



BACHELOR OF SCIENCE (B.Sc.)

(THREE YEAR DEGREE COURSE)

SUBJECT

CLINICAL NUTRITION & DIETETICS

B.Sc.(CLINICAL NUTRITION & DIETETICS)

COURSE STRUCTURE

FIRST YEAR

PAPER – 101: Basic Nutrition & Food Micro Biology 75 MARKS

PAPER – 102: Human Physiology & Nutritional Biochemistry 75 MARKS

PAPER – 103: PRACTICAL 50 MARKS

SECOND YEAR

PAPER – 201: Food commodities, Meal Management & Basic
Dietetics 75 MARKS

PAPER – 202: Sanitation and Hygiene, Personnel Management
And Quantity Food Production & Service 75 MARKS

PAPER – 203: PRACTICAL 50 MARKS

THIRD YEAR

PAPER – 301: Food Service Equipment Layout & Community
Nutrition 75 MARKS

PAPER – 302: Advanced Dietetics & Clinical Nutrition 75 MARKS

PAPER – 303: PRACTICAL 50 MARKS

B.Sc.(CLINICAL NUTRITION & DIETETICS)

FIRST YEAR DETAILED SYALLBUS

PAPER – 101

BASIC NUTRITION & FOOD MICRO BIOLOGY

UNIT I

1. Definition of nutrition, definition of nutrients, food, functions of food, definition of good nutrition, malnutrition.
2. Inter-relationship between nutrition & good health, characteristics of well nourished persons, difference between a people provided with good nutrition & malfunction.
3. Basic five food groups – carbohydrates, proteins, lipids, minerals & vitamins, water.
4. Digestion – digestion of proteins, fats and carbohydrates, absorption.

UNIT II

1. Energy – Unit of energy, food as a source of energy, energy volume of carbohydrates, proteins and lipids, basal metabolism.
2. Carbohydrates – composition, classification (monosaccharide, oligosaccharides, polysaccharides), RDA, food sources, functions of carbohydrates, storage in body.
3. Fats & Oils – Composition, saturated and unsaturated fatty acids, classification (major types of lipids), sources, functions of fats.

UNIT III

1. Proteins - composition, sources, essential and non-essential amino acids, sources of proteins, functions of proteins, proteins deficiency – Marasmus and Kwashiorkor (in brief).
2. Water – Distribution of water in body, functions of water, intake & loss of body water, water balance, water deficiency – dehydration. Causes & effects of dehydration, water intoxication.
3. Acid – Base Balance - Definition of acid, biological fluids and disuses, mechanism of acid – base, balance in the body, renal mechanism of acid base balance, disturbance of acid base balance.

UNIT IV

1. Minerals – Functions, sources, requirement and deficiency of calcium, iron, iodine, fluorine, sodium and potassium.
2. Vitamins – Classification, functions, requirements, sources and deficiency of fat soluble vitamins (vitamins A, vitamins D, vitamins E and vitamins K) and water soluble vitamins (ascorbic acid and vitamins B- complex).

UNIT V

1. Microbiology of different foods – spoilage and contamination – sources, types and effect on the following:-
 - a). Cereals & Cereals products.
 - b). Sugar & Sugar Products.
 - c). Vegetables & Fruits
 - d). Meat & Meat Products.
 - e). Fish & other Sea Foods.

- f). Eggs & Poultry.
 - g). Milk & milk Products.
 - h). Canned Products.
2. Microbial intoxications and infections – sources of contamination of food, toxin production and physiological action. Sources of infection of foods by pathogenic organism – symptoms and method of control.

B.Sc.(CLINICAL NUTRITION & DIETETICS)

FIRST YEAR DETAILED SYALLBUS

PAPER – 102

HUMAN PHYSIOLOGY & NUTRITIONAL BIOCHEMISTRY

UNIT I

1. The skeleton – skeleton, definition of axial & appendicular skeleton, endoskeleton, functions of bones, bones of axial & appendicular skeleton.
2. Blood & Blood circulation – blood composition, functions, clothing (extrinsic & common pathway), blood groups, Rh factor, blood & vessels artery, vein & capillary, their structure & function.
Structure of heart & blood flow through the heart, cardiac cycle, pulse, blood pressure systolic & diastolic.
Different types of anemia, leukemia, varicose veins, arthrosclerosis & angina pectoris.
3. Lymphatic system – functions of Lymphatic system, Lymphatic tissues, Lymph nodes, tonsils, spleen, Thymus gland.
4. Respiratory system – respiratory organs, structure & function of nose, Pharynx, Larynx, Trachea, Bronchi. Structure of lungs & its functions. Physiology of external (pulmonary) & internal tissues respiration. Common diseases – TB (tuberculosis), Asthma & cough.

UNIT I

1. Digestive System –

- (a) Structure of teeth, structure & functions of tongue, structure of salivary glands, composition & functions of saliva.
 - (b) Structure & functions of esophagus, stomach, small intestine. Glands-Liver, pancreases, pancreatic secretions & functions of enzymes & gallbladder, composition & function of bile.
 - (c) Diabetes Millets.
 - (d) Vomiting, constipation, diarrhea, peptic ulcer & its treatment & piles.
2. Excretory system – structure & functions of kidney, nephron, parts of nephron & its functions, structures & functions of ureter & urinary bladder, physiology of urine formation, composition of urine, abnormal constituents of urine. Diseases – Renal stones, nephrosis, significance of urine examination.
3. Skin - functions of skin, structure of skin, hair, glands (sebaceous gland & sudoriferous glands) and nails. Disorders – Burns, Dermatitis.

UNIT III

1. Sense Organs –
 - (a) Eye – external structures of eye, anatomy of eyeball, image formation, accommodation & near point vision, physiology of vision, myopia & hypermetropia. Conjunctivitis, cataracts & Trachoma.
 - (b) Ear – External ear, middle ear, internal ear, sound waves, physiology of hearing, physiology of equilibrium. Disorders – deafness, vertigo.
2. Muscular system – non striated, striated & cardiac muscles. Differences & similarities between these three, mechanism of muscular contraction.

3. Nervous system – structure of a nerve cell, nerve fiber, classification of nervous system.
4. Brain and spinal cord, functions of different parts of brain, peripheral nervous system. Automatic – sympathetic and parasympatric nervous system, nerve impulse, synapse, reflex action and voluntary action.

UNIT IV

1. Structure & functions of ovary, fallopian tubes, uterus, vagina, external genitiation.
2. Structure & function of teste, vas deferens, urethra, penis & prostrate gland.
3. Menstruation, puberty, menopause, development of fertilized ovum, placenta, its functions, parturition.
4. Endocrine system –
 - (a). Pituitary gland – hormones of anterior pituitary clove, hormones of middle lobe, hormones of posterior lobe, structure & functions of thyroid gland, parathyroid gland, structure & functions of adrenal gland, functions of testosterone & estrogen hormones of pancreas.
 - (b). Disorders – Pituitary dwarfisin, glantism & acromegaly, Grave's diseases, Addison's diseases, cretinism, Cushing's diseases, diabetes mellitus.

UNIT IV

1. Biological oxidation – electron transport mechanism, NADH, Cytochromes, electron transport chain, energy conservation, high energy phosphate bond, storage and release of high energy phosphate.
Genetic control of metabolism – nucleic acids, structure and replication of DNA and RNA.
Genetic repair mechanism.

2. Major metabolic pathways:-

- (a) Carbohydrates metabolism: Digestion, absorption, glucose transport, glycolysis.
- (b) Lipid metabolism – digestion, absorption transport, oxidation of fatty acids, biosynthesis of fatty acids, metabolism of phospholipids, glycolipids and cholesterol.
- (c) Amino acid metabolism – digestion, absorption and transport.

B.Sc.(CLINICAL NUTRITION & DIETETICS)

FIRST YEAR DETAILED SYALLBUS

PAPER – 103

PRACTICAL

Based on the Paper – 101 & Paper - 102

B.Sc.(CLINICAL NUTRITION & DIETETICS)

SECOND YEAR DETAILED SYALLBUS

PAPER – 201

FOOD COMMODITIES, MEAL MANAGEMENT & BASIC DIETETICS

UNIT I

1. Cereals & Pulses – Cereals and millets, breakfast cereals, cereal products, fast food – structure, processing, use in variety of preparations, nutritional aspects. Pulses & Legumes – uses in variety of preparations, nutritional aspects and cost.
2. Milk and milk products – composition, classification, quality processing, storage, spoilage, uses, cost, nutritional aspects of milk curds, butter milk, panner, khoa, chesses, ice-cream, kulfi and various kinds of processed milk.
3. Eggs – Grade, storage, users, cost and nutritional aspects.

UNIT II

1. Fish, poultry and meat – users, cost and nutritional aspects, storage of fish, poultry & meat.
2. Vegetables & Fruits – Variety, selection, purchase, storage, availability, cost, use and nutritional aspects of raw and processed vegetables and fruits.
3. Sugar & Sugar Products – Different forms of sugar (sugar, jiggery, honey syrup) preserves.
4. Fats & Oils – Types and sources of fats and oils (animal and vegetable) uses, cost and nutritional aspects.

UNIT III

1. Leaving aspects – Air, steam, baking powder, fermentation
2. Food adjuncts – spices, condiments, herbs, extracts, concentrates, essences & food colours origin, classification, description, uses, specifications, procurement and storage.
3. Convenience Foods – role, types, advantages, uses, cost and contribution to diet.
4. Salt – Types, uses in the diet and stimulants – beverages, appetizers, refreshing and nutrition aspects.

UNIT IV

1. Food guide – basic 5 food group – balanced diet – introduction to meal management.
2. Nutritional requirements and meal planning of:
 - (a) Infant.
 - (b) Pre-schooler
 - (c) School going
 - (d) Adolescent
 - (e) Adult – Man, Women, Girl, Boy according to work and money matters.
 - (f) Geriatrics
3. Nutrition during :
 - (a) Pregnancy, its complication.
 - (b) Lactation and its importance.
 - (c) Weaning foods and their importance.

4. Therapeutic diets

- (a) Diabetes
- (b) Fevers and their classification
- (c) Gastro intestinal disorders.
- (d) Cardiovascular disorders.

5. Routine Hospital diets

- (a) Modification of diet.
- (b) Therapeutic diet adaptation.
- (c) Improvement in hospital diet
- (d) Diets in convalescence.

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SECOND YEAR DETAILED SYALLBUS

PAPER – 202

SANITATION AND HYGIENE, PERSONNEL MANAGEMENT AND QUANTITY FOOD PRODUCTION & SERVICE

UNIT I

1. The relationship of micro-organisms to sanitation, role of microbiology – environmental effects of microbial growth- effects of micro-organisms on food degradation and food borne illnesses – bacteria, virus, molds, yeasts and parasites.
2. Other food hazards – chemicals, antibiotics, hormones, metal contamination – poisonous foods.
3. Food contamination – sources and transmission. Water, air, sewage and soil reservoirs or infections and ways of spread. Other agents of contamination. Humans, domestic, animals, vermin birds.

UNIT II

1. Importance of personal hygiene of food handler – habits, clothes, illness, education of food handler in handling and serving food.
2. Safety in food procurement, preparation, cooking and storage, control of spoilage, safety of left over.
3. Cleaning measures, sterilization, disinfection – products and methods – use of detergents and soaps for sanitizer strength.
4. Kitchen design equipment and layout.

5. Structure and layout of food premises maintaining clean environment.
6. Selecting and installing equipment, cleaning equipments.

UNIT III

1. Waste product handling.
2. Disposal of refuse.
3. Control of infestation – Rodent Control eg – Rats, Mice, Proofing, Destruction, Vector Control – Use of pesticides.
4. Food sanitation, control and inspection - planning and implementation of training programme for health personnel.

UNIT IV

1. Food material management –
 - (a) Meaning, definition, importance.
 - (b) Food selection, purchasing, receiving and store room management.
 - (c) Control in relation to the above operations (material planning, budgeting, material identification and standardization, inventory control, store – keeping, definition, objectives, functions, factors underlying successful storekeeping duties and responsibilities of a store keeper, purchasing, principles, procedure.
2. Visits to different types of food service institutions to study the following: store, hospitals, flight kitchens, hotel restaurants, canteen (industrial).
 - (a) Organization.
 - (b) Physical plan and layout
 - (c) Food service equipment.

- (d) Sanitation and hygiene.

UNIT V

1. Meal planning menus served for Indian (regional i.e. North Indian, South Indian, West India and East India, Western and others). Techniques of writing menus (give exercise for planning menus).
2. Types of meals and styles of service, breakfast, launch, dinner, afternoon tea, snacks (table d hote and a'la Carte menu).
3. Introduction to basic and special equipment for food production and services
 - (a) indicate and list
 - (b) care and use of equipments – silver, cutlery, glass laying up for number (particles, use AV aids and handouts).
4. Staff organization of different outlets (a la carte and table of hote) manager, hostess, supervisor, steward, waiter.
5. Beverages, alcoholic and non alcoholic, hot and cold, classification of beverages, use and importance in meals and snacks, suitable glassware for beverages services.

B.Sc.(CLINICAL NUTRITION & DIETETICS)
SECOND YEAR DETAILED SYALLBUS

PAPER – 203

PRACTICAL

Based on the Paper – 201 & Paper - 202

B.Sc.(CLINICAL NUTRITION & DIETETICS)

THIRD YEAR DETAILED SYALLBUS

PAPER – 301

FOOD SERVICE EQUIPMENT LAYOUT & COMMUNITY NUTRITION

UNIT I

1. Equipment in Food Service
 - (a) Classification of equipment – Electrical equipment, oven with grill, fridge, dish washer, mixer, grinder. Non-electrical equipments – Mixer, grinder, cooker, vessels of different types.
 - (b) Basic concept, safety consideration, wiring installation, insulation material used and precaution of all types of gadgets.
2. Planning of Food service units: layout of kitchens, cooking, cleaning, storage of perishables and non-perishables, lighting arrangement and sizes of working place.

UNIT II

1. Community Nutrition: definition of community. Important factors affecting of community. Festivals diets in different communities – Diwali, Holi, Eid, Christmas, Pongal, Onam.
2. Role of Nutrition and health in National development.
National and International agencies in community nutrition: ICDS, SNP, ANP, midday meal programme, FAO, WHO, UNICEF, CARE, AID, ICMR, ICAR, CSIR, NIN, CFTRI.
3. Food Adulteration.

4. Diet Surveys of different income groups.

UNIT III

1. Methods of assessment of nutritional status:
 - (a) Sampling Techniques.
 - (b) Direct Assessment
 - (c) Indirect Assessment
 - (d) Anthropometry
 - (e) Clinical and Biochemical estimation
 - (f) Growth charts
2. Nutrition intervention schemes in the community, nutrition exhibitions and visual aids.
3. Recent advances in community nutrition, enrichment of food.

UNIT IV

1. Breast feeding and its implications, hazards of bottle feeding.
2. Importance of correct and timely weaning.
3. Weaning foods, Planning, formulation and preparation.
4. Carbohydrates, their digestion, absorption, metabolism and functions.
5. Lipids – their digestion, absorption, assimilation, functions and production of ketone bodies.

UNIT V

1. Energy metabolism – BMR energy requirement for physical activities.
Influence of exercise on body. Intensity and duration.

2. Water and Electrode Balance, effect of dehydration. Electrolyte losses and their importance.
3. Nutrients and drug interaction. Effects of drug therapy on intake, absorption and utilization of nutrients.

B.Sc.(CLINICAL NUTRITION & DIETETICS)

THIRD YEAR DETAILED SYALLBUS

PAPER – 302

ADVANCED DIETETICS & CLINICAL NUTRITION

UNIT I

1. Concept of Diet Therapy – Growth and source of dietetics, purpose and principles of therapeutic diets, modification of normal diet, classification of therapeutic diets.
2. Role of Dietitian – Definition of nutritional care, interpersonal relationship with patient, planning and implementing dietary care, team approach to nutritional care.
3. Routine Hospital Diets - Preoperative and post operative diets, study and review of hospital diet, basic concepts and methods of (i) oral feeding, (ii) tube feeding, (iii) parental nutrition, (iv) intravenous feeding.
Diet in surgical conditions, burns and cancer.
4. Obesity and Leanness – Causes, complications and health effects, dietary treatment and other recommendations.

UNIT II

1. Diet in fevers and infections – types, metabolism in fevers, general dietary considerations, diet in influenza, typhoid fever, recurrent malaria and tuberculosis.
2. Diet in gastritis, peptic ulcer (gastric and duodenal) etioloss, symptoms and clinical findings, treatment, dietary modifications, adequate nutrition, amount

of food, intervals of feeding. A four stage diet (liquid soft convalescent – liberalized diet).

3. Diet in disturbances of the small intestine and colon – diarrhea (child & adult), classification, modification of diet, fiber, residue, fluids, nutritional adequacy.
4. Constipation, flatulence – dietary consideration.
5. Ulcerative colitis (adult) symptoms, dietary treatment.
6. Spure, Celiac disease and disaccharide intolerance, dietary treatment.

UNIT III

1. Diet in disease of the liver and gall bladder and pancreas – etiology, symptoms and dietary treatment in jaundice, hepatitis, cirrhosis of liver and hepatic coma.

Role of alcohol in liver disease.

Dietary treatment in cholecystitis and cholelithiasis and pancreatitis.

2. Diet in Diabetes Mellitus –

Incidence and predisposing factors.

Symptoms, types and tests for detection.

Metabolism in diabetes.

Dietary treatment and mental management.

Hypoglycemic agents, insulin & its types.

Complications of diabetes.

3. Gout – Nature and occurrence of uric acid, causes, symptoms and diet.

UNIT IV

1. Diet in Allergy and skin distribution – definition, classification, manifestations, common food allergies, tests and dietetic treatment.

2. Nutrition & diet counseling – nutritional assessment of patients, dietary prescription and counseling follow up, patient education and diet.
3. To be familiar with the dietary / behavior modifications based on physiological changes occurring in disease conditions. To acquire knowledge regarding affects of various diseases on nutritional status and nutrient requirement.

UNIT V

1. Disease of the Gastro-intestinal tract – effect on digestion, absorption and nutritional status, Diarrhea, Constipation, Gastritis and Ulcers, Colitis, Malabsorption syndromes.
2. Nutrition during Cardiovascular disorders – Sodium restricted diet & sources of sodium, Etiology, Symptoms.
3. Role of specific nutrients – Clinical findings related to nutritional care, Hypertension, Atherosclerosis.

B.Sc.(CLINICAL NUTRITION & DIETETICS)
THIRD YEAR DETAILED SYALLBUS

PAPER – 303

PRACTICAL

Based on the Paper – 301 & Paper - 302