

Kazi Nazrul University, Asansol

Syllabus for B.Sc. Honours in Nutrition

Semester-I

Nutrition

Core Course-I

Community Nutrition Epidemiology

A. Community Nutrition

Total 55 hrs.

1. Concept of Community and its type, factors affecting health of Community- environmental, social, cultural and economic. 3
2. Community health data-span and vital statistics of infants, child and maternal mortality statistical data analysis (mean, median, mode, students 'L' test) 6
3. Nutritional assessment –different anthropometric measurement and interpretation, clinical signs, BMI, body fat percentage, use of growth charts 6
4. Diet survey-importance methods, concept of consumption units, distribution of food-individual in family. 6
5. Concept of nutritional surveillance system and international, national and regional agencies/organizations, Nutritional intervention programmes-ICDS, Mid day meal programme, National prophylaxis . 8
6. Nutritional nutrition-introduction, causes and prevention 4

B. Epidemiology

- 1 Epidemiology of nutrition related disease, study of epidemiological approaches, determinant of diseases, preventive and social means incidence & prevalence rate of disease. 5
- 2 Community of food protection, epidemiology of food borne disease-mode of transmission, control and prevention. 6
- 3 Community water and waste management: water borne infections agent, safe drinking water, potable water, waste and waste disposal. –sewage treatment, solid & liquid waste disposal. 6
- 4 Immunization-its importance, schedule for children, adult, Foreign traveler, pregnant mother vaccination. 5

Core Course-II

Nutritional Biophysics and Biochemistry

Total 55 hrs

A Nutritional Biophysics

1. Introduction to Biophysics, interrelationship between Biophysics and nutrition
2. Cell membrane transport-passive diffusion, facilitated diffusion and active transport, Ion channels, symport, antiport transport system, osmosis: plasmolysis and deplasmolysis, colloid and surface tension 4

3. Principles of colorimetry, photometry, and Electrophoresis.
4. Acid, Base, Buffer, pH, and Acid-Base balance.
5. Principles of thermodynamics and its importance in nutrition. 3
6. Enzymes: Definition, types and classification: Coenzyme: definition and types, specificity of enzymes, isozymes, enzyme kinetics including factors affecting velocity of enzyme catalyze reactions, enzyme inhibition.

B. Nutritional Biochemistry

- 1 Introduction to Biochemistry, Interrelationship between Biochemistry and Nutrition. 2
1. Intermediary metabolism. 1
 - a. Carbohydrates: Glycolysis, TCA cycle and energy generation, Gluconeogenesis, Glycogenesis, Blood sugar regulation, Glycemic index.
 - b. Proteins: Classification, Structure in brief, Properties, Protein quality (BV, PER, NPU), Deamination, Transamination, Urea cycle, Elementary idea about protein synthesis.
 - c. Lipids: Classification, structure and properties, saturated and unsaturated fatty acids, their importances, β -oxidation of fatty acids, ω -oxidation, ketone bodies-generation, utilization, fatty liver.
2. Dietary fibres-classification, properties, nutritional significance.
3. Antioxidants, Nutraceuticals-preliminary idea, Natural source.
4. Lipoproteins-Types, comparison, role and significance in disease.
5. Nucleic acids: Structure, Replication, Transcription, Genetic code.
6. Water metabolism & balance (in brief).
7. Vitamins: water and fat soluble vitamins, pseudovitamins, provitamins-definition and example.
8. Minerals: Biochemical role of Ca, Na, K, Fe, Se, I, Zn.

Nutritional Biophysics and Biochemistry

Lab-Practical-Qualitative

Total 45hrs

1. General qualitative tests for carbohydrates, reducing and nonreducing sugars, monosaccharides, aldoses and ketoses, disaccharides and polysaccharides. 6
2. Qualitative tests for simple proteins and derived proteins. 3
3. Qualitative tests for bile salts. 3
4. Qualitative tests for fat, glycerol, cholesterol. 3
5. Qualitative tests for detection of Ca, K, Fe, in food **striffs**. 6
6. Sequential tests for detection of an unknown nutrients. (Only from the above mentioned nutrients)
7. Qualitative test for detection of saccharine, metanil yellow, kessin , banaspati in different food striffs starch in milk. 3
8. pH determination of solution using pH paper/pH meter, solution preparation of different normality molarity
9. Laboratory note book
10. Viva-voce

GE-1	
Community Nutrition and programmes	Total 45hrs

1. Concept of Community, definition and types, factors affecting health and community.
2. Community health data-span and vital statistics of infants, child and maternal mortality.
3. Communicable disease: food borne diseases, water borne diseases, prevention, importance of food hygiene and water hygiene and prevention.
4. Non communicable diseases: diabetes, obesity, cardiovascular diseases-causes and dietary prevention.
5. Concept of nutritional surveillance system and international, national and regional agencies organizations, Nutritional intervention programmes-ICDS, Mid day meal programme, National prophylaxis.
6. Immunization programme-Principle, child and mothers immunization.
7. Growth chart analysis, Anthropometric assessment of nutritional status of child.

GE-1(Lab)	45 hrs
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1. Growth chart preparation of preschool and School going children.
2. Nutritional status assessment using height, weight, BMI.
3. Evaluation of mid day meal programme-Report preparation.
4. Problem solving on the basis data on vital statistics.
5. Immunization status report preparation on your society.

Kazi Nazrul University, Asansol

Syllabus for B.Sc. Honours in Nutrition

Semester-II

Nutrition

Core Course III

Food Science & Food Commodities

1. Basic concept of Food & Nutrition, Classification of Food & Nutrition, food group.
2. Carbohydrate:- Definition, properties, classification with structure, sources, daily requirement & function, effect of too high & too low carbohydrate on health, blood glucose, glycaemic index.
3. Lipids:-properties, sources, daily requirement & function, PUFA, MUFA, SFA, omega fatty acid-composition, properties, type & nutritional signification.
4. Proteins:- Definition, sources, daily requirement & functions, effect of too high & too low proteins on health, Assessment, Factors effecting protein bio-availability including anti-nutritional factors.. Amino acid classification, type, structure & function.
5. Special food type & components:-GM food, super food, Organic food, fast food, junk food, convenience food, prebiotics, probiotics, antioxidants .
6. Food standards:- ISI, Agmark, FPO, MPO, PFA, FASSI.
7. Sensory characteristics of food:- types, importance.
8. Food additives, type, impact on health.

Food commodities:

Cereals and Millets: cereals products, breakfast cereals, processing and storage.

Pulses and Legumes:- varieties, storage, processing, and use in different preparations, nutritional aspect.

Milk and milk products:- composition, classification, selection quality, processing storage and use in different preparations, nutritional aspect.

Fish, Meat and poultry (meat, egg): types, selection, storage, uses, spoilage and its detection, nutritional aspect.

Vegetables and fruits: types, selection, storage, availability, nutritional aspect of raw and processed products and use in different preparations.

Fats and oils:- types and sources, processing(refining) uses in different preparation, storage, nutritional aspect.

Sugar and sugar products:-types of natural structures, manufacture, storage and uses as preserver.

Basic of bakery and confectionary items, Bread, biscuit, cake, and Pastry-manufacturing and nutritional aspect.

Semester-II
Nutritional Physiology

Core Course –IV

Credit-4

1. Structure & Function of Cells:- structure and function of plasma membrane, nucleus, mitochondria, Golgi bodies, endoplasmic reticulum, ribosome, lysosome.
2. Cardio vascular system- blood, composition of blood, function of blood, erythropoiesis, blood group, blood transformation & its hazards, coagulation of blood, heart-structure & function of heart, heart rate, cardiac cycle & cardiac output. Blood pressure & its controls, general course of blood circulation.
3. Gastro intestinal system:- structure & function of various organ of GI tract. Digestion and absorption of food. The role of enzymes & hormone on digestion and absorption.
4. Excretory system:- structure & function of kidney & bladder, formation of urine. Role of kidney in homeostasis, structure & function of skin & body temperature control.
5. Respiratory system:- structure of respiratory system, mechanism of breathing & its control. Oxygen and Carbon-dioxide transport in blood. Vital capacity & other volumes. Acclimatization.
6. Nervous system:- Elementary anatomy of nervous system, function of different parts of the brain in brief. Sympathetic & parasympathetic nervous system. Special senses.
7. Musculoskeletal system:- types of muscle, function & structure, skeletal system, formation of bone & teeth(general idea).
8. Endocrine system:-structure & function, deficiency & excess symptoms, hypothalamus, pituitary, thyroid, parathyroid, pancreas, adrenal gland, testis, placenta, gastro-intestinal tract.
9. Immunology:- Cellular immunity, humoral immunity, active and passive immunity, complement system.
10. Reproductive events:- Hormonal control of puberty, menstrual cycle and menopause.

Recommended books for nutrition physiology

1. Medical Physiology: Guyton
2. Review of Physiology: Ganong
3. Text book of Human Physiology: C.C Chatterjee, Vol I and Vol II

Food Science, Nutrition physiology, Practical

Course – IV (Practical)

- a) Quantification of Starch, Lactose, Sucrose in different food stuff.
- b) Quantification of total protein in food.
- c) Quantification of calcium, Vitamin-C, Vitamin-A, in food.
- d) Blood pressure measurement.
- e) Qualitative assessment of glucose, blood, ketone bodies in urine.

Core-III Food science & food commodities**Core-IV Nutritional Physiology.**

Salt:- types and uses.

Beverages: tea, coffee, chocolate and cocoa-its nutritional significance, other beverages-aerated beverages-impaction health.

Semester-II**GE II****Credit-4****Physiology and Nutritional aspect of food**

1. Structure and functions of cells: Brief idea.
2. Gastric intestinal system: structure of various organs of GI tract, digestion and absorption of food.
3. Endocrine system: function, deficiency, and excess symptoms of different endocrine organ (Thyroid, parathyroid, pancreas, adrenal). Concept of GI hormones.
4. Nervous system:- Elementary anatomy of nervous system, brief function of different components of brain sympathetic and parasympathetic nervous system and special senses.
5. Cardiovascular system: Blood-composition and function, group, transtrisium, and its hazards, coagulation. Heart: rate cardiac cycle and blood pressure.
6. Carbohydrate, protein & Fat: Definition & properties, classification, daily requirement and their on health.
7. Mineral, vitamins & water:- sources, physiological function, deficiency symptoms, water metabolism.
8. Crewels & pulses:- type & nutritional importance.
9. Fish, meat, egg, & milk:- nutritional importance.
10. Vegetables, fruits-salts-Physiological importance.
11. Be recycle: type, impact on health.
12. Food standards & food additives:- general concept.

Recommended Books for GE II

1. Chatterjee Chandi Charan: Text Book of Human Physiology Vol-I and Vol-II
2. Medical Physiology; A.C Dev
3. Food Science: Sri Lakshmi

GE-II (Lab)**Credit-2****Physiology and Nutritional aspect of food.**

1. Determination of blood group and blood pressure.
2. Qualitative test of Glucose, Starch, Cholesterol, Uric acid.
3. Qualitative of common food additives- meanly yellos, Banaspati, Argemoneoil.

Recommended Books: Food Science & Food Commodities.

1. Dowell, P. and Bailey A: The Book of Ingredients, Borling Kinderly ltd. London
2. Hugoes, O and Beninion. M: Introductory Foods, Mac Millan and Com. New York
3. Lavies S. Food commodities Ltd. London
4. Prevention of Food Adulteration Act: Govt. of India.
5. Essential of Food & Nutrition by Swaminathon Vol-I & Vol-II
6. Food Chemistry by L. H. Muyer.

**SEM-III
NUTRITION (HONS)
SKILL ENHANCEMENT COURSE-I
(CREDIT-2)**

CHILD DEVELOPMENT SKILLS (Theory)

UNIT I: Introduction to child development- Meaning and importance of child development, need for studying child development, factor influencing child development, aspect of development, characteristics of various stages of child development, expected development tasks of childhood.

UNIT II: Physical and motor development: Factors affecting physical development, hazards in physical development, gross motor and fine motor development, principals of motor development.

UNIT III: Intelligence and cognitive development-Concept of intelligence, factors influencing intelligence, language development and stages of language development, cognitive development, components and stages of cognitive development (Piaget's theory), factors influencing cognitive development.

UNIT IV: Social and emotional development- Concept of social development, stages in social development, Characteristics of children's emotion, important childhood emotions

SKILL ENHANCEMENT COURSE-I

HOME MANAGEMENT SKILLS :(Theory)

Credit-2

UNIT I: Introduction to Home Management- Concept of home management, process of home management, process of planning, controlling and evaluation in home management.

UNIT II: Motivating factors of management – Concept of values, attitudes, standards and goals in management, role of my family, cycle.

UNIT III: Family recourses and management- Types of recourses, characteristics of recourses, classification of recourses, management of time and energy, alignment of body parts, importance of space management.

UNIT IV: Work simplification- Concept of work simplification, modes of work simplification, techniques of work simplification (Mundal's model)

Semester III

Nutrition Programming and Emergency Nutrition Management

Core Course –V

Credit-6

Nutrition Programming:

- a) Definition of Nutrition Programme- Program planning, steps adopted for formulation of Nutrition Programmes, Objectives of Nutrition programme.
- b) Types of Nutrition Programme- Supplementary Nutrition Programmes, Applied Nutrition Programmes, Features of such Programmes and Applied value of such Programme.
- c) Monitoring and Evaluation of Nutrition Programme- Definition of Programme Monitoring , Types of Monitoring, Applied values, Definition of Programme Evaluation, Types of Evaluation, Objectives of Evaluation, Objective of Evaluation and Applied Values.

Emergency Nutrition Management:

- a) Emergency/Disaster- Types, Nutritional disturbances in Emergency/Disaster conditions.
- b) Disaster Management Cycle- Its different phases and their importance.
- c) Packed food/Dry Food distribution of the immediate phase and Advantages of Dry Food distribution.
- d) Common Kitchen concept for Nutritional Management and Nutritional Rehabilitation.
- e) Nutritional Management at Critical Care Unit- Concept of parenteral and Enteral Feeding for Nutritional Management. Monomeric and Polymeric types of Formulated Diet and General Features and Advantages.

Semester III

Human Nutrition

Core Course-VI

Credit-6

- Concept and Definition of Form Nutrition, Malnutrition and Health. Brief history of Nutritional Science and Scope of Nutrition.
- Body Composition and its changes in Different phases of Life.
- Minimum Nutritional requirement and recommended dietary allowances. Reference Man, Reference Woman.
- Energy in Human Nutrition: Energy and its Units, Energy balance, Energy Requirement of Body. Basal Metabolic Rate(BMR) Factors Affecting measurement of BMR, Specific Dynamic Action (SDA). Calorific Values of Food. Determination of Energy in Food.



Energy and Nutritional Requirement of adult Male and Female engaged in different types of work (Sedentary, Moderate, and Heavy).

Growth and Development

- a) Physical growth and development, different phase of life Embryonic, Infancy, School children and Adolescents, Growth spurt in Pubertal changes, Use of growth chart and standard Nutrition during infancy- Breast feeding and its Advantages & Disadvantages, Colostrum and its importance in Feeding.
- b) Formula feeding, Supplementary foods and Digestive disturbances of infants.
- c) Nutritional requirements of Toddlers, Pre-school children, School going children and Adolescents.

Semester III **Diet Theory-Fundamental** **Core Course-VII**

- Basic concepts of Therapy: Modification of normal diet to therapeutic diet, its principal and classification.
- Food Groups: Cereals, pulses, milk and meat product, fruits and vegetables, fats and sugars, Food composition table.
- Food Exchange list system: Diet Counselling and its advantages, Basic principles for preparation of diet. Balanced Diet, Formulation of Diet chart, Principle of Energy distribution in different meal/day. Diet in infancy, pre-school going children and Adolescents. Principles and steps in planning menu.
- Vegetarian Aid: Socio-cultural and regional food habits in different age groups.

Semester III **Diet Theory-Fundamental Lab** **Core Course-VII (Practical)**

1. Calculation of energy requirement- Basal stats, Different grade of work, 24 hours energy requirement calculation on the basis of types of work, body PAL(Physical Activity Level), Height, Weight, PA, etc.
2. Requirement of Carbohydrate, Protein, Fat on the basis of energy calculation.
3. Energy distribution in Breakfast, Lunch and Dinner, Menu-planning and Nutritional Analysis.
4. Balance Sheet preparation in different meal.

Semester III
General Elective III (Theory)

Nutrition Programming

Definition types, Steps adopted for formulation of Nutrition programmes, Objectives, Applied values of such programmes.

Emergency Nutrition Management

- Energy in Human Nutrition : Energy requirement of the body, BMR, Factors affecting measurement of BMR, Specific Dynamic Action (SDA) and Calorific value of Food. Energy and Nutritional requirement of adult male and female engaged in different kinds of work (sedentary, moderate and heavy).
- Basic concepts of Diet Therapy: Modification of normal diet to therapeutic diet, its principle and classification, Formulation of diet chart, Principle of energy distribution in different meal per day.

Semester III
General Elective III (Lab)

1. Computation of energy requirement of an individual per day on the basis of BMR and physical activity.
2. Preparation of low-cost and middle cost school tiffin (ingredients are to be supplied)

UNDER GRADUATE SYLLABUS IN NUTRITION

B.Sc. Honours in NUTRITION – 4TH SEMESTER

Food Microbiology – Core Course – VIII

Credit – 4

1. Introduction about food microbiology and importance of microorganisms in food science covering beneficial and harmful role.
2. Primary sources of microbial contamination of food.
3. Cultivation of microorganism, nutrition requirement covering different media. Bacterial growth-extrinsic and intrinsic factors. Control of bacterial growth-use of high and low temperature, dehydration, freezing, Irradiation, Sterilization and disinfection.
4. Food Spoilage – Contamination of microorganism in the spoilage of cereal and cereal products, vegetable and fruits, fish and other sea food, meat and meat products, egg and poultry, milk and milk products, canned foods.
5. Importance of sanitation and hygiene in foods, kitchen hygiene, employee health, food plant hygiene, food laws.
6. Bacterial Food Infections – Salmonellosis, Shigellosis and Listeriozes, Food poisoning

(Staphylococcal and Botulin) - Symptoms, Mode of transmission and methods of prevention. Concept of aflatoxin, Intoxication.

Food Microbiology – Practical Core Course – VIII (Practical)

Credit – 2

1. Preparation of liquid (Broth) and solid media, Slant and Stab.
2. Pure culture of microbiological techniques-spread plate, pour plate and streak plate.
3. Staining of microorganisms – simple stain, differential stain (gram main).
4. Biochemical tests for characterization – catalase, indole formation, Nitrate-reduction, sugar fermentation test.
5. Microbiological examination of milk – Methylene blue reduction test.

Core Course – IX

Credit – 4

Diet Therapy – Physiological States

1. General concept of Diet Therapy – Energy computation on work pattern, Macronutrients allocation on the basis of daily energy requirements. Micronutrients allocation – their importance in different phases of life cycle.
2. Classification of Diet – Energy rich, low, carbohydrate high, low, protein high, low, fat high, low, fibre high, low, Na- high, low, Routine diet, soft diet, Fluid diet, etc.
3. Planning and preparation of income dependant diet formulation for different phases of life cycle of human – Infant, pre-school children, school going children, college students, adult, geriatric person, pregnant and lactating mother, sports person.
4. Supplementary food – Types, importance at different phases of life cycle. Indication of supply of supplementary food with special reference to vulnerable group. General idea about F-75, F-100 supplementary diet.

Core Course – IX (Practical)

Credit – 2

Diet Therapy – Physiological States

1. Planning and preparation of meals for different age group – pre-school children, school going children, adolescence, pregnant, lactating mother, geriatric person.
2. Diet / Meal preparation for different workers-Light, moderate and heavy work load.
3. Diet formulation on economical levels – low cost, moderate cost and high cost diet.
4. General idea about veg and non-veg diet formulation on same energy level.

Core Course – X

Credit – 4

Food Preservation and Processing

1. General concept of food preservation – Importance of food preservation, limitation of food preservation.
2. Physical and Chemical methods of food preservation, activity in food preservation – role of water, Role of sugar, chemicals, sun dryings and dehydration, Refrigeration and freezing – mechanism involved.
3. Some preserved foods – Jam, Jellies, Pickles, Syrup, Squashes – their composition, manufacture, use and nutritional aspects.

4. General concept of food processing – Food fermentation, Curd, Idle, Dohsa etc., their nutritional importance.
5. Industrial processing of oil, milk, Vanaspati, Vinegar, Vit-B12 and citric acid – food fortification.
6. Food adulteration types, impact, health disorders – controlling measures.

Core Course – X (Practical)

Credit – 2

Food Preservation and Food Processing

1. Efficacy testing of the method of Food preservation by bacterial load assessment per field in different duration dependant sample.
2. Preparation of Jam and Jellies.
3. Visit to food industry and report preparation on food processing and packaging preservation, plant sanitation and hygiene.

GENERIC ELECTIVE (GE) - IV –

Semester – IV

Credit – 5

Food microbiology, preservation and processing

1. Basic idea on Food microbiology – food spoilage, food intoxication, beneficial and harmful role of Microbes in food science.
2. General concept of food preservation on – sugar, dehydration, low temperature mediated processes.
3. Food processing – nutritional aspect of processed food, food fortification, food adulteration.

GENERIC ELECTIVE (GE) - Tutorial - IV

Semester – IV

Credit – 2

1. Extensive idea and group discussion / Seminar / Presentation
 - a. Food microbiology
 - b. Food processing
 - c. Food preservation

SKELL ENHANCEMENT COURSE (SEC) - II

Semester – IV

Credit – 2

- A. Nutrient Analysis Quantitative (Vitamin / Minerals)
Nutrient analysis of different food items covering vitamins, macro and micro minerals using standard food analysis table,

Or

- B. Growth assessment of school going children
(Primary School Level)

Weight / age using growth chart, height / age, weight / height and score, BMI, Body surface area, of school going children.

SUGGESTED BOOKS

Core Course-VIII

1. Text book of microbiology; Michael .J Pelczar; Tata McGraw-Hill.
2. Text book of bacteriology; A.J. Salle. Tata McGraw-Hill
3. Text book of food microbiology; Adam Moss.
4. Text book of food toxicology; CRC press.
5. Practical microbiology; New Age International publishers.
6. Modern food microbiology; J.M Jay. Springer.
7. Food Microbiology; W.C Frazier, Tata McGraw-Hill.
8. Industrial Microbiology; Prescott SC .Dunn CG (2009).

Core Course-IX

1. Basic concepts of clinical nutrition; Y.K. Joshi. Jaypee Publishers.
2. Text book of Clinical nutrition; Krause.
3. Text book of nutrition & Child development; K.E. Elizabeth.
4. Text book of human nutrition; Mehtab S. Bamji.
5. Clinical Nutrition; Nutrition society.
6. ESPEN/ASPEN guidelines.
7. Rbinson C.H; Lawer M.R Mc Millan Pub.com.... Normal and Therapeutic Nutrition.

Core Course-X

1. FOODS: Shakuntala Manay; New Age International Publishers;
2. Food preservation; A text book for student; teacher, W.W Chenoweth
3. Food processing and food preservation; B. Shivsankar.
4. Meyer, Food Chemistry, New Age 2004.

GE-IV

1. Text book microbiology; Michael J Pelczar Tata McGraw-Hill.
2. Text book of bacteriology; A J Salle. Tata McGraw-Hill
3. Foods: Shakuntala Manay , Age International Publishers.

SEC-II

A. Nutrient Analysis Quantitative: (Vitamins/ Minerals)

1. Indian Food Composition Table; NIN
2. RDA book; ICMR
3. Laboratory Manual; NIN
4. USDA guidelines for food composition.

B. Growth assessment of school going children.

1. Text book of community nutrition; ICAR; R. Raghu Vanshi
2. WHO website.

Semester- V
Core Course XI
Diet Therapy – Non Communicable diseases

Credit-4

1. General rules for modification of normal diet to therapeutic diet- principle.
2. Therapeutic diet of Diabetic patient:-
Classification of Diabetes mellitus ethology, symptoms, diagnosis, glucose monitoring, Insulin therapy, oral hypoglycaemic drug, Dietary management of obese & non obese diegetic patient- Artificial natural sweeteners, sugar substitute.
3. Therapeutic diet of cardio vascular diseases Atherosclerosis hyperlipidaemia- ethology, risk factor, signs & symptoms, diagnosis & dietary management.
4. Renal disease- classification, ethology, signs & symptoms Dietary management of glomerulonephritis, Uraemia, Renal stone.
5. Obesity & Stress Management by diet therapy- Ethology of obesity, classification, Dietary management. Stress- causative factors, Health disorders, Dietary management.

Core Course-XI (Practical)
Diet Therapy Non- communicable Diseases lab

Credit-2

1. Diet chart preparation of diabetic patient,(Core specific).
2. Formulation of therapeutic diet on different cardio vascular diseases.
3. Planning of therapeutic diet on renal diseases.
4. Diet formulation for the management of obesity and stress.

Core Course –XII**Credit-4****Research Methodology**

1. General concept of research methodology, its importance for research designing. General idea about- Data, Information & Intelligence.
2. General idea about Basic, applied and action research with examples- objectives, interrelationships, limitation.
3. Hypothesis- Types, Importance of hypothesis. 4. Literature Review- Sources, importance's, and impact on project formulation.
5. Fundamentals steps adopted for project formulation.
6. General concept of Experimental designing.

Core Course –XII**Credit-2****Research Methodology****(Practical)****Research Methodology Review**

1. Review writing as per standard protocol in the field of recent domains of nutritional research and submission under the guidance of your teachers as per allotment by the concern department.

DSE-I (Theory)**Credit-4**

A. Family diet survey: - General idea about diet survey different methods fouldard for diet survey. Cross & longitudinal survey. Merits & Demerits of different diet survey cycle of diet survey- types duration. Importance's of diet survey.

Or

B. Internship- In any Hospital for therapeutic diet analysis at least for 7 days. Report Preparation under the guidance of your Mentor as allotted by the concerned Department. (Theory)

DSE-I (Lab)**Credit-2**

A. Family diet survey (Practical):- Prepare diet survey report on 3 family alleoft and submit it after proper forwarding of your concerned teacher.

Or Credit-2

B. Internship (Practical):- Audio-visual presentation of your data on internship.

DSE-II (Theory)**Credit-4**

A. Child Immunization:- General concept of Immunization Vaccination, Taper of vaccination. Triple vaccine, concept of booster dose. Universal Immunization schedule. Primary & secondary reaction vaccination. Memory cell formation.

Or

B. Child Hygiene: - General concept of child hygiene. Factors affection child hygiene. Child hygiene by women to women strategy. Food hygiene, Cloth hygiene, Habited on child health.

DSE-II (Lab)**Credit-2**

A. Assignment programme conductor and report writing an child immolation by survey technique through questionnaire method and submission of report.

Or (Lab)

B. Assignment programme conductor and report writing an child hygiene by survey technique through questionnaire method and submission of report.

Semester-VI
Core Course-XIII
Diet Therapy-Communicable Disease **Credit-4**

1. Gastro-Intestinal Communicable Disease-Diarrhoea, Cholera-Ethology, Pathophysiology, symptoms, Dietary management of diarrhoea and cholera patients.
2. Communicable Hepatic Disease: Jaundice, Hepatitic Factors, Pathophysiology, sympomps, Diatery management of Jaundice & Hepatitis
3. Malaria: Types, Factors, symptoms, Diatary management.
4. Immuno deficiency viral related Disease: HIV, Etiology, symptoms, Diagnosis
Dietary management of HIV sero positive individuelles.

Core Course-XIII

Practical-Diet Therapy- Communicable Disease **Credit-2**

1. Diet Formulation of the patient suffering from diarrhoea, Cholera
2. Formulation of diet of Jaundice and Hepatitis patient.
3. Principle of therapeutic diet and its formulation of Maleria affected patients.
4. Diet formulation of HIV positive individual.

Core Course-XIV

Health Statistics **Credit-4**

1. Fundamentals about data presentation-Grouped ungrouped data, Bardigram, Pie diagram, Histogram, Frequency distribution, Frequency polygon, Ogive, Normal distribution, Skewnen kurtozi.
2. Central Dentency: Concept of Mean, Median & Mode. Computation of Mean from grouped and ungrouped data.
3. Standard deviation & Standard Errors.
4. Test of significance: One tail and two tail 't' tests-single group paired observation, Independent groups, Comparetive analysis with population mean or reference value.
Chi square test

Health Statistics Lab **Credit-2**

1. Presentation of data in grouped manner.
2. Graphical presentation of data in Histogram, Bar diagram, Pie diagram and Ogive.
3. Computation of central tendency of the supplied data.
4. Analysis of test of significans by conducting students 't' test.
5. Test of significance analysis of nonparametric data by Chi square test.

DSE-III
Dietary Counselling (Theory) **Credit-4**

1. Defination of Counsellor, Features of dietary Counsellor.
2. Methodology of dietary Counselling.
3. Types of Dietitian-Academic, Professional, Administrative.
4. Dietian as part of Medical term-Role of health protection, Disease prevention and Disease recovery.

5. Pre-diagnostic and post diagnostic phases of dietary counselling.
6. Spiral model of dietary counselling.
7. Barriers of dietary Counselling and problem solving strategies.
8. Field of Employment of dietary counsellor.

DSE-III
Dietary Counselling(Lab)

Credit-2

1. Questionnaires preparation of dietary counselling- Model questions-on the basis of condition provided(If possible Hospital exposure may be included)
2. Submission of Counselling report-any two report in the field of dietary counselling.

DSE-IV
Patient Education

Credit-4

1. Role of Information, Education & Communication in Patient Education.
2. Knowledge, Attitude & Practice development through patient Education
3. Problems of Patient Education and its solving.
4. Outreach system of patient education and its impact on community health upgradation.
5. Types of adaptor/ Patient and their features.

DSE-IV
Patient Education (Lab/Tutorial)

Credit-2

1. Assesment of knowledge upgradation of patient before and after information delivery and its report preparation-Any two report in two different field of patient community.