regulationandvariation	**12**
2.	**Cardiovascular system** Heart –Physiological anatomy, Nerve supply Properties of Cardiacmuscle, Cardiac cycle-systole, diastole Intraventricularpressure curves Cardiac Output– Heart sounds- Normalheart sounds, cause characteristicsandsignification, Heartrate, areasofauscultation. Blood Pressure– Definition, normal value, clinical easurement of bloodpressure. Physiological variations, regulation of heartrate,cardiac shock,hypotension, hypertension. Pulse–radial pulse, tripleresponse Electrocardiogram (ECG)–significance.	**9**
3.	**Digestive System** Physiological anatomyof Gastrointestinaltract, Functionsofdigestive system Salivaryglands-Structure andfunctions Deglutition–stagesandregulation Stomach– structure andfunctions Gastric secretion– Composition,function,regulationofgastric juice secretion Pancreas – structure,function,composition,regulationofpancreatic juice Liver– functionsofliver Bile secretion,composition,function,regulationofbile secretion Bilirubinmetabolism- types ofbilirubin, Vandenbergreaction, Jaundice-types, significance. Intestine –smallintestine andlarge intestine Smallintestine – functions- digestive,absorption, movements. Largeintestine – functions, digestionandabsorptionofCarbohydrates, Proteins, Fats, Lipids Defecation.	**10**
4.	**Respiratorysystem** Functionsof Respiratorysystem, Physiological Anatomy of Respiratory system, Mechanism of normal and rigorous respiration Forces opposing and favoring expansion of the lungs Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall. TransportationofRespiratorygases: TransportationofOxygen& Carbon dioxide . Lungvolumesandcapacities Regulationofrespiration,MechanismsofRegulation-nervousand chemicalregulation Hearing Breuer, Reflexes. Applied Physiology and Respiration: Hypoxia, Cyanosis, Asphyxia,Dyspnea, Dysbarism, Artificial Respiration, Apnea.	**8**
5.	**Nervous system** Functions of Nervoussystem,Neuron structure,classificationandproperties Neuroglia, Nerve fiber,classification, conduction of impulses continuousandsalutatory. Velocityof impulse transmission and fact or saffecting Synapse –structure,types, properties Receptors– Definition,classification, properties Reflexaction–unconditioned properties of reflexaction, Babinski'ssign Spinal cordnervetracts-Ascendingtracts,descendingtracts–pyramidaltracts	**8**

	Extrapyramidal tracts Functions of Medulla, pons,hypothalamic disorders Cerebralcortexlobes and functions, Sensory cortex, Motorcortex, Cerebellum functions of Cerebellum Basal ganglia-functions EEG, Cerebrospinal Fluid (CSF):formation,circulation,properties,compositionandfunctions lumbarpuncture. Autonomic, Nervous System: Sympathetic and para-sympathetic distribution and functions and comparison of functions.	
6.	**Muscle nervephysiology** Classificationofmuscle,structure ofskeletal muscle, Sarcomere contractile proteins, neuromuscularjunction Transmissionacross, neuromuscularjunction Excitation contractioncoupling Mechanism ofmusclecontraction,muscle tone,fatigue: Rigormortis	**2**

Semester-I	
Subject- Physiology-II(Practical) **Credit hours-2**	
Topic	**Hours**
1. Haemoglobinometry 2. White Blood Cell count 3. Red Blood Cell count 4. DeterminationofBloodGroups 5. Leishman's stainingand Differential WBC count 6. Determination of packed cell Volume 7. Erythrocyte sedimentationrate [ESR] 8. Calculationof Bloodindices 9. Determination of Clotting Time, Bleeding Time	20

Semester-I Paper 4	
COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT **Course Code: AEEC- ND-01** **Credit-2** **(Theory)**	
S.No.	**Contents**
1	**Listening Comprehension** • Speeches • Interviews • audio-video clippings followed by exercises • Introduction to Communication • Importance of Communication • Barriers to Communication and ways to overcome them
2	**Conversation Skills** • Greetings and introducing oneself • Framing questions and answer • Role play • Buying: asking details etc • Word formation strategies • Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution
3	**Reading Comprehension** • Simple narration and Stories • Simple Passages • Newspaper and articles clippings • Note Making • Paragraph Writing • Comprehension • Report Writing: types, characteristics • Introduction to Letter Writing
4	**Pronunciation** • Pronunciation • Syllable and Stress • Intonation and Modulation
5	**Writing Comprehension** • Letters: types, format, style • Précis Writing • Paragraph: Order, Topic sentence, consistency, coherence • Report and Proposal • Project Writing: Features, Structure

Semester-I	**Paper 5**
HEALTHY LIFESTYLES AND NUTRITION **Course Code:(GE-ND-01)** **Credit-4** **(Theory+Tutorials)**	
S.No.	**Contents**
1	Definition of Food, Nutrition, Health, Fitness. Interrelationship between nutrition and health, concept of a desirable diet for optimum nutrition, health and fitness. Factors affecting food habits, choices and dietary patterns.
2	A brief review of nutrients in general – Energy and macronutrients – Carbohydrates, Protein, Fat - functions, sources deficiency, disorders and recommended intakes. Micronutrients: Minerals – Calcium, Iron, Iodine, and other elements. Vitamins – A, D, E, K, B-complex, andVitamin C.
3	Basic principles of planning diet – Nutritional assessment, RDA for Indians, Food groups, Dietary guides and balanced diets.
4	Basics of Body composition and changes during life span.
5	Nutrition and physical fitness: Exercise and Fitness- Definition, benefits, components and indicators of fitness. Nutritional requirements of exercise – fluids, vitamins and minerals, energy, macronutrient needs and distribution, body adaptation. Approaches to the management of fitness and health in weight management.

Semester-II	**Paper 1**	
Subject-Nutrition for Life Span **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1.	Nutrition in pregnancy - Physiological stages of pregnancy, - nutritional requirements - foodselection - Complication of pregnancy.	**6**
2.	Nutrition during lactation - Physiology of lactation - Nutritional requirements.	**4**
3.	Nutrition during infancy - growth& development - nutritional requirements - breast feeding -infant formula - Introduction of supplementary foods.	**8**
4.	Nutrition during early childhood (Toddler/Preschool) - Growth & nutrient need -nutritionrelated problems - feeding patterns	**8**
5.	Nutrition of school children - Nutritional requirement - importance of snacks - School lunch.	**6**
6.	Nutrition during adolescence - Growth & nutrient needs - food choices, - eating habits, - Factor influencing needs.	**6**
7.	Nutrition during adulthood - Nutritional requirements, feeding pattern.	**4**
8.	Geriatric nutrition : Factors affecting food intake and nutrient use,nutrient needs, nutrition related problems.	**6**

Semester-II	
Subject- Nutrition for Life Span (Practical) **Credit hours-2**	
Topic	**Credit Hours-2**
1. Planning, preparation and nutritional evaluation of diets in relation to physiological state. **2.** Planning and preparation of a balanced diet for a pregnant woman. **3.** Diet during complication of pregnancy. **4.** Planning and preparation of a balanced diet for a lactating woman. **5.** Preparation of weaning foods. **6.** Planning and preparation of a balanced diet for pre-school child. **7.** Balanced diet for school going child. Preparation of packed lunch. **8.** Planning and preparation of a balanced diet for adolescence. **9.** Planning of meals for adult belonging to different income group. **10.** Planning meal for senior citizen.	20

Semester-II Paper 2		
Subject- Nutritional Biochemistry-II		**Credit hours-4**
S.No	**Contents**	**Lectures**
1.	**Brief out line of metabolism**:Beta oxidation of fatty acids, Ketosis, Cholesterol & it's clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis	**5**
2.	**Enzymes** - Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.	**6**
3.	**Hormones -** Classification, general mode of action, hormones of Pituitary, Thyroid, Parathyroid, Adrenals, Reproductive Glands, Pancreas, hormonal disorders, counter regulatory hormones.	**6**
4.	**Water metabolism-** Distribution of fluids in the body, ECF, ICF, Water metabolism, dehydration.	**4**
5.	**Hyperglycemia & hypoglycemia** - Diabetes mellitus - definition, types, features, gestation diabetes mellitus, glucose tolerance test, glycosurias, Hypoglycemia & its causes.	**5**
6.	**Liver functions and their assessment** - Based on - Carbohydrate metabolism Protein metabolism Lipid Metabolism Measurements of serum enzyme levels Bile pigment metabolism: Jaundice - its types and their biochemical findings.	**12**
7.	**Renal functions tests -** Various tests, GFR & clearance.	**4**
8.	**Tumor markers & their clinical applications –** Including oncofeatal antigens, CEA etc.	**4**

Semester-II	
Subject- Nutritional Biochemistry-II(Practical)	**Credit hours-2**
Topic	**Hours**
1. To study general properties of the enzyme Urease & Achromatic time of salivary amylase. **2.** Estimation of glucose in urine by Benedict's methods **3.** Urine analysis - normal & abnormal constituents of urine **4.** Blood glucose estimation	20

Semester-II Paper 3		
Subject- Physiology-II		**Credit hours-4**
S.No.	**Contents**	**Lectures**
1.	**Endocrine System** Definition, Classification ofEndocrine glands&theirHormones Thyroidglandhormone– Physiological, Anatomy,Hormonesecreted, Physiologicalfunction, regulationofsecretion Disorders–hypoandhypersecretionofhormone Adrenal gland,Adrenalcortexphysiologic anatomy ofadrenal gland, Adrenalcortex, cortical hormones–functionsandregulation Adrenalmedulla– Hormones,regulationandsecretion. FunctionsofAdrenalineandnor adrenaline Pituitaryhormones– Anteriorandposteriorpituitaryhormones,secretion, function Pancreas– Hormonesofpancreas Insulin–secretion,regulation, function andaction Diabetesmellitus–Regulationofbloodglucoselevel Parathyroidgland–function,action, regulation of secretionofparathyroidhormone Calcitonin–functionandaction Calcium Homeostasis	**12**
2.	**Special senses** Vision– structure ofeye. Functionofdifferent parts. Structure ofretina Hearing-structure andfunctionof ear,mechanismofhearing Taste–Tastebudsfunctions. Smell physiology, Receptors.	**10**
3.	**ExcretorySystem** ExcretoryorgansKidneys:Functionsofkidneysstructuralandfunctionalunitnephron,vasarecta,cortical and juxta-medullarynephrons–Comparison,JuxtaGlomerular Apparatus–Structure andfunctionRenalcirculationpeculiaritiesMechanismofUrine formation:Ultrafiltrationcriteria forfiltrationGFR, Plasma fraction, EFP,factorseffectingEFR. DeterminationofGFR selectivereabsorption–sitesof reabsorption, substance reabsorbedmechanismsofreabsorptionGlucose,and urea.H+Claminoacidsetc. TMG,Tubularload,renalthreshold%ofreabsorptionofdifferent substances, selective secretionPropertiesandcompositionofnormalurine,urineoutputCounter– CurrentMechanisms:Micturition,InnervationofBladder,Cystourethrogram. Diuretics:Water, Diuretics,osmotic diuretics, artificial kidney,renalfunctiontests–plasma clearance Actionsof ADH,Aldosterone and PTHonkidneys Renalfunctiontests	**12**
4.	**Reproductivesystem** FunctionofReproductive system,Puberty,male reproductive system. Functionsoftestes, spermatogenesis site,stages,and factorsinfluencingsemen. Endocrine functionsoftestesAndrogens–Testosterone structureandfunctions. Femalereproductive system: Ovulation, menstrualcyclePhysiological changesduringpregnancy,pregnancytestLactation:Compositionofmilkfactorscontrollinglactation	**10**
5.	**Skin-structure andfunction** Bodytemperaturemeasurement, Physiologicalvariation,Regulationofbody temperature by physicalchemical andnervousmechanismsRoleofHypothalamus,Hypothermiaandfever	**4**

Semester-II	
Subject- Physiology-II(Practical)	**Credit hours-2**
Topic	**Hours**
1. Haemoglobinometry 2. White BloodCellcount 3. RedBloodCellcount 4. DeterminationofBloodGroups 5. Leishman's stainingand DifferentialWBCcount 6. Determinationofpackedcell Volume 7. Erythrocyte sedimentationrate [ESR] 8. CalculationofBloodindices 9. DeterminationofClottingTime,BleedingTime 10. Bloodpressurerecording 11. Auscultationfor Heart Sounds 12. ArtificialRespiration 13. Determinationofvital capacity	20

Semester-II Paper 4		
Subject-Food Service Management		**Credit hours-4**
S.No.	**Contents**	**Lectures**
1.	**Catering industry-** Definition of catering. Classification of food service institutions according to a. Function: Profit oriented, service oriented and public health facility oriented. b. Processing method: Conventional system, commissary system and fast food service systems. c. Service of food: Self-service, tray service and waiter-waitress service.	5
2.	**Floor planning and layout**-Characteristics of typical food service facilities.	4
3.	**Equipment** – Classification, factors involved in selection, use and care of major equipments.	4
4.	**Quantity food preparation-** Selection, purchasing methods and storage of foods.	4
5.	**Menu planning** – Definition, principles involved in planning and types of menus. Standardization of at least 2 recipes in each of the following category 1.Cereal and cereal products 2.Vegetables. 3.Fruits. 4.Meat, chicken and other fleshy foods. 5.Sugar and jaggery 6.Milk and its products. 7.Pulses. 8.Nuts and Oil seeds.	3
6.	**Standardization of recipe** – Definition, standard recipe format and uses. Planning and preparation of menu for various occasions and to calculate amount of each food ingredients a)Birth-day menu b)Holy function menu c)New year special menu d)Wedding menu e) Lhori special menu f) Christmas special menu	2
7.	**Standard portion sizes** - Definition, portioning equipments and portion control.Use of left over foods.	4
8.	**Management-** Definition, principles and techniques of effective management.	5
9.	**Tools of management-** Organization chart, work study and work improvement.	4
10.	**Financial management-** Principles and methods of food cost control, factors affecting food cost, labor cost, operating cost and overhead cost. 1. Calculate food cost, labor cost, operating cost and overhead cost of a home-made dish. 2. Calculate gross profit percentage of an establishment welfare/ commercial/ transport	6

	catering.	
11.	**Personnel management**- Methods of selection, orientation, training, supervision and motivation of employees.	4

Semester-II	Paper 5
FUNDAMENTALS OF COMPUTER SCIENCE **Course Code: ASEC-ND-01** **Credit-2** **(Theory)**	
S.No.	**Contents**
1	**Introduction**: What are computers, Application areas, Characteristics & limitations, Evolution of computers, Classification& generations of computers, Data representation in computer memory (numbering system)
2	**Computers Architecture /Organization:** Basicarchitecture, Functional Block diagram, Types of computers on the basis of purpose, Signal and Portability.
3	**Hardware:** CPU their generations and performance parameters, Input, output and storage devices. Primary (Main) Memories (RAM, ROM, Types of RAM and ROM, Cache Memory, Registers and types of registers, Storage Evaluation Criteria, Memory Capacity), Secondary Storage Devices: (Magnetic Disk, Floppy and Hard Disk, USBs, Optical Disks CD-ROMs).
4	**Software:** Types: System Software (Machine Level Languages, Operating Systems, Device Specific Drivers), Higher Level Languages, and Applications.
5	**Languages**: Machine Language, Assembly Languages, Programming Languages. Use of Compilers, Assemblers, Linkers, Loaders and interpreters in programming languages
6	**Operating System:** Booting/Start Up Procedure of machines, Introduction to Operating System, Functions and Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows.
7	HTML, Use of Multimedia, Computer aided teaching and testing, Application Software MS office (Word, Excel and Powerpoint).
8	**Basic Introduction to Computer Networks:** Data Communication, Network devices (Hub, Switches, Modems, and Routers etc), LAN, LAN topologies, WAN, MAN, Internet: Introduction, Basics of E-mail, Web browsers (IE, Google Chrome, and Mozilla Firefox).
9	Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), IP address, Backbone network, Network connecting devices, HTTP, DNS, Network Security and Search Engine.

Semester-II	**Paper 5**
NEUTRACEUTICALS AND HEALTH FOODS **Course Code:(GE-ND-02)** **Credit-4** **(Theory+Tutorials)**	
S. No.	**Contents**
1.	**Nutraceuticals**: (a) Use of neutraceuticals in traditional health sciences. Their role in preventing /controlling diseases. (b) Definition, Classification, food and non-food sources, mechanism of action. Role of omega-3,fatty acids, carotenoids, dietary fiber, phytoestrogens; glucosinates; organosulphur compounds as neutraceuticals.
2.	**Prebiotics and probiotics**: Usefulness of probiotics and prebiotics in gastro intestinal health and other benefits. Beneficiary microbes; prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes.
3.	**Functional foods** Definition, development of functional foods, benefits and sources of functional foods in Indian diet.
4.	**Development of nutraceutical and functional foods** – Standards for health claims. Process of developing - preclinical & clinical studies, Marketing and Regulatory issues, Regulatory bodies in India.

Semester-III		
Subject-Basic Dietetics	**Paper 1**	**Credit hours-4**
S.No.	**Contents**	**Lectures**
1	1. Dietician 2. Difference between registered dietician & Nutritionist 3. Role of dietician in hospital 4. Role of dietitian in community	5
2	1. Therapeutic process 2. Phases of Care process 3. Diet Therapy 4. Objectives of Diet therapy 5. Concepts of Diet therapy	6
3	1. Principles of diet therapy 2. Therapeutic nutrition for changing needs 3. Role of Antioxidants in the prevention of degenerative disease	5
4	1. Therapeutic adaptation of normal diet:- consistency, energy intake, nutrient, fiber, frequency of feeding, mode of feeding, elimination of food	4
5	1 Introduction of therapeutic diets 2. Modification of diet 3. Routine hospital diets:- clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, tube feed, PEG feed, JJ feed, bland diet, high & low calorie diet, high & low protein diet, high & low fiber diet, low cholesterol diet	8
6	**Modification of diet** 1. Infection: - nutrient & immune response, metabolic changes during infection, nutritional management. 2. Fever: - classification, typhoid, tuberclosis, metabolic changes, nutritional management. 4. Surgical conditions:- general surgery, emergency surgery, gastrointestinal surgery ,bariatric surgery , nutritional management	8
7	**Nutrient Drug Interaction** 1. Introduction, stages of drug absorption, nutrient drug list.	4
8	**Feeding the patient** 1. Introduction objectives, feeding technique, psychology of patient, assessment of patient	6
9	**Feeding infant & children** 1. Introduction, normal infant, pre-term infant, nutritional management, feeding problems, management of feeding problem	4
10	**Nutrient & diet clinics** 1. Introduction, Nutritional Assessment, patient checkup, 2. dietary counseling, educating the patient, follow-up	3

Semester-III		
Subject-Food Science **Paper 2** **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1	**Cereals:** Structure and composition, Nutritional value, Processing- Milling, polishing. Parboiling, flaking, parching, roasting, use in variety of preparations selection, storage and care, breakfast cereals.	12
2	**Pulses:** Composition and nutritional value, processing, soaking, germination. Cooking and fermentations: Toxic constituents of pulses, Lathyrism.	8
3	**Milk and milk products:** Composition of milk, properties and effect of heat, nutritional importance, milk processing, milk products.	10
4	**Nuts and oil seeds:** Nutritive value, importance & classification	6
5	**Fats and oils:** Types, role of fat in cookery	5
6	**Fruits and vegetables:** Classifications, composition and importance in human nutrition storage, cooking of vegetables, changes during cooking, and effect of heat, acid and alkali.	10
7	**Beverages:** Coffee, tea, and cocoa, processing composition and preparation, spices and condiments, types and composition.	12

Semester-III	
Subject- Food Science (Practical) **Credit hours-2**	
Topic	**Hours**
1. To study the effect of cooking on whole and washed dehusked /decorticated pulses and legumes. 2. To prepare batter using different flours and study the effect of deep frying them. 3. To demonstrate the effect of roasting on nuts and oil seeds. 4. To determine the smoking point of fats and oil. 5. To study the effect of heat on milk. 6. To study the effect of sugar on boiling point of water. 7. To prepare fruit jelly. 8. To study the effect of browning in fruits and vegetables. 9. Preparations of some traditional, fermented , functional and other products. Preparation of soyabean products ,non dairymilk and their acceptability test.	20

Semester-III		
Subject-Food microbiology Paper 3 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1.	Introduction of microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa, and algae.	5
2.	Growth of microorganisms: Growth curve, effect of environmental factors in growth of microorganism - pH , water activity , oxygen availability, temperature and others.	6
3.	Microbiology of deficient food: Spoilage. contamination sources, types, effect on the following : (a) Cereal and cereal products (b) Sugar and sugar products. (c) Vegetables nd fruits (d) Meat and meat products. (e) Fish, egg and poultry, (f) Milk and milk products (g) Canned foods.	10
4.	Environmental microbiology: (a) Water and water borne diseases. (b) Air and air borne diseases. (c) Soil and soil borne diseases. (d) Sewage and diseases.	8
5.	Waste product handling : - (a) Planning for waste disposal. (b) Solid wastes and liquid wastes.	6
6.	Microbial intoxication and infections: Sources of contamination of food, toxin production and physiological action, sources of infection of food by pathogenic organisms, symptoms and method of control.	4
6.	Beneficial effect of organism	3
7.	Relevance of microbial standards for food safety.	4

Semester-III	
Subject-Food microbiology (Practical) **Credit hours-2**	
Topic	**Hours**
1. Study of equipments in a microbiology lab. 2. Preparation of laboratory media and special media, cultivation of bacteria, yeasts and moulds. 3. Staining of bacteria: gram-staining. 4. Cultivation and identifications of important molds and yeast in food items. 5. Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms or their products. 6. Visit (at least one) to food processing units or any other organization dealing with advanced methods in food microbiology.	20

Semester-III			
Subject- Environmental Science **Credit hours-4**		**Paper 4**	
	Unit	**Lesson**	**Lecture No.**
1	**Introduction**	Multidisciplinary nature of Environmental Studies: Definition,	1
		Scope and Importance. Need for public awareness	2
2	**Natural Resources**	Natural Resources: Renewable and Non-Renewable	3
		Forest Resources: Use and over-exploitation, deforestation, case studies.	4
		Timber extraction, mining, dams and their effects on forests and tribal people.	5
		Water resources: Use and over-utilization of surface and ground water	6
		Floods, drought, conflicts over water, dams: benefits and problems.	7
		Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.	8
		Food resources: World food problems, changes caused by agriculture and overgrazing, green revolution	9
		Effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.	10
		Energy resources: Growing energy needs, renewable and non-renewable energy sources	11
		Conventional and non-conventional energy sources, Use of alternate energy sources. Case studies.	12
		Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.	13
		Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	14
		Tutorial	15-16
3	**Ecosystems**	Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.	17
		Food chains and food webs, Ecological pyramids.	18
		Ecological succession, Introduction, types,	19

		characteristic features, structure and function of the following ecosystem: Forest ecosystem Grassland ecosystem Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
		Tutorial	20-21
4	**Biodiversity and its conservation**	Introduction – Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	22
		Biodiversity at global, National and local levels. India as a mega-diversity nation	23
		Hot-spots of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts	24
		Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	25
		Tutorial	26-27
5	**Environmental Pollution**	Definition, Causes, effects and control measures of:- Air pollution	28
		Water pollution,	29
		Soil pollution,	30
		Marine pollution, Noise pollution	31
		Thermal pollution, Nuclear hazards	32
		Role of an individual in prevention of pollution. Pollution case studies.	33
		Solid waste management: causes, effects and control measures of urban and industrial wastes.	34
		Disaster management: floods, earthquake, cyclone and landslides	35
		Tutorial	36-37
6	**Social issues and Environment**	From Unsustainable to Sustainable development, Urban problems related to energy	38
		Water conservation, rain water harvesting, watershed management	39
		Resettlement and rehabilitation of people; its problems and concerns. Case studies.	40

		Environmental ethics: Issues and possible solutions.	
		Wasteland reclamation. Consumerism and waste products.	41
		Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act Wildlife Protection Act Forest Conservation Act	42
		Environment Protection Act. Issues involved in enforcement of environmental legislation	43
		Tutorial	44-45
7	**Human Population and the Environment**	Population growth, variation among nations, Population explosion	46
		Family Welfare Programme Environment and human health. Human Rights.	47
		Value Education. HIV / AIDS	48
		Women and Child Welfare. Role of Information Technology in Environment and human health.	49
		Case Studies.	50
	Project work		51-55
	Seminar	On current Environmental Issues	56-58
	Assignments		59-60

Semester-III	**Paper 5**
FOOD LAWS &FOOD SAFETY **Course Code:(GE-ND-03)** **Credit-4** **(Theory+Tutorials)**	
S.No.	**Contents**
1	Concept and meaning of Food quality and food Safety, food adulteration, food hazards, Natural toxins.
2	Food laws and regulations –National and international food laws, Governing bodies.
3	Exposure, estimation, toxicological requirements and risk assessment
4	Safety aspects of water and beverages such as soft drinks, tea, coffee, cocoa.
5	Safety assessment of food contaminants and pesticide residues.
6	Safety evaluation of heat treatments and related processing techniques.

Semester-IV		
Subject-Therapeutic Nutrition Paper 1 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1	**Nutrition for gastrointestinal diseases-** 1 Problem of stomach:- diarrhea, constipation, peptic ulcer, type, nutritional management 2 Intestinal disorder:- diverticular disease, IBS, celiac disease, lactose intolerance, nutritional management .	6
2	**Diet for Renal disease-** 1 Nephritis, nephrotic syndrome:- causes, symptoms, nutritional management 2 Renal disease:- Acute renal failure, Chronic renal failure, ESRD, symptoms, nutritional management	8
3	**Diet for obesity**: - introduction, assessment of obesity, hazards of obesity, nutritional management	5
4	**Diet for cardiovascular disease**: - introduction, stages of development, etiology, risk factor, nutritional management	5
5	**Diet for Diabetes Mellitus** 1**.** Introduction, classification, symptoms nutritional management	4
6	**Diseases of Liver**-Hepatitis, Cirrhosis, alcoholic, liver disease, Gall stones - Causes, prevention and dietary management.	6
7	**Diet in Kidney disease** 1. Kidney transplant, Dialysis:- introduction, types of dialysis, nutritional management 2. Kidney Stones, Types, Nutritional Management	6
8	**Diet in Cancer** 1. Introduction, origin, causes, types of cancer, diagnosis, relation of nutrition & cancer, effect of cancer on nutritional status, objectives of nutrition therapy, nutritional management.	5
9	**Diet in AIDS & Allergy** 1. AIDS: - Introduction, stages of disease progression, relation of nutrition & AIDS, impact of AIDS on nutritional status, nutritional management. 2. Allergy:- Introduction, types, symptoms, risk factor, diagnosis nutritional management	4
10	**Diet for metabolic disorder** 1. Introduction, definition, causes, types, nutritional management.	5
11	**Diet in burn and surgery:-** 1. Burn**: -** Introduction, types & extent of burn, nutritional management. 2. surgery:- Introduction, factors affecting surgery, pre-operative nutrition, post- operative nutrition, goals of dietary management, dietary management	6
12	**Diet in addictive behaviour:-** 1. Anorexia nervosa**: -** Introduction, types, difference between dieting and anorexia, symptoms, causes, risk factor, effect, treatment, nutritional management. 2. Bulimia nervosa: - Introduction, symptoms, causes, risk factor, effect, treatment, nutritional management. 3. Alcoholism: - Introduction, symptoms, causes, diagnosis, treatment, nutritional management.	3

Semester-IV	
Subject-Therapeutic Nutrition (Practical) **Credit hours-2**	
Topic	**Hours**
1. Standardization of common food preparations. 2. Planning, preparation and calculation of following diets: (a) Normal diet. (b) Clear Liquid and liquid diet (c) Soft diet (d) Tube Feed (e) High and low caloric diet (f) Bland diet for peptic ulcer (g) Diet for Viral hepatitis and cirrhosis (h) Diet for Diabetes mellitus (i) Diet for Hypertension and Atherosclerosis (j) Diet for Nephritis and Nephrotic syndrome 3. Low and medium cost diet for P.E.M., Anemia & vitamin A deficiency. 4. Plan and preparation of diet for celiac sprue	20

Semester-IV		
Subject-Food Science & preservation	**Credit hours-4**	
Paper 2		
S.No.	**Contents**	**Lectures**
1	**Flesh foods-** Selection, storage, uses and nutritional aspects of meat, fish and poultry, spoilage of fish.	8
2	**Egg –** Composition & classification of egg & egg products, its nutritive value.	6
3	**Baking –** Types of bake products & its nutritive value.	5
4	**Role of spices in food science** - Importance, composition & classification	12
5	**Sugar and Sugar products-** Form of sugar and liquid sweetness Caramelization, Hydrolysis, Crystallization Indian confectionery	5
6	**Food additives:** Definitions, functions and uses in processed food products.	10
7	**Food Flavors**: Spices and flavoring constituents, flavors in food industries.	8
8	Food Preservation & Food Adulteration	8

Semester-IV	
Subject- Food Science & preservation (Practical) Credit hours-2	
Topic	**Hours**
1. Nutritional value & criteria of food selection in Indian diet according to ICMR. 2. Survey of marketed processed and labeling of processed food items. 3. Detection of toxins and adulterants of some of the common foods. Preparation of some confectionary products. 4. Visit to food industry, dairy firm & confectionaries. 5. Food preservation techniques (use of different techniques in product formulation and analysis of product for quality standards). a. Sun drying and dehydration-cereals, legumes, vegetable based. b. Preservation with sugar-jams, jelly, preserves, etc. c. Preservation - salt, oil, vinegar-pickling. d. Preservation of foods using chemicals –tomato ketchup, squash. 6. To study the effect of cooking time on the color, texture and acceptability of whole egg.	20

Semester-IV		
Subject- Job training & Management of diets Paper 3 (Practical) Credit hours-2		
S.No.	**Contents**	**Lectures**
1	The students of first year do the market survey of available food items in stores.	**5**
2	Plan a specific calorie bases nutrition charts as per the physical activity,physiological conditions and socio-economical status • Sedentary • Moderate • Heavy • LIG • MIG • HIG	**15**
3	Maintain logbook of the normal human nutrition and at the end of academic year their logbooks will be evaluated by the faculty concerned.	**40**
4	Practical consideration in giving dietary advice and counseling – a) Factors affecting and individual food choice. b) Communication of dietary advice c) Consideration of behavior modification d) Motivation.	**20**
5	Counseling and educating patient a) Introduction to nutrition counseling b) Determining the role of nutrition counselor c) Responsibilities of the nutrition counselor d) Practitioner v/s client managed care e) Conceptualizing entrepreneur skills and behavior f) Communication and negotiation skills.	**20**

Semester-IV		
Subject-Quality control in food industry **Paper 4** **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1	Concept of quality: Quality attributes – physical, chemical, nutritional, microbial, and sensory. Quality control in Food industry.	8
2	Concepts of quality management: Objectives, importance and functions of quality control; Principles of quality control ,Quality management systems in India; Sampling procedures and plans.	10
3	.Food Safety organizations dealing with inspection, traceability and Labeling issues, International food standards.	5
4	Use of hazard analysis and critical control points in processing of foods	4
5	Quality assurance, Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices; Quality manuals, documentation and audits; Indian & International quality systems and standards like ISO and Food Codex; Export import policy, export documentation; Laboratory quality procedures and assessment of laboratory performance; Applications in different food industries.	15
6	Quality control in food service institutions	5

Semester-IV		
Subject- Assessment of Nutritional Status **Credit hours-4** **Paper 5**		
S.No.	**Contents**	**Lectures**
1	**Indirect methods** - Demography, population dynamics and vital events and their health implications, indicators of health and nutrition (IMR, TMR, MMR).	6
2	**Direct methods** – Introduction to Anthropometry, Biochemical, Clinical, Dietary and Functional indices of assessments.	4
3	**Anthropometry –** methods, reference standards in children and adults, scales of comparison (percentiles, Z score), classification and interpretation of somatic data, somatic indicators of PEM	6
4	**Biochemical -** use of specimen types, indicators of protein-energy status, anemia, immune function, CVD risk, oxidative stress. Urine and stool analyses.	8
5	**Dietary-** methods, nutrient intake analysis, dietary assessment in special populations and specific situations, Dietary reference intakes	6
6	**Clinical- c**omponents of clinical assessment, associations with nutrient deficiencies and biochemical status	8
7	**Assessing food and nutrition security** – Definition and assessment schedules, National and household food security. Factors affecting food security system. National and International systems to improve food security	8

Semester-IV	
SPORTS NUTRITION **Course Code:(GE-ND-04) Paper 6** **Credit-4** **(Theory+Tutorials)**	
S.No.	**Contents**
1.	**Approaches to the management of fitness and health:** Nutrition, exercise, physical fitness and health- their inter relationship. Significance of physical fitness and nutrition in prevention and management of weight control regimes. Nutrition guidelines for maintenance of health and fitness.
2.	**Nutritional requirements of exercise:** Effect of specific nutrients on work performance and physical fitness. Nutrients that support physical activity, Mobilization of fuel stores during exercise. Fluid requirements.
3.	**Nutrition in sports:** Sports specific requirements- Importance of carbohydrate loading, pre game and post game meals, Diets for persons with high energy requirements, stress, fracture and injury.
4.	**Dietary supplements and Ergogenic aids:** Definitions, Use of different nutragenic / ergogenic aids and commercial supplements, Sports drinks, sports bars etc.

Semester-V		
Subject-Advanced Dietetics **Paper 1** **Credit hours-4**		
S.NO	**Contents**	**Lectures**
1	Concept of Diet therapy: Growth and source of dietetics, purpose and principles of therapeutic diets, modification of normal diet, classification of therapeutic diets.	4
2	Role of Dietician: Definition of nutritional care, interpersonal relationship with patient, planning and implementary dietary care, Team approach to nutritional care.	4
3	Routine hospital diets: Preoperative and postoperative diets, study and review of hospital diet. Basic concepts and methods of - (a) Oral feeding (b) Tube feeding (c) Parental nutrition (d) Intravenous feeding.	6
4	Diet in fever and infections- Types- metabolism in fever, general dietary consideration diet in influenza typhoid fever, recurrent malaria and tuberculosis.	7
5	Diet in gastritis, peptic ulcer- symptoms, clinical findings, treatment, dietary modification, adequate nutrition, amount of food, and intervals of feeding, Chemically and mechanically irrigating foods, four stage diet (Liquid, soft, convalescent, liberalized diet).	8
6	Diet in disturbances of small intestine and color. • Diarrhoea- (child and adult)- classification, modification of diet, fiber, residue. fluids &nutritional adequacy. • Constipation- flatulence - dietary considerations. • Ulcerative colitis (adults)- symptoms, dietary treatment. • Spruce, coeliac disease- disaccharide intolerance, dietary treatment.	10
7	Diet in allergy and skin disturbances: Definition, classification, manifestations, common food allergies and test and dietetic treatment.	6

Semester-V	
Subject- Advanced Dietetics (Practical) **Credit hours-2**	
Topic	**Hours**
1. Planning, preparations and calculations of diets with modified- (a) Consistency (b) Fibre and residue (c) Diet for Diarrhoea and constipation (d) Diet for peptic ulcer. (disease) 2. Planning, preparation and calculation of diets in food allergy. 3.Planning, preparation and calculation of diets in fever and infections.	20

Semester-V		
Subject- Community Nutrition **Paper 2** **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1	Nutrition and health in National development	2
2	Malnutrition- meaning. factors contributing to malnutrition, over nutrition.	3
3	Nutritional disorders- Epidemiology, clinical features, prevention and dietary treatment for Protein Energy malnutrition, nutritional anaemia& vitamin deficiency disorders .	10
4	Methods of assessing nutritional status: a) Sampling techniques , Identifications of risk groups, b) Direct assessment – Diet surveys, anthropometric, clinical and biochemical estimation. c) Indirect assessment- Food balance sheet, ecological parameters and vital statistics.	8
5	Improvement of nutrition of a community: a) Modern methods of improvement or nutritional quality of food, food fortification, enrichment and nutrient supplementations. b) Nutrition education themes and messages in nutrition and health, Antenatal and postnatal care.	8
6	Nutritional and infection relationship: Immunization and its importance, Food borne infection and intoxication diseases, foods involved, methods of prevention, Infestation of food borne diseases , Outbreak, Prevention signs and control of infection.	10
7	National and International agencies in uplifting the nutritional status -WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. Various nutrition related welfare programmes, ICDS, SLP, MOM, and others (in brief).	10
8	Community nutrition programme planning - Identification of problem, analysis of causes, resources constraints, selection of interventions, setting a strategy, implementations and evaluation of the programme.	8

Semester-v	
Subject- Community Nutrition (Practical)	**Credit hours-2**
Topic	**Hours**
1. Diet and nutrition surveys: (a) Identification of vulnerable and risk groups. (b) Diet survey for breast-feeding and weaning practices of specific groups. (c) Use of anthropometric measurement in children. d) Estimation of food and nutrient intake, household food consumption data, adult consumption unit, 24 hours diet recall and 24 hours records. 2. Preparation of visual aids. 3. Field visit to (a) Observe the working of nutrition and health oriented programmes (survey based result). (b) Hospitals to observe nutritional deficiencies	20

Semester-V		
Subject- Research & Biostatics Paper 3 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1	**Introduction** Meaning,definition, and characteristicsofstatistics Importance ofthe studyofstatistics Branchesofstatistics Statisticsandhealth science includingnursing Parametersandestimates Descriptive andinferentialstatistics Variablesandtheirtypes Measurement scales	**8**
2	**TabulationofData** Rawdata,the array,frequencydistribution Basic principlesofgraphical representation Typesofdiagrams-histograms,frequencypolygons, smoothfrequencypolygon,cumulativefrequencycurve, Normalprobabilitycurve	**10**
3	**MeasuresofCentralTendency** Introduction: Uses, applications and practical approach Definitionandcalculationofmeanfor ungroupedandgrouped data Meaning,interpretationandcalculationofmedianungroupedandgrouped data Meaningandcalculationofmode Comparisonofthemean,andmode Guidelinesforthe use ofvariousmeasuresofcentral tendency	**10**
4	**MeasuresofVariability** Introduction: Uses, applications and practical approach The range,the average deviation or mean deviation The variance and standarddeviation Calculationofvariance and standarddeviation for ungroupedandgrouped data Propertiesandusesofvariance and standard deviation	**10**
5	**SamplingTechniques** Introduction: Uses, applications and practical approach Criteriafor good samples ApplicationofsamplinginCommunity Sampling Methods, Sampling and Non-sampling errors Samplingvariationandtestsofsignificance	**10**

Semester-V		
Subject-Food Packaging **Paper 4** **Credit hours-4**		
S.NO	**Contents**	**Lectures**
1.	Food Packaging: Definition, functions of packaging materials for different foods, characteristics of packaging material. • Food packages – bags, pouches, wrappers, tetra packs.	10
2.	Packaging Materials: Introduction, purpose, requirements, types of containers. • Modern Packaging Materials and Forms: Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.	12
3.	Packages of Radiation Stabilized Foods: Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. • Radiation measurement of radiations. Biodegradable packaging material - biopolymer based edible firm.	10
4.	Packages of dehydrated products. Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.	8
5.	Packaging of Finished Goods: Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping. Labeling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, mandatory labeling provision	8

Semester-V		
Subject- Product Development & Sensory Evaluation Paper 5 **Credit hours-4**		
S.NO	**Contents**	**Lectures**
1	**Sensory evaluation of foods**: a. Importance and application for product formulation, b. Basic tastes, threshold tests for basic tastes, c. Requirements for sensory analysis, d Sensory panel, type, selection and training, e. Subjective and objective sensory evaluation, f. Different types of sensory tests g. Instrumental tests for sensory attributes – colour, texture and odour.	12
2	**Product Development** a. Designing new product – types and drawing forces b. Need for product development c. Stages of product development d. Success in product development e. Consumer research f. Role of sensory evaluation in consumer product acceptance	15
3	**Consumer Behavior** in purchasing foods, Factors influencing product acceptance andpurchasing trends. Market place changes in processed foods.	6
4	**Special food processing technologies and novel food ingredients** – Membrane technology (reverse osmosis and ultra filtration), agglomeration, agitation, air classification, extrusion, automation in food industries.	12

Semester-VI		
Subject- Clinical Nutrition & Dietetics **Paper 1** **Credit hours-4**		
S.NO	**Contents**	**Lectures**
1	Obesity and leanness- causes, complication and health effects, dietary treatment and other recommendation Diet in surgical conditions, burns and cancer.	8
2	Diet in surgical conditions, burns and cancer.	8
3	Diet in diseases of the liver, gall bladder and pancreas, a) Etiology, symptoms and dietary treatment in - Jaundice, hepatitis, cirrhosis and hepatic coma. b) Role of alcohol in liver diseases. c) Dietary treatment in cholecystitis, cholelithiasis and pancreatitis.	8
4	Gout- Nature and occurrence of uric acid, causes, symptoms and diet.	3
5	Diet in Diabetes mellitus: a) Incidence and predisposing factors. b) Symptoms-types and tests for detection. c) Metabolism in diabetes d) Dietary treatment & meal management e) Hypoglycemic agent, insulin and its types. f) Complication of diabetes.	6
6	Diet in Renal diseases: Basic renal function, symptoms and dietary treatment in acute and chronic glomerulonephritis, Nephrosis, renal failure, dialysis. Urinary calculi-causes & treatment, acid and alkali producing and neutral foods and dietary treatment.	8
7	Diet in Cardiovascular diseases: Role of nutrition in cardiac efficiency, incidence of Atherosclerosis, dietary principles, Hyperlipidenmia, Hypertension- causes and dietary treatment, Sodium restricted diet, level of sodium restriction, sources of sodium, danger of severe sodium restriction.	8

Semester- VI	
Subject- Clinical Nutrition & Dietetics (Practical) **Credit hours-2**	
Topic	**Hours**
1. Planning, preparation and calculation of diets for Diabetes mellitus, 2. Planning, snacks. Deserts and beverages for Obesity. 3. Planning. Preparation and calculation of diet in cardiovascular diseases. 4. Planning, preparations and calculation of diet in Kidney failure , Kidney transplant, Renal complication &Kidney stone. 5. Planning, preparations and calculation of diet in Cancer, Trauma (burns) & Surgery 6. Planning, preparation and calculation of diets for liver, gall bladder and pancreas. 7.Planning, preparation and calculation of diets for Gout.	20

Semester-VI		
Subject- Nutritional Management during Emergencies Paper 2 **Credit hours-4**		
S.No.	**Contents**	**Lectures**
1.	Natural/manmade disasters: resulting in emergency situations-Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies, Factors contributing to the rise and development of emergency situations (**Use illustrations from Indian case studies).**	15
2.	**Nutritional problems and communicable diseases**: Causes, major deficiencies and communicable diseases, (PEM and other specific deficiencies) (Cholera, typhoid, measles, TB, plague).Control and prevention, role of immunization and sanitation.	10
3.	Assessment and surveillance of nutritional status: in emergency affected populations- Scope for malnutrition assessment, indicators and simple screening methods. Organization for nutritional surveillance**.**	6
4.	**Nutritional relief and rehabilitation:** Assessment of food needs, food distribution strategy, targeting food aid, mass and supplementary feeding, special foods/ rations for nutritional relief, organizations for mass feeding/ food distribution, transportation and storage, feeding centers, sanitation and hygiene and public nutrition approach to tackle nutritional and health problems in emergencies, ethical considerations.	10

Semester-VI Paper 3		
Subject- Internship/Training		**Credit hours-8**
S.No.	**Contents**	**Lectures**
1 **2**	Internship in Food Service Institutions & Hospitals / Clinics. Submission of report on case studies in any disease condition.	**2months internship**

Semester-VI	
Subject- Project work **Paper 4** **Credit hours-6**	
S.No.	**Contents**
1.	The project is to be carried out over a period of approximately 2 to 3 months. Students will select project in consultation with their respective supervisors. The projects will be selected such that a student can reasonably be expected to make an original contribution to the chosen area within the time period allotted. The purpose of the project is to provide the student with training in academic research and acquisition of practical skills, including the design of a project, planning of experiments, dealing with practical problems, recording, presenting and analyzing the data.
2.	Report will be evaluated as stated under project work regulations.